

# Banana Split: To Eat, or Not to Eat

by

Lori M. Carris

Department of Plant Pathology  
Washington State University

and

Nancy L. Jacobson  
Biology Department  
Ithaca College



## Part I – The Past

*Narrator:* This is a conversation between Ethan Brown, the chairman of the fictitious major fruit company Integrated Fruit, and Bill Snowe, a banana breeder in one of the company's research stations in Central America. The conversation takes place in the 1970s. Ethan Brown was dedicated to making positive changes in Integrated Fruit, but the company was struggling financially, faced with intense competition and a backlash in the form of increased regulation from a Latin American government. Bill Snowe had been breeding bananas for the company for many years, was widely regarded as an expert on banana cultivation, and was also well known for his empathy for the banana workers.

*Bill Snowe:* You know, Ethan, the longer I work on developing a better banana for the U.S. market, the more I wonder about the whole enterprise. How did we end up in the business of selling such a fragile fruit that lasts only a couple of weeks, has to be picked when it's green and transported thousands of miles in refrigerated ships to prevent ripening, and then ripened artificially?

*Ethan Brown:* And consumers are accustomed to inexpensive bananas—they cost less per pound than apples or oranges that are grown in the U.S. The narrow profit margin is killing the company.

*Bill Snowe:* What if we could charge more for bananas? The company would make more money, but would the banana workers get paid more?

*Ethan Brown:* I know how you feel about the treatment of banana workers. Integrated Fruit has been criticized for exploitation ever since the company's founder, Major Streif, discovered that he could make a lot of money by growing bananas along the railroad lines he was building in Costa Rica in the 1870s. He built the rail in exchange for lots of cheap land, courtesy of the Costa Rican government. What I've never understood is why the company acquired so much land, when most of it wasn't being used to grow bananas.

*Bill Snowe:* It took a lot of land to grow bananas in the tropics back then. Most of the nutrients in tropical soils are bound up in the vegetation. Many of those nutrients are lost when the rainforest is cleared to grow crops like bananas. And then when you grow the same crop on the same land year after year, you quickly use up what nutrients are left in the soil. When the nutrients in the soil were depleted, the fields were abandoned. At first the company had a policy of giving the abandoned land back to the local government, but then Panama disease showed up. It spread quickly through banana plantations, which then had to be abandoned. To satisfy the demand for bananas, the rate at which company managers cleared rainforest to establish new plantations intensified.

*Ethan Brown:* That explains why the company owned so much land. I remember hearing that in the 1950s, Integrated Fruit owned 70% of the farmland in Honduras. The country's president, Pedro Ancho, tried to reclaim the abandoned banana fields for the people, but he wasn't willing to pay much to Integrated Fruit—just what the land was assessed for taxes. Integrated Fruit officials prevented what they viewed as a land grab, and what Ancho saw as land reform, by convincing the U. S. president that Ancho and his top officials were Communists. In 1954, the U.S. military and CIA helped overthrow the Ancho government.

*Bill Snowe:* Good old U.S. hegemony. What I hate is that the people in these countries are put between a rock and a hard place. Integrated Fruit owns much of the land, so this is where the jobs are. But when the workers try to organize to get better wages and improve their substandard housing and almost non-existent health care, the company packs up and moves to another country ... or worse. I think it stinks. In order to avoid striking workers and Panama disease, Integrated Fruit has destroyed enormous amounts of rainforest.

*Ethan Brown:* Hmm. The striking workers I get. But this Panama disease—why is it so bad?

*Bill Snowe:* Turns out that "Gros Michel," the only banana cultivar that was being grown for export, was highly susceptible to this soil fungus that infects banana roots. When plants are infected, the fungus clogs up the vascular system; water can't get from the roots to the rest of the plant, and so the leaves wilt and the bananas turn black. That's Panama disease. And there's nothing we can do about it. There's no way to keep the fungus from infecting the banana roots, and no practical way to eliminate the fungus from the soil.

*Ethan Brown:* So why isn't it a problem now?

