

Seeding Controversy: Did Israel Invent the Cherry Tomato?

Abstract: This research brief explores the controversial history of the cherry tomato and analyzes its role in the construction of Israel's national identity. Since 2003, mentions of Israel having “invented” the cherry tomato have appeared in both Israeli and international media. However, such claims have sparked outrage on various blogs and websites, and questions have been raised about the veracity of Israel's claims—as well as about the true origin of the cherry tomato. I explore the history of the cherry tomato, tracing mentions of it from the Renaissance period to modern times. In addition, I clarify the assertions of Israeli scientists credited with the development of the cherry tomato—that their research transformed the cherry tomato into a commodity in the 1980s. Finally, I discuss the cherry tomato claim in light of the Israeli government's *hasbara* (Hebrew for “explanation”) efforts,

which attempt to counter negative images of Israel in the international press. While much previous scholarship on food and nationalism has focused on the relationship between the cultivation, preparation, or consumption of a food and the construction of a national identity, the present work focuses on the relationship between the food's *invention* narrative and national identity. By transforming the cherry tomato into an embodiment of technological innovation, I argue that *hasbara* separates the cherry tomato from its essence as a food and co-opts it into a symbol of modernity and progress.

Keywords: tomato, cherry tomato, Israel, nationalism, national cuisine, culinary history

FOR SUCH A SMALL FRUIT, the cherry tomato seems to have gotten itself mired in a disproportionate amount of controversy. A February 17, 2010 *New York Times* article on an Israeli public relations campaign—in which, among other things, it was reported that Israel claimed to have “invented” the cherry tomato—sparked outrage on the Internet.¹ How could an entire country lay claim to inventing a fruit? The controversy is reflected on the Wikipedia page for “cherry tomato,” which has seen references to Israel added and deleted over a dozen times.² In one instance, an editor wrote: “removed wild claims about Israel inventing the cherry tomato in 1973.”³ In another, a user deleted an entire Israel-related history section, noting that it was “demonstrably false.”⁴

The 2010 campaign was part of a larger Israeli public relations effort, known as *hasbara*, which is Hebrew for “explanation.” *Hasbara* efforts are ostensibly aimed at countering negative reports of Israel in the international press; they often focus on presenting Israel as a technologically advanced, innovative society that devotes its resources to science, medicine, and healthcare. However, the aims of *hasbara* are themselves contested: while some consider *hasbara* a kind of advocacy, others describe it as a “combat doctrine” that is designed by the Israeli government to counter criticism of its treatment of

Palestinian citizens and Palestinians in the West Bank and Gaza.

As part of the 2010 campaign, stacks of pamphlets geared toward Israelis traveling abroad were left at departures lounges in Tel Aviv's Ben Gurion airport, to guide Israelis in talking about their country to foreigners.⁵ Alongside personal advice, such as to make “eye contact,” “speak concisely—long speeches are likely to lose your audience's interest,” and “use humor—it always helps,” was a page enumerating ten famous Israeli inventions.⁶ Item number ten was accompanied by a close-up shot of cherry tomatoes in a greenhouse: “Israel developed the famous cherry tomatoes. About 40% of tomato seeds grown in Europe's hothouses come from Israel.”⁷

Within Israel, as well as outside it, the government's public relations efforts have not been without critics. The popular comedy television show *Eretz Nehederet* (“A Wonderful Country”), which has been likened to an Israeli version of *Saturday Night Live*, mocked *hasbara* in a rap skit called “X-Plain”; the video of the sketch later went viral.⁸ *Haaretz*, Israel's largest left-leaning newspaper, reporting on the critiques of the campaign, quoted London marketing professional Jonathan Gabay: “If they're still doing the cherry

tomato—that’s bananas.”⁹ Even the right-wing *Jerusalem Post* ran a critical editorial on February 23, 2012, by David Rosenberg (“Interesting Times: We Have Met the Enemy and . . .”):

Spreading the word about how we developed the PillCam or the cherry tomato smooths out the rough edges of our global image. Yet, while economic and technological prowess buys you some respect, it rarely buys you friends. No one likes China just because it makes the world’s iPods or Germany because it builds such good cars.

But while those within Israel questioned the utility of the *hasbara* efforts, no one in Israel publicly questioned the cherry tomato “invention” claim itself. It was only when reports of the campaign were published in the international press that the cherry tomato story was challenged on non-Israeli blogs and websites.¹⁰ But the veracity of the claim was difficult to assess: while much has been written about the origins of the tomato, little has been written about the history of the *cherry* tomato.

On one blog, a professor suggested that Santorini, Greece, was the true origin of the cherry tomato (AbuKhalil 2010). Indeed, the island has hosted several international conferences on the cherry tomato, and Santorini-related websites claim the cherry tomato as their own.¹¹ A Santorini website calls the cherry tomato the “tomatina,” or baby tomato, and notes that it “first arrived in Greece in 1818, when an abbot from the monastery Kapoutsinon, named Fragkiskos, brought the first seeds” and that “the first signs of cultivation have been reported in 1875.”¹² The website’s owner, however, could not provide a source for the claims: “We are not historians,” he wrote in an email, “we only publish what is read from other’s people’s findings” (Santorini.com webmaster, pers. comm., May 2, 2011).

The late 1880s cultivation date was repeated by others involved in the Santorini cherry tomato industry, such as Maria Nomikos, sales chief of D. Nomikos, the largest tomato processing company in Greece and the conference’s major sponsor (“SANTORINI cherry tomatoes are the love of my life,” she wrote me in a May 6, 2011 email). But she, too, could not provide a source. When I mentioned the Israeli claim about the cherry tomato on the phone, she was taken aback. “That’s not—I’m sorry to say this . . . how can it be true?”

Others suggested that the Americas were the true origin of the cherry tomato. A February 19, 2010 blog post on the *Angry Arab News Service* quoted Dr. Riad Baalbaki, senior seed botanist at the California Department of Food and Agriculture:

The Israelis claiming that they have developed the cherry tomato is completely unfounded. . . . This claim, as with their other false claim that they have developed drip irrigation (which was “invented” in the

US) . . . is their usual practice of taking something that they have not invented and slapping their name on it.¹³

Indeed, Dr. Baalbaki seemed to be right: the entries for “cherry tomato” in food and horticultural reference works, such as the *Encyclopedia of Fruit and Nuts* and the *Cambridge World History of Food*, pointed to its originating in South America in the 1500s (Janick and Paull 2008: 855–69; Long 2000: 351–58). Further complicating the matter, none of the sources mentioned Israel or Greece.¹⁴

What, then, is the true origin of the cherry tomato? This research brief explores the fruit’s controversial history and analyzes its role in the construction of Israel’s national identity. In the first section, I show how the cherry tomato invention claim is not limited to the 2010 public relations campaign: mentions of Israel inventing the cherry tomato appear in the Israeli media as far back as 2003—admittedly only a decade ago, yet Israelis seem to have internalized this national narrative. In the next section, I clarify the claims of the Israeli scientists credited with the development of the cherry tomato. The third section delves deeply into the history of the cherry tomato, tracing mentions of it from the Renaissance period to modern times. In the fourth section, I explore the Israeli scientists’ claims of the commodification of the fruit in the 1970s and 1980s, and attempt to assess external evidence in support of these claims. The common thread running through both the third and fourth sections is that of the inherent difficulty in determining the history of a plant. I have therefore, as a conscious choice, left in the various methodologies attempted. In the final section, I discuss the cherry tomato claim in light of the *hasbara* movement. While much previous scholarship on food and nationalism has focused on the relationship between the cultivation, preparation, or consumption of a food and the construction of a national identity, the present work focuses on the relationship between the food’s *invention* narrative and national identity. By transforming the cherry tomato into an embodiment of technological innovation, I argue that *hasbara* separates the cherry tomato from its essence as a food and co-opts it into a symbol of modernity and progress.

The Cherry Tomato in Israeli Media and Consciousness

The first mention of the cherry tomato in the Israel press occurred on May 14, 2003, seven years prior to the airport pamphlets. The article, “Israeli Inventions that Drove the World Crazy,” was published in *YNet Science News* in honor of Israeli Independence Day. It opens with the line: “Yes, yes, cherry tomatoes are the fruits of an Israeli development. They



FIGURE 1: Produce for sale in Jerusalem's Machane Yehuda market.

"MAHANE YEHUDA MARKET" BY ALAN KOTOK IS LICENSED UNDER CC BY 2.0.

were actually developed 15 years ago at a number of research centers here.”¹⁵ The article goes on to list other Israeli inventions, such as ICQ (the instant messaging platform), Epilady (a hair-removal device), and drip irrigation. Nine months before the launch of the public relations campaign, a popular Israeli news website called *Mako* ran the April 28, 2009 article “From Bamba to the Uzi: Inventions of the Blue and White,” which contained several paragraphs about Israeli inventions, including one about the Israel invention of the cherry tomato. A modified version of the article (“Epilady Is an Israeli Invention?”) was published that same day on the women’s section of the site.

Articles about “inventing” the cherry tomato did not stop after the public relations campaign: in December 2010, months after the airport pamphlet initiative, the Israel Ministry of Foreign Affairs published an English article on the “Innovative Israel” section of their website, noting the arrival of the “dripless” tomato. The subheading read: “After bringing the world the cherry tomato, a virus-resistant tomato, and the long-life tomato, Israel adds a new star to the red fruit’s lineup—a tomato that doesn’t drip” (Kadesh 2010). In 2011 *Calcalist*, an Israeli business newspaper, reported on the opening of a new exhibit at Jerusalem’s Bloomfield Science Museum called “Innovation Ltd,” which featured Israel’s fifty greatest inventions. “What do cherry tomatoes, disk-on-key, and drip irrigation have in common? They’re all Israeli inventions born in the ever-churning minds of Israeli inventors,

sometimes by accident, sometimes after long and systematic research efforts, which have subsequently succeeded around the world.”¹⁶

It could be argued that media reports tend to be exaggerated, and perhaps the above-mentioned articles do not accurately reflect the beliefs of Israeli citizens. To get a sense of whether or not Israelis themselves believe that their country is responsible for the cherry tomato, in December 2012 a colleague and I asked approximately forty produce vendors at Jerusalem’s central market if they knew the origins of the cherry tomato. Exact numbers are difficult to report, as the market was extremely crowded, and often many vendors were working at the same stall and speaking to us simultaneously. Approximately fifteen individuals (mostly young Arab vendors) said that they did not know, and another ten individuals either did not respond or replied with a joke. However, over a dozen individuals, roughly thirty percent of those we asked, said “Israel.” On several occasions, shoppers overheard our questions and, before the vendor could respond, interjected: “Here, in Israel.”

While our inquires were not systematic, they suggest that Israelis have, in some sense, internalized the belief that their country is responsible for the invention of the cherry tomato. In other words, the cherry tomato narrative is not relegated to the press or government publications; rather, it resonates with at least part of the Israeli population. This is particularly intriguing, especially in light of the fact that *hasbara* efforts are

ostensibly directed outward, to a kind of perceived global community. But it seems that *hasbara*, at least in the case of the cherry tomato narrative, exerts a more powerful effect at the local level, on the insider rather than the outsider. The cherry tomato narrative helps reinforce the “imagined community” (see Anderson 2006) of Israel as smart, innovative, and technologically advanced.

The Israeli Scientists’ Claims

Israeli newspapers credit two professors, Nachum Kedar and Haim Rabinowitch, both at the Faculty of Agriculture at Hebrew University of Jerusalem, with developing the cherry tomato in the 1970s. Kedar, who is in his early nineties, is no longer actively working at Hebrew University (he has been a professor emeritus there since 1988). Rabinowitch, who still conducts agricultural research at the university, was able to clarify his and Kedar’s claim.