*Bill Snowe:* This is where the story gets interesting. Royale Fruit, one of our major competitors, was already exporting a new variety in 1947, called "Cavendish." Cavendish was resistant to Panama disease. Royale Fruit had less land than Integrated Fruit and they didn't have the option of outrunning the disease. Integrated Fruit didn't switch over to Cavendish until 1961. But Cavendish is susceptible to other things, such as bacteria, another fungal disease called Sigatoka, nematodes, caterpillars, aphids, and root weevils. I'm a pretty good plant breeder, but breeding a banana that is resistant to all these pests is a tall order!

*Ethan Brown:* But a banana that's resistant could save the company. What's your biggest challenge?

*Bill Snowe:* No seeds. In most banana varieties, there are only about 25 seeds in 250,000 bananas. Cavendish is totally seedless so we can't even use it as part of a cross. But I do have some varieties that can resist many of the most serious diseases. It's just that consumers won't buy them because they don't look and taste exactly like a Cavendish.

*Ethan Brown:* I guess we were lucky that consumers accepted Cavendish, come to think of it. It's not as sweet as the old Gros Michel. You said that Cavendish is susceptible to other types of diseases and pests. How can it be grown then?

*Bill Snowe:* These other diseases and pests can be controlled with pesticides. That has actually been the main research done here. Some call this research station "La Quimica." The most challenging disease is Sigatoka. It was a problem with Gros Michel as well. But the Sigatoka fungus infects plants through the leaves, so it can be controlled by spraying the leaves with a pesticide. The first one that was used for Sigatoka was a concoction called "Bordeaux mixture." The mixture contained copper sulfate, which, unfortunately, got into the workers who sprayed it. It turned them blue and made them sick. Many died. Bordeaux mixture was eventually abandoned because too much copper in the soil kills the banana plants, not because of what it did to the workers.

*Ethan Brown:* Ouch. Aren't there other pesticides available to control Sigatoka?

*Bill Snowe:* Sure, but what worries me is that we're no longer dealing with the original Sigatoka disease. Now there's a different fungus that causes black Sigatoka, and this one is much more destructive. We have to spray up to 40 times a year to control just this one disease.

*Ethan Brown:* That explains why pesticides are 25% of the production costs. (Brown shakes his head.) I really thought I could turn this company around. But in addition to all these production problems, I'm now faced with new taxes on each box of bananas coming out of the Honduras. The company is already operating in the red. I know that if I pay a 1.25 million dollar bribe to the Honduran government, I can get the tax reduced and the company will survive. But you know Bill, I consider myself an ethical businessman. Moses said, "Bribery blinds the eyes of the wise, and perverts the words of the just." Bill, what do you think I should do?

### Questions

1. Bill Snowe was trying to develop a "better banana"; based on information presented, what qualities would this banana need to have in order for it to be better than the Cavendish? How are Snowe's challenges in developing a better banana different from that of an apple breeder?
2. What are the challenges Ethan Brown faces in keeping Integrated Fruit from going bankrupt?
3. What should Ethan Brown do? What are the potential consequences of his decision?

Fig. 1. Plants with Panama disease.



Fig. 2. Panama disease in the xylem of a banana plant.



Fig. 3. Cross-section of unripe wild-type banana with numerous large, hard seeds.



## Part II – The Present

*Narrator:* Simon, a business major, finds an empty table in the university's Commons. He pulls out his lunch as he skims over a draft of a paper that his classmate Chelsea has written for her political science class. Chelsea drops into a seat next to him just as he finishes the last page.

*Chelsea* "So what do you think about my paper?"  
*(spotting her paper in his hand):*

*Simon:* "It's really good. I like the way you've written this as a conversation between Ethan Brown and Bill Snowe, but I want to know the ending. What did Ethan Brown decide to do?"

*Chelsea:* "He paid the bribe. The banana tax was reduced from one dollar to 25 cents per box and then Brown killed himself by jumping out of his office window. The bribe caused a scandal in Honduras. The president who accepted the bribe was removed from office by the Honduran military."

*Simon:* "Wow. Who'd have guessed there was all this international intrigue involving fruit!"

*Narrator:* Simon and Chelsea are silent for a moment.

*Simon:* "So, what got you interested in bananas?"

*Narrator:* Chelsea shoves a blue paperback book with a picture of a banana on the cover across the table.