Surprisingly, Rabinowitch fully acknowledged that the cherry tomato had existed prior to the 1970s and 1980s; he even pointed me to an article about the cherry tomato being the ancestor of the modern cultivated tomato (Rabinowitch, pers. comm., February 4, 2013). But according to him, cherry tomatoes never really caught on as a consumer product—until the 1970s and 1980s, they were mostly grown in backyard gardens, had a shelf life of one or two days, a “standard (or even inferior) flavor,” and picking them required “intensive labor,” which affected their price. Cherry tomatoes were not a commodity “and were not sought for by consumers” (Rabinowitch, pers. comm., August 10, 2010). Rabinowitch wrote that in the 1970s and 1980s, he and Kedar

pioneered the introduction and utilization of genes which could slow down the ripening process, i.e., extending the shelf life of the fruit. Hence, fruit could remain attached to the source plant for a longer period of time and accumulate more sugars and other components contributing to its good flavor. Additionally, these fruit could be shipped long-distances and stored for a couple of weeks with minimum softening. When these genes were introduced by our Team to plants bearing small, short-lived tasteless tomatoes, we were able to dramatically improve both the flavor and shelf life, and thus make this fruit a marketable produce (ibid.)

Rabinowitch said that he and Kedar had spent several decades working to create regular tomatoes that had a long shelf life. To create the long shelf life *cherry* tomatoes, they used basic genetic hybridization: they took regular-sized tomatoes that carried the genes for long shelf life and crossed them with several cherry tomato varieties.¹⁷ They grew the “offspring” in breeding plots, selected for the most favorable cherry tomatoes, and crossed the most stable lines with one another. The result was a new line of seeds for long shelf life cherry tomatoes, which

were registered by Yissum, the technology transfer company at Hebrew University, and subsequently licensed to Israeli seed companies. Various sources—including the airport pamphlet and an undated page on the Faculty of Agriculture’s website—claim that forty percent of European greenhouse tomato acreage (not just the cherry variety) is composed of cultivars from Hebrew University’s Faculty of Agriculture, although Rabinowitch later clarified that this most likely referred to Southern Europe.¹⁸

Kedar and Rabinowitch themselves never claimed to have invented the cherry tomato. Rather, the opposite seems to be true: when Kedar and Rabinowitch have been directly asked about the cherry tomato by the media, they have attempted to clarify their contributions. A May 2, 2006 *Jerusalem Post* article about Kedar being awarded the prestigious Israel Prize for agriculture (“Scholars in the Spotlight”) began with the following lines:

Professor Nachum Kedar is often credited with inventing the cherry tomato. He explains, however, that is “not really the right way to call it.” More accurately put, Dr. Kedar’s work in genetics and breeding took the pre-existing cherry tomato and lengthened its shelf life enough for it to become a viable commercial product—his work made the cherry tomato available for mass consumption.

When I asked Rabinowitch directly about the controversy, he wrote: “Indeed, we have never said/claimed fame on ‘invention’ of tomatoes, nor of cherry tomatoes . . . cherry tomatoes were there before we made our move” (Rabinowitch, pers. comm., February 4, 2013).

The History of the Cherry Tomato

Was the cherry tomato truly not a marketable product prior to the 1970s and 1980s? Although there are over a dozen books about the origins of the tomato, little historical information exists about the cherry tomato. The earliest potential mention I found was a 1590 portrait by Italian painter Giuseppe Arcimboldo, which was reprinted in historian David Gentilcore’s book *Pomodoro! A History of the Tomato in Italy* (2010). The painting, *The Emperor Rudolph II as Vertumnus*, depicts the emperor’s face as composed of fruits and vegetables. Commenting on the image, Gentilcore writes that “two cherry tomatoes form the emperor’s low lip,” but several paragraphs later he backtracks: “Perhaps, however, the emperor’s lower lip is not composed of tomatoes,” because in a poem by Arcimboldo’s contemporary describing the contents of the portrait, there is no mention of cherry tomatoes (Gentilcore 2010: 22–24). Furthermore, Gentilcore notes, he cannot find any mention of cherry tomatoes in Italy until fifty years later.



FIGURE 2: *Vertumnus* by Giuseppe Arcimboldo, ca. 1590.

"VERTUMNUS" BY GIUSEPPE ARCIMBOLDO - JENS MOHR - LSH 87582 (SM_DIC3224_11615), PUBLIC DOMAIN, [HTTPS://COMMONS.WIKIMEDIA.ORG/W/INDEX.PHP?CURID=37166400](https://commons.wikimedia.org/w/index.php?curid=37166400)

I sent a high-resolution image of the painting to two professional botanists; both were of the opinion that the objects were cherries, not cherry tomatoes.¹⁹

The first direct reference to the cherry tomato seems to appear in 1623, in a work called *Pinax theatri botanici* ("Illustrated exposition of plants") by Swiss botanist Caspar Bauhin, which contains descriptions and classifications of approximately six thousand species, many of which were later adopted by Carl Linnaeus. In a section on "Solanum" (nightshades), Bauhin writes of a variety called "Solanum racemosum cerasoru[m] forma," which translates to "Solanum [that is] full of clusters [racemosum], in the form (shape) of cherries" (Bauhin 1623: 166–67).²⁰ However, it is unclear whether these words refer to what we know of today as cherry tomatoes. Indeed, there is an inherent difficulty in establishing anything definitive with regard to the history of a plant: absent photos, specimens, or a

common name—Linnaeus's work on binomial nomenclature came roughly a hundred years after *Pinax theatri botanici*—one must rely on written descriptions. But given that Bauhin meticulously classified many other different varieties of tomato, the fact that he described one specific kind as "full of clusters in the form of cherries" weighs rather strongly in favor of the existence of cherry tomatoes in the early seventeenth century. E. Lewis Sturtevant, a nineteenth-century Massachusetts botanist, counted at least five other mentions of the cherry tomato in the hundred years following Bauhin's listing, although he noted that his enumeration was based almost solely on written descriptions, often just several words long (Sturtevant 1891: 705–6).

In the late eighteenth century, as Linnaeus's binomial nomenclature was beginning to take hold, several works by British botanists described the cherry tomato in greater detail, although

some disagreed with Linnaeus's classification of the tomato in the "Solanum" genus. In 1754, Scottish botanist Philip Miller removed the tomato from the "Solanum" genus and placed it in a new genus, "Lycopersicon" (see discussion in Smith 2001: 18–19). In *The Gardener's Dictionary*, Miller (1768) noted that one species of Lycopersicon had "round, smooth, pulpy fruit about the size of a Large cherry. There are two varieties of this, one with yellow, one with red fruits." Thomas Mawe and John Abercrombie's *The Universal Gardener and Botanist* lists several different varieties of tomatoes, including the "Common large, furrowed-fruited Love-Apple," the "Cherry fruited [sic] Love-Apple, having smooth, round, red fruit the size of large cherries," and the "yellow cherry-fruited" (Mawe and Abercrombie 1778). The cherry tomato was also mentioned in British botanist Charles Bryant's *Flora Diaetetica: or, History of esculent plants, both domestic and foreign* in 1783, and in Charles Marshall's *Introduction to Gardening*, published in Boston in 1799 (Bryant 1783: 212; Smith 2001: 37).

By the 1840s, additional mentions of the cherry tomato appear, although one source notes that they appear "to have been grown as a curiosity" and not cultivated for the market (Agricultural College of Michigan 1887: 12). Notes from the September 4, 1841 meeting of the Massachusetts Horticultural Society list a Col. F. Bigelow as having brought "Small tomatoes called the cherry tomato" (Hovey 1841: 388). By the 1850s, according to tomato historian Andrew Smith, cherry tomatoes were grown by home gardeners and sold in farmer's markets (Andrew Smith, pers. comm., February 3, 2013). In the late 1800s, there are dozens of mentions of cherry tomatoes—often accompanied by illustrations—in agricultural journals and magazines, such as the *Students' Farm Journal* (1887: 2), *Meehans' Monthly* (1896: 177), and *Country Gentleman's Magazine* (1870: 46–48). But it seems that it was not common to eat the cherry tomato raw: several references from this time period indicate that the red cherry variety was used for pickles and preserves (see, e.g., Agricultural College of Michigan 1887: 13; Sturtevant 1891: 706; Harder 1885: 359).

In 1903, Charles White of the Smithsonian Institute published an article in *Science* describing how the seeds of a large-fruit tomato, when planted in a different climate, can yield smaller fruits. He related the story of a large variety of tomato seeds, obtained in the United States, being planted in Cuba and resulting in a crop of the "small cherry variety." Additionally, White wrote that he had corresponded with a woman who informed him that when "the seed of a choice variety" of tomato from New York was planted in Louisiana, the first year's crop was true to size, but if the seeds from that first crop were planted the next year—instead of freshly sourced seeds

from New York—the resulting crop would yield smaller, inferior fruit (White 1903: 76–78).

This phenomenon is likely responsible for the production of the Santorini cherry tomatoes. Maria Nomikos, the sales chief of Santorini's D. Nomikos, told me that when regular tomato varieties were initially introduced to Santorini, they never developed to full size. Santorini, she said, has unique agricultural conditions: the island is volcanic and contains soil that is not well suited to farming because it is rich in metal elements but low in organic substances. Furthermore, because the island is arid, crops are irrigated not from rainwater but from seawater, which evaporates up the island's cliffs and is absorbed by the tomato plants. Nomikos told me that if the seeds of the Santorinian variety were planted outside the island, "You'd get a regular tomato, not a cherry tomato" (Nomikos, pers. comm., May 9, 2011).

If Nomikos is right, then Santorini cannot be the origin of the cherry tomato, because the variety could not have been successfully grown outside the island as cherry tomatoes. Santorinians, it should be noted, never claimed to have *invented* the cherry tomato. They just believe that their cherry tomato is unique, and indeed, in December 2013, the European Commission granted them a "protected designation of origin" (PDO) status for their cherry tomato, "tomataki Santorinis."²¹ The PDO certification ensures that a specific food product is prepared in a given geographical area using a specific technique²² (for example, PDO status protects the recognition of Italy's Asiago cheese and its Parma ham).²³

At the same time as the Santorini cherry tomatoes were beginning to be cultivated (if the late 1800s date is to be believed), in the United States the fruit was still a rarity. A US Department of Agriculture report noted that cherry tomatoes, though resistant to diseases such as tomato blight, have "no commercial value" (US Department of Agriculture 1915: 235).

In 1919 in northern Canada, cherry tomatoes went on display at a Saskatoon supermarket for several days before being sold, having been sent over as a gift by residents of Melfort Country, some one hundred miles away.²⁴ Cherry tomatoes were seldom seen in bigger cities like New York, either: a September 2, 1936 article in the *New York Herald Tribune* ("Tom Thumb Tomatoes Step Out Stuffed with Savory Pastes") featured an image of cherry tomatoes and noted they are "not so easy to come by." It was only "occasionally, and then usually in an Italian neighborhood" that one discovers "these Tom Thumbs of the tomato family." The article mentioned that a "very French" catering establishment arranged for shipments of cherry tomatoes from an Italian farmer in upstate New York. As for the cherry tomato's uses, the *Herald*

Tribune stated that they could be topped with a dollop of mayonnaise and offered at cocktail bars or served as salad garnish, or they could be purely decorative, such as an arrangement “around a molded loaf.”