*Chelsea:* "We were assigned this book for my political science class: *Banana, the Fate of the Fruit that Changed the World* by a science writer named Dan Koeppel. He says bananas are the fourth most valuable food in the world, worth 2.5 billion dollars annually, and only wheat, rice, and milk are worth more. Most Americans had never even seen a banana until the late 1800s when Integrated Fruit developed huge plantations in Latin America, built a fleet of refrigerated ships called the Great White Fleet, and then convinced Americans to eat bananas."

*Simon (pulling a banana out of his backpack):* "That's what I'm going to do right now."

*Chelsea:* "You're really going to eat that banana after reading my paper?"

*Simon:* "I like bananas. Plus all that stuff you wrote about is history. Banana companies couldn't get away with that stuff now."

*Chelsea:* "How much did you pay for that banana? Have you thought about why it was so cheap? The fruit companies may no longer own most of the plantations, but they still control the price of bananas. Pay your workers too much and you can't sell your bananas. Some of the banana workers from several Central American countries even filed lawsuits against Royale. They say they can no longer have children because of what pesticides did to them. This is happening now. Last I heard, juries had decided against Royale and awarded 5.8 million dollars to workers.<sup>1</sup> But then Dole claimed fraud and, based on 27 secret witnesses that Dole provided, a judge agreed. The judge dismissed the rest of the cases and reversed part of the first ruling.<sup>2</sup> It's hard to know what to think given the secrecy." (Chelsea throws her hands up in frustration.)

*Narrator:* Chelsea's monologue is interrupted when their friend Brendan sits down.

*Brendan:* “Did I hear you talking about bananas? That’s what we were covering in my environmental studies class last week. Our professor said that banana production in Latin America has caused large-scale destruction of the rainforest. He also said that there was something called Panama disease that nearly wiped out the banana industry in the first half of the 20<sup>th</sup> century. The only reason the industry survived is because of a banana called the Cavendish that is resistant to Panama disease, and now a new strain of this fungus has turned up in Malaysia that can attack the Cavendish. If it gets into Latin America, there go our bananas.”

*Simon (with a puzzled look on his face):* “I should know this from Chelsea’s paper, but I’m confused. If this disease can’t be controlled, why are banana workers suing Royale because of what pesticides did to them?”

*Brendan:* “Panama disease isn’t the only thing that attacks bananas. Insects are also a big problem—there are plastic bags impregnated with pesticides placed over banana bunches on the tree to keep them from getting damaged by insects. Our professor said that there were lawsuits against Royale because of something called DBCP; it kills nematodes, which are microscopic roundworms that attack banana roots. DBCP is really bad stuff—the company that made it knew it was dangerous because some of their own workers at a plant in California had become sterile—but when the company tried to pull it off the market, Royale threatened them with a lawsuit. But the company stopped making DBCP in 1977, so I doubt this is a problem now. In fact, I’ve done some research and it looks like the lawsuits pushed Royale into doing a lot of research on biological ways to control banana diseases.”

*Chelsea:* “Based on what Koeppel says in his book, there are still plenty of environmental concerns with banana production. A disease called black Sigatoka is one of the biggest problems in bananas. It kills the banana leaves, but it can also cause bananas to ripen during shipment, so that when the fruit arrives in the grocery store, it’s already rotten. Most of the pesticides sprayed on bananas are for just this one disease.”

*Brendan:* “And the more pesticides are sprayed, the more resistant the fungus gets to the pesticide, and then they have to spray more pesticide—up to 40 times a year. DBCP was only used once or twice a year.”

*Chelsea:* “The pesticides for black Sigatoka are sprayed from an airplane, and some of it drifts into the workers’ houses, gets onto their food and everything. And some workers are even in the fields while they are spraying pesticides.”

*Brendan:* “Another problem is that the pesticides and the insecticide-impregnated plastic bags end up in rivers where they kill fish. If the bags make it into the ocean, they can strangle sea turtles.”<sup>3</sup>

*Simon:* “OK, enough—I’ll give up bananas!”

*Brendan:* “You don’t have to do that. There are organic bananas—in fact, that’s what you’re eating. Look at the sticker—it says that the banana is “USDA Organic.” That means the farm is certified by the U.S. Department of Agriculture as organic—the farmer can’t use synthetic pesticides or fertilizer, or genetically modified organisms.”