Smith, the tomato historian, told me that by the 1950s, cherry tomatoes were frequently mentioned in cookbooks, mainly for use as pickles or in salads (Smith, pers. comm., February 3, 2013). A recipe in an August 15, 1967 edition of the *Milwaukee Journal* is accompanied by a photograph of a woman using a cherry tomato as a garnish for “mix and match broiled sandwiches.” Several individuals to whom I spoke remembered cherry tomatoes being sold in supermarkets, such as Piggly Wiggly in California, in the 1950s (I was not able to reach Piggly Wiggly for confirmation). It is likely, however, that cherry tomatoes were grown locally and not produced on a commercial scale. In *Ripe: The Search for the Perfect Tomato*, science journalist Arthur Allen (2010: 29) writes that in the early 1960s, “few people were in the custom of eating” cherry tomatoes. By the early 1970s, at least one famous person was dining on them: an August 5, 1971 article in the *News and Courier* (“Nixon Dines with Tricia, Husband”) related that President Nixon and his wife had a lobster dinner with their newly married daughter Tricia, who cooked them a meal that included, among other things, stuffed potatoes and a cherry tomato salad.

In the 1970s and 1980s, mentions of the cherry tomato increase dramatically. A Google N-gram for the phrase “cherry tomato,” which depicts the occurrence of the phrase in books that have been scanned and indexed by Google, shows a sharp rise in the 1970s and 1980s (a search for the plural version of the phrase shows a dramatic increase in the 1970s, but not in the 1980s). It seems, then, that the accumulated evidence is consistent with Rabinowitch’s first assertion, that prior to the 1970s and 1980s the cherry tomato was not a marketable product.

The Cherry Tomato as a Sought-After Commodity

Rabinowitch’s second assertion is that his and Kedar’s work on genetic breeding transformed the cherry tomato into the popular product that it is today. How can an increase in the production and consumption of a fruit over time be assessed? There are multiple points in a fruit’s journey from the seed to the plate that can, in theory, be measured: revenue from the licensing of a seed, profit from the sales of a seed, tons of fruit imported or exported, and revenue from the sales of the fruit. However, there are multiple obstacles to obtaining this information.

First, much of this data is simply nonexistent. Indeed, a 2006 article in *HortTechnology* noted that “little published information exists concerning consumer demand, preference, and demographic characteristics related to fresh tomato consumption” (Simonne, Behe, and Marshall 2006: 674). Second, many statistics do not stretch back to the 1970s: for example, the USA Vegetables and Pulses Yearbook Data has figures for the value of the production of fresh and frozen cherry tomatoes, but only for the years 1995–2012 in the state of California (US Department of Agriculture 2012: Table 172). Third, agricultural statistics often group different kinds of tomatoes together. The US Department of Agriculture has tomato data from the 1950s and 1960s, but the figures do not distinguish cherry tomatoes from regular-size tomatoes. Another US Department of Agriculture report, “US Tomato Statistics 1960–2010,” has information on tomato shipments from 1978 to present, but grape and cherry tomatoes are grouped together (US Department of Agriculture 2010: Table 75). The fourth and most vexing problem is that most existing data belong to companies and are therefore proprietary.

However, I did manage to find information related to revenue from the licensing of the cherry tomato seeds by Yisum, the technology transfer company of Hebrew University. In a report for the World Intellectual Property Organization (WIPO), Renee Ben-Israel, Vice President of Intellectual Property at Yisum, wrote that the company attributes its revenues “to three main products, the first being the cherry tomato seeds” that are licensed to two Israeli companies, Hazera and Zeraim Gedera (Ben-Israel 1999). The report lists Yisum’s revenue for the 2007 fiscal year as \$51 million (and compares it to Stanford’s 2007 technology transfer revenue of \$50 million and MIT’s \$61 million). Similarly, an undated page on Hebrew University’s Faculty of Agriculture’s website states that “Sale of the fruit or the tomato seeds are at present bringing in more royalty to the Hebrew University than all other commercialized University discoveries combined.”

I met with two representatives from Yisum: Irina Abramzon-Shmueli, Business Development Manager, and Michal Levy, Vice President, both of the Agri-Tech, Veterinary & Environment division. Yisum’s office is located on the edge of the university’s Givat Ram campus in Jerusalem, and the walls are decorated with glossy posters of cherry tomatoes. Abramzon-Shmueli and Levy explained that virtually all intellectual property generated at Hebrew University belongs to Yisum. When a researcher develops a new variety of plant, Yisum registers “breeder’s rights,” which provides protections similar to those of a patent. Yisum can then license the breeder’s rights, and

the resulting revenue is split between the researcher, his or her lab, and Hebrew University.

Levy told me that prior to the establishment of the State of Israel in 1948, farmers had been planting tomato seeds that were obtained from Europe, but due to the drastic differences in climate the crop yields were low. Israeli seed companies, such as Hazera, began to experiment with developing varieties that were specifically suited to Israel's hot, arid climate. The Israeli government, recognizing the importance of a successful agriculture industry for the economy, decided to fund tomato breeding programs at various Israeli research institutes. Today, Levy said, Israel has become a world leader in agricultural research and development, and it now supplies Europe with many of its tomato seeds.

The push to develop the long shelf life cherry tomatoes, according to Levy, came from an unusual source: Marks and Spencer, the British retailer. Their chief food technologist from 1948 to 1972 was Nathan Goldenberg, who first came to Israel in 1959 and visited several times a year thereafter. In his autobiography *Thought for Food*, Goldenberg writes that he was a Zionist who was interested in the development of the Israeli food industry (Goldenberg 1989: 159–60). Although his book contains mentions of Israeli tomatoes and his work with Kedar, there is no specific mention of cherry tomatoes. Levy told me that Marks and Spencer had been using cherry tomatoes as a decoration in the grocery section of their store. The company—presumably represented by Goldenberg—came to Hebrew University's Faculty of Agriculture with the idea of selling the cherry tomato as a food item.

Rabinowitch later confirmed Goldenberg's involvement, but said that the interest in developing the long shelf life cherry tomato was “most probably mutual.” The scientists had wanted to test the expression of the genes for long shelf life on cherry tomatoes, but they lacked the funds. “Mr. Goldenberg thought that long shelf life cherry tomatoes might become a hit,” Rabinowitch wrote me in a February 9, 2013 email, so he provided funding and “sent seed[s] of whatever was available at the time for home gardening.”

According to Levy, the long shelf life cherry tomato gained popularity in the mid-1980s, and for several years Hazera, an Israeli seed company, had a hold on the market. During that time, an additional advance was made: cherry tomatoes were bred to ripen in two neat lines around the stem, or in what Rabinowitch calls a “two-dimensional fishbone,” so that they could fit more easily in boxes that could then be stacked one atop the other. Levy told me that the “peak” of the cherry tomato, at least in terms of Yissum's licensing revenue, was in 1992; after that, other seed companies were able to mimic the long shelf life of the Hebrew University variety.



FIGURE 3: *Cherry tomatoes growing in a “two-dimensional fishbone.”*
“CHERRY TOMATO” BY TERESA BOARDMAN IS LICENSED UNDER CC BY 2.0.

Abramzon-Shmueli said that Yissum did not have specific revenue figures for the cherry tomato: although each tomato variety is assigned a code number, Yissum's revenue is not broken down by variety. Though she did have Yissum's revenue data for total tomato sales, she did not provide it, citing confidentiality. However, judging by Yissum's annual revenue and mentions of the tomato being Yissum's main revenue producer, the yearly profit from tomatoes is likely somewhere between \$10 and \$40 million. Rabinowitch, however, called this figure an “underestimate.” (Rabinowitch, pers comm., July 5, 2013).

I asked Rabinowitch if he knew of any data that would confirm that his and Kedar's genetic breeding work spurred a demand for the cherry tomato. He said there were statistics from Agrexco, a major Israeli produce exporter, which showed an increase from five hundred tons of experimental shipments in the late 1980s to six thousand tons by the early 1990s. Agrexco, however, went out of business in 2011, and I was unable to obtain these figures. In the early 1990s, Rabinowitch said, there was a shift in the content of agricultural exports: instead of shipping just produce, companies such as Hazera and Zeraim Gadera began shipping cherry tomato seeds to local growers in Europe, who then grew the fruit themselves. But here, too, I could not get confirmation: Hazera's representative, Nili Snir, told me that “the only information they could pass on to me” was that the commercial variety of cherry tomato was created at the Faculty of Agriculture, by crossing the “sweet 100” variety with the genes that slowed

down ripening and delayed the softening of the fruit (Snir, pers. comm., February 4, 2013).

Thus, the existing evidence, mostly from estimations of Yissum's revenue, seems consistent with Rabinowitch's second assertion, that the genetic and breeding work conducted by him and Kedar transformed the cherry tomato into a marketable commodity. The scientists did not "invent" the fruit; rather, they used the initial funding provided by Marks and Spencer to develop long shelf life varieties, which were then registered by Yissum and licensed to several Israeli seed companies.

The Cherry Tomato and Israeli Nationalism

The cherry tomato is not the first food over which the Israeli government has asserted ownership. For example, though falafel originated in Egypt, it has been informally adopted as a national symbol of Israel (Raviv 2003). According to one scholar, the Israeli government has worked to erase the dish's Arab origins: one Israeli government publication "described the falafel as a dish that became popular in Israel with the growing [Jewish] immigration from Yemen" (Raviv 2002). Hummus, too, has come to signify "Israeliness," despite having origins in Egypt and Syria (Hirsch 2011). Both Lebanon and Israel claim hummus as part of their national identity, and the "hummus wars" have played out in competitions to create the largest serving of hummus in the world and in legal battles such as the Lebanese attempt to trademark the name (Ariel 2012).

But the cherry tomato, unlike hummus and falafel, does not hold a cherished place in the gastronomical hearts of Israelis. The fruit is not a symbol of Israel, nor is it a particularly beloved food item. In fact, in the most common salad on the menu in Israeli restaurants, it is regular tomatoes, not cherry tomatoes, that are used. Thus, while hummus and falafel can be viewed as examples of the Israeli's government's construction of a national "Israeli" cuisine—a process that has been well demonstrated in scholarship on the cuisines of India (Appadurai 1988), Mexico (Pilcher 1998), and Japan (Cwiertka 2006), among others—the cherry tomato is not central to Israel's national identity. Furthermore, while scholarship has examined the rituals surrounding Israeli food consumption practices and their relation to the Israel-Palestinian conflict (see, e.g., Avieli 2013), the cultivation, preparation, and consumption of the cherry tomato is not politically meaningful. There is also no movement among Israelis to obtain a "protected designation of origin" (PDO) status—such as the one assigned to the Santorini cherry tomatoes—for Israeli cherry tomatoes. Finally, while some view the Israeli consumption of Palestinian food as a kind of "colonization" of food, the cherry tomato does not have Palestinian origins.

Thus, it is the story about the *invention* of the cherry tomato that exerts the most powerful effect on Israeli national identity. The *hasbara* narrative separates the cherry tomato from its essence as a food and co-opts it into a symbol of modernity and progress. *Where* and *how* the cherry tomato was invented is more important than how it is prepared or consumed. The cherry tomato has become an embodiment of technological innovation, much like other inventions that Israel has laid claim to via *hasbara*, such as ICQ, drip irrigation, and the Epilady.

While *hasbara* began as a conscious strategy by the government to improve Israel's image on the international stage, it seems to have had a more dramatic effect locally, on Israeli citizens themselves. Levy, Abramzon-Shmueli, and the produce vendors in the market all displayed a kind of national pride in scientific accomplishments that is characteristic of many Israelis. Indeed, various nongovernment websites, such as NoCamels.com, exist solely to report Israel's scientific and technological achievements, and Israeli universities frequently mention the number of Nobel Prize winners at their institutions.²⁵ *Hasbara* seems to have drawn together what Benedict Anderson has termed the "imagined community" of Israel, instilling pride in Israeli citizens and insulating them against international criticism.