*Chelsea:* “But just because bananas are produced organically doesn’t mean they don’t have a negative impact on the environment, or that the workers are treated fairly. Koeppel wrote in his book that organic bananas can’t be grown on a large scale because of black Sigatoka. They have to be grown away from other banana fields and at higher elevations or in drier areas where the fungus won’t grow as well. So to increase the number of organic bananas grown, new fields usually need to be cleared from the rainforest.”

*Brendan (sounding disappointed):* “Oh. (Brendan pauses) Hey, there’s Maria. Her uncle owns an independent banana plantation in Costa Rica—she might have something to say about all this. Hey, Maria!”

*Narrator:* Brendan waves his hand at his friend. Maria spots the group and comes over to their table.

*Maria:* “What’s up?”

*Brendan:* “We were just talking about Integrated Fruit, bananas, pesticides, and workers’ rights.”

*Maria:* “My uncle sells bananas to Integrated Fruit.”

*Chelsea and Simon (in unison in a tone of disbelief):* “Really?”

*Maria (a little defensively):* “Yeah. Of the three major multinational companies, it’s probably the best. All of the company farms and a third of the independent farms they buy from are certified by the Rainforest Alliance—it’s called the Better Banana Program.<sup>3</sup> My uncle’s farm is certified. He started with abandoned pastureland. For certification, he planted native trees in places where bananas wouldn’t grow, decreased the amount of pesticides he uses, and no longer uses the really toxic ones. And Integrated Fruit has been working with the Central American unions as well. His bananas used to go to Europe until the European Union placed import restrictions on Latin American bananas. That was so they could protect their trade with Caribbean nations—many of those countries were former European colonies.<sup>4</sup> My uncle was really glad when the Clinton administration formally objected to the World Trade Organization about it.<sup>5</sup>”

*Chelsea:* “Yeah, and surprise, surprise, Integrated Fruit then donated \$500,000 to the Democratic Party.<sup>5</sup> All it did was lead to a trade war between the U.S. and the E.U. I still think the best way to go is to buy Fair Trade bananas. Fair Trade mostly buys from cooperatives of small growers and pays them more for their bananas. But also the workers have safe working conditions, are paid a living wage, and there’s no child labor used.”

*Brendan:* “How much more do the growers get?”

*Chelsea (Chelsea flips through the book):* “Here it is. Koepel says ‘In Ecuador, such bananas bring about eight dollars per box to the cooperatives that produce them, compared to a dollar or so for standard bananas.’<sup>6</sup>”

*Brendan:* “But Fair Trade bananas aren’t necessarily grown without synthetic pesticides are they?”

*Chelsea:* “True, they aren’t the same as organic, but part of the Fair Trade principle is that the bananas are grown in a sustainable manner, and there are certain pesticides that can’t be used. And farmers that get certified as organic producers are paid a higher premium for their organic bananas.”<sup>7</sup>

*Maria (thoughtfully):* “Actually, some of the indigenous people in the Talamanca area of Costa Rica grow bananas interspersed with native trees, real trees—banana plants are actually more like giant grasses than trees. It’s a biologically diverse area. When researchers studied these agroforests, they found fewer bird and bat species in them than in the rainforest, but a lot more species than in nearby conventional plantain monocultures.<sup>8</sup> And the agroforests contained some of the species considered at risk of extinction, while the monocultures didn’t. This fits into the new field of ecoagriculture<sup>9</sup> that I’ve been studying.”

*Brendan:* "I heard that a university in England is getting carbon offsets by paying farmers in Peru to plant native trees together with bananas in already disturbed areas."<sup>10</sup>

*Maria:* "And growing trees and crops, or just different crops, together helps in nutrient cycling and makes it harder for plant diseases and pests to spread."<sup>11</sup> My uncle would like to try agroforestry, but he doubts Integrated Fruit would go for it."

*Brendan:* "But should we be importing bananas at all? What about their carbon footprint?"

*Simon:* "This is getting complicated. But you've given me a great idea for a project in my marketing class. I'll call it "Ethical Consumerism: Are All Bananas Created Equal?" So what else do I need to know for the project?"