Part of the reason why the cherry tomato claim is so appealing—and has not been questioned within Israel—is likely because it fits into Israel's self-image as brainy and scientifically innovative. Eric Hobsbawm, in his seminal text on nationalism, has written that though governments are engaged in "deliberate ideological engineering, it would be a mistake to see these exercises as pure manipulation from above. They were, indeed, most successful when they could build on already present unofficial nationalist sentiments" (Hobsbawm 2012: 92). Indeed, the cherry tomato narrative reifies existing nationalist sentiments regarding Israel's intellectual abilities. For example, Israelis often point to the fact that prior to 1948, Israel was a malaria-infested swamp, but in just sixty years—due to Israeli ingenuity—the country became a center of scientific and technological development.

The idiosyncratic reasoning style that is characteristic of *hasbara* is sometimes put on public display, especially when there are international incidents related to the Israeli-Palestinian conflict. For example, in May 2013, Stephen Hawking pulled out of the Presidential Conference in support of the boycott, divestment, and sanctions (BDS) movement, which advocates putting pressure on Israel to protest its treatment of the Palestinians.²⁶ In response, many Israelis called Hawking a hypocrite, because his communications computer allegedly runs on a chip that was designed by Israel's Intel team. In a quote that was reported in

the *Guardian* (May 8, 2013) and other international press—and one that exemplifies how *hasbara* has influenced Israeli thinking—Nitsana Darshan-Leitner of Shurat HaDin, an Israeli law center, said: “I suggest if he truly wants to pull out of Israel he should also pull out his Intel Core i7 from his tablet.”

The fact that *hasbara* mounts “technological progress” as a kind of defensive move to deflect criticism over Israel’s treatment of Palestinians has been pointed out by many journalists and scholars. For example, in a May 9, 2013 article for the left-leaning Israeli news blog +972, journalist Yossi Gurvitz critiqued the *hasbara* strategy, which he referred to as “redemption through technology”:

Even if we accept the assumption that Israeli technology is somehow indispensable to modern life—and I certainly do not buy this assumption—there is a conflation here between the activities of individual Israelis or Israeli companies and Israel’s political pursuits. An American female blogger, whose name I have unfortunately forgotten, noted that this minor psychosis is really strange: when someone criticizes the United States government, it does not occur to her to say “but we gave the world a whole range of Apple products!”²⁷

The cherry tomato, it seems, is being used by the government as a kind of “redemption through agricultural innovation.” Even those Israelis who recognize that the cherry tomato claim is not true seem to regard the government’s claim as an acceptable embellishment. For example, Abramzon-Shmueli, the business development manager at Yissum, told me that she believes the cherry tomato existed before the 1970s and 1980s. Rather than being outraged or angered by the government’s claim, for her, the overall narrative (of Israel as a technologically advanced society) was still intact, and it did not matter that the government may have exaggerated.

Israeli scientists did make dramatic modifications to the cherry tomato, but it would be incorrect to say they “invented” it. Although *hasbara*—at least with regard to the cherry tomato—has raised questions on the international stage, it has found success at the national level. The cherry tomato story works because it fits into the idea of Israel as a scientific leader, and in turn, the image of a progressive Israel is strengthened by the claim to the cherry tomato. The cherry tomato claim, though created by the Israeli government to “explain” Israel’s technological ability to other nations, has asserted a more powerful effect at a local level, perpetuating the imagined community of Israel as intellectually and scientifically innovative. ©

Acknowledgments

Thank you to Shira Katz for assistance with conducting the survey of produce vendors in Jerusalem, Haim Rabinowitch for patiently answering my questions, Steven Ostrow for prompt

translation help, and my advisor Susan Silbey for guidance. Thanks to Camille Andrews, Michelle Baidon, James Eggleston, Mike Fordon, Anita Perkins, Christine Sherratt, and Sarah Young for research assistance. Thanks as well to Irina Abramzon-Shmueli, As’ad AbuKhalil, Riad Baalbaki, Renee Ben-Israel, Matthilde Caus, Charles Davis, Ami Kaufman, Michal Levy, Maria Nomikos, Donald Pfister, Jonathan Reisman, Andrew Smith, Noa Yachot, Rami Zurayk, and the two anonymous reviewers of this piece for their insightful comments.

NOTES

1. See Ethan Bronner, “Israel Begins Campaign to Improve Nation’s Image,” *New York Times*, February 17, 2010, www.nytimes.com/2010/02/18/world/middleeast/18israel.html.
2. See the cherry tomato revision history for Wikipedia at http://en.wikipedia.org/wiki/Talk%3ACherry_tomato.
3. See http://en.wikipedia.org/w/index.php?title=Cherry_tomato&offset=2011004124752&action=history.
4. See http://en.wikipedia.org/w/index.php?title=Cherry_tomato&offset=2011004124752&action=history.
5. See Juliane von Mittelstaedt, “The Politics of Stasis: Israelis Increasingly Resigned to Life without Peace,” *Spiegel Online*, June 2, 2011, www.spiegel.de/international/world/the-politics-of-stasis-israelis-increasingly-resigned-to-life-without-peace-a-765960.html.
6. See Itamar Eichner, “Israelis Recruited to PR Corps,” *Ynetnews.com*, February 21, 2012, www.ynetnews.com/articles/0,7340, L-3850693,00.html.
7. See “Israeli Hasbara Pamphlet,” photograph by author, December 29, 2010, www.flickr.com/photos/annawexler/5305913803.
8. See video, “Xplain: Fall on Me Till,” www.dailymotion.com/video/x8gqii_xplain-fall-on-me-till-satire-israe_fun.
9. See Raphael Ahren, “Ministry Translates Israel Advocacy Site, Reigniting Critique of Its Strategy,” *Haaretz*, September 17, 2010, www.haaretz.com/israel-news/ministry-translates-israel-advocacy-site-reigniting-critique-of-its-strategy-1.314272.
10. See, for example, Philip Weiss, “I Heard All This at AIPAC,” *Mondoweiss*, February 17, 2010, <http://mondoweiss.net/2010/02/i-heard-all-this-at-aipac.html>.
11. See, for example, “2nd International Conference on Santorini Cherry Tomato,” *Heliotopos Conferences*, <http://heliotopos.conferences.gr/index.php?id=2093>.
12. See “The Santorini Cherry Tomato: ‘Tomatoes’ Are Unique to Santorini,” *SantoNet.gr*, www.santonet.gr/restaurants/tomatines.htm.
13. See “Who Invented Cherry Tomatoes: The Claim by Ethan Bronner,” <http://angryarab.blogspot.com/2010/02/who-invented-cherry-tomatoes-claim-by.html>.
14. Some references suggest that contrary to what many believe, the cherry tomato is not a subspecies of the modern tomato, but is actually its ancestor. A recent study on the genetics of the cherry tomato supports this genealogy. See Ranc et al. (2008).
15. Unless otherwise noted, all quoted sentences are the author’s translations from Hebrew.
16. See Uzi Blomer, “Giving Respect to Israeli Inventions,” *Calcalist*, July 2, 2011, www.calcalist.co.il/local/articles.
17. Note that the technique the scientists used—genetic hybridization—utilizes simple breeding techniques to produce a hybrid from two genetically distinct populations. It should not be confused with the techniques used to create genetically modified organisms (GMOs), which are often done in a biotechnology lab using methods such as gene splicing.
18. “Israeli Hasbara Pamphlet,” photograph by author, December 29, 2010, www.flickr.com/photos/annawexler/5305913803; “Long Shelf Life Tomatoes: Progress through Science and Technology,”