### Questions

1. What else does Simon need to know for his project?
2. What are examples of ethical consumerism?

### References for Part I

Koeppel, Dan. 2008. *Banana: The Fate of the Fruit That Changed the World*. Plume Books (Penguin Group): New York, 281 pp.

Soluri, John. 2005. *Banana Cultures: Agriculture, Consumption, & Environmental Change in Honduras & the United States*. University of Texas Press: Austin, 321 pp. (reference to La Quimica)

### Footnoted Citations for Part II

<sup>1</sup> Banana Workers Win \$2.5M in Dole Lawsuit. November 16, 2007. CBSNews.com. Retrieved July 30, 2010, from [http://www.cbsnews.com/stories/2007/11/16/business/main3512301.shtml?source=RSSattr=Business\\_351230](http://www.cbsnews.com/stories/2007/11/16/business/main3512301.shtml?source=RSSattr=Business_351230)

<sup>2</sup> Kim, V. June 08, 2010. Judge cites safety fears in Dole pesticide case. *LA Times*. Retrieved July 29, 2010, from <http://articles.latimes.com/2010/jun/08/local/la-me-dole-20100608>; and Kim, V. July 15, 2010. Judge throws out L.A. jury verdict awarding millions to Dole workers retrieved July 29, 2010, from <http://latimesblogs.latimes.com/lanow/2010/07/judge-throws-out-la-jury-verdict-awarding-millions-to-dole-workers.html>.

<sup>3</sup> Taylor, J. Gary, and Patricia J. Scharlin. 2004. *Smart Alliance: How a Global Corporation and Environmental Activists Transformed a Tarnished Brand*. Yale University Press: New Haven. 278 pp.

<sup>4</sup> Castle, S. December 16, 2009. Pact Ends Long Trade Fight Over Bananas. *The New York Times*. Retrieved 13 June 2010 from <http://www.nytimes.com/2009/12/16/business/global/>

<sup>5</sup> Koeppel (see above) p. 221

<sup>6</sup> Koeppel (see above) p. 234

<sup>7</sup> Fair Trade Certified™ TransFair USA (n.d.) Retrieved 13 June 2010 from <http://www.transfairusa.org/content/resources/faq.php#organic>

<sup>8</sup> Harvey, Celia A., and Jorge A. González Villalobos. 2007. Agroforestry systems conserve species-rich but modified assemblages of tropical birds and bats. *Biodiversity and Conservation* 16: 2257-2292. Retrieved 13 June 2010 from <http://orton.catie.ac.cr/repdoc/A3529I/A3529I.PDF>

<sup>9</sup> Scherr, Sara J., and Jeffrey A. McNeely. 2008. Biodiversity conservation and agricultural sustainability: towards a new paradigm of 'ecoagriculture' landscapes. *Philosophical Transactions of the Royal Society B* 363:477-494

<sup>10</sup> CREES Foundation Carbon Offsetting Through Community Agroforestry Initiative. Retrieved 13 June 2010 from [http://www.crees-foundation.org/docs/CREES Foundation Carbon Offsetting Initiative.pdf](http://www.crees-foundation.org/docs/CREES%20Foundation%20Carbon%20Offsetting%20Initiative.pdf)

<sup>11</sup> M.A. Altieri. 2002. Agroecology: the science of natural resource management for poor farmers in marginal environments. *Agriculture, Ecosystems and Environment* 93:1–24.



Image credits: Photo of bananas in title block ©Margarito Luevanos | Dreamstime.com. Figures 1 and 2 provided copyright-free by Scot C. Nelson, University of Hawaii at Manoa (UHM), College of Tropical Agriculture and Human Resources (CTAHR), Department of Plant and Environmental Protection Sciences (PEPS), <http://www.ctahr.hawaii.edu/nelsons/banana/>. Figure 3 by Warut Roonguthai, used in accordance with the Creative Commons Attribution-Share Alike 3.0 Unported license (<http://creativecommons.org/licenses/by-sa/3.0/deed.en>).

Case copyright held by the **National Center for Case Study Teaching in Science**, University at Buffalo, State University of New York. Originally published November 21, 2010. Please see our **usage guidelines**, which outline our policy concerning permissible reproduction of this work.