Hebrew University Faculty of Agriculture, www.agri.huji.ac.il/research/english/8e.html.

19. Harvard botany professor Donald Pfister, who was of the opinion that the objects were cherries and not cherry tomatoes, as he observed “the cleft that one often finds in cherries” (pers. comm., May 29, 2013). His colleague, Harvard plant researcher professor Charles Davis, agreed: “They have the right shape, and a small stem is peeking through” (pers. comm., May 30, 2013).
20. Thanks to MIT historian Steven Ostrow for providing this translation from Latin.
21. See “Tomatiki Santorinis.” 2014. *European Commission, Agriculture and Rural Development*. <http://ec.europa.eu/agriculture/quality/door/appliedName.html?denominationId=4550>.
22. See “Geographical Indications and Traditional Specialties,” European Commission, Agriculture and Rural Development, http://ec.europa.eu/agriculture/quality/schemes/index_en.htm.
23. See “Production Rules,” Asiago Cheese Consortium, www.asiagocheese.it/en/consortium/production-rules/; “The Consorzio and the Protected Designation of Origin,” Parma Ham Consortium, www.prosciuttodiparma.com/en_UK/home.
24. See “Mayor Mac Millan Displays Fruits of Melfort District,” *Saskatoon Phoenix*, September 30, 1919.
25. See, for example, www.Israel21c.org, www.nocamels.com, www.isarelthinkagain.org, and www.fromthegrapevine.com (accessed between November 2012 and March 2013).
26. See Harriet Sherwood and Matthew Kalman, “Stephen Hawking Joins Academic Boycott of Israel,” *The Guardian*, May 7, 2013, www.guardian.co.uk/world/2013/may/08/stephen-hawking-israel-academic-boycott.
27. See “Techwashing: Hasbara Group Strikes Back after Hawking Boycott,” <http://972mag.com/techwashing-giving-the-gift-of-speech-as-long-as-it-doesnt-criticize-israel/70758/>.

REFERENCES

- AbuKhalil, A'sad. 2010. “Positive Views of Israel, Brought to You by . . . Ethan Bronner,” *Angry Arab News Service*, February 18. <http://angryarab.blogspot.com/2010/02/positive-views-of-israel-brought-to-you.html>.
- Agricultural College of Michigan. 1887. *Bulletin no. 31*. Lansing: Michigan State University.
- Allen, Arthur. 2010. *Ripe: The Search for the Perfect Tomato*. Berkeley: Counterpoint Press.
- Anderson, Benedict. 2006. *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. London and New York: Verso.
- Appadurai, Arjun. 1988. “How to Make a National Cuisine: Cookbooks in Contemporary India.” *Comparative Studies in Society and History* 30(1): 3–24.
- Ariel, Ari. 2012. “The Hummus Wars.” *Gastronomica: The Journal of Food and Culture* 12(1): 34.
- Avieli, Nir. 2013. “Grilled Nationalism: Power, Masculinity and Space in Israeli Barbeques.” *Food, Culture and Society* 16(2): 301–20.
- Bauhin, Caspar. 1623. *Pinax theatri botanici*. Basileae Helvet.: Sumptibus & typis Ludovici Regis.
- Ben-Israel, Renee. 1999. “Intellectual Property Financing in the Field of Patents: The Use of Patents as a Tool for Access for Future Financing.” World Intellectual Property Organization Information Paper on Intellectual Property Financing. Geneva: World Intellectual Property Organization.
- Bryant, Charles. 1783. *Flora Diaetetica: Or, history of esculent plants, both domestic and foreign*. London: B. White.
- Country Gentleman's Magazine. 1870. “The Culture of Tomatoes.” Vol. 5. London: Simpkin Marshall.
- Cwiertka, Katarzyna Joanna. 2006. *Modern Japanese Cuisine: Food, Power and National Identity*. London: Reaktion Books.
- Gentilcore, David. 2010. *Pomodoro!: A History of the Tomato in Italy*. New York: Columbia University Press.
- Goldenberg, Nathan. 1989. *Thought for Food: A Study of the Development of the Food Division, Marks & Spencer: An Autobiography*. Orpington, UK: Food Trade Press.
- Harder, Jules Arthur. 1885. *The Physiology of Taste: Harder's Book of Practical American Cookery*. San Francisco.
- Hirsch, Dafna. 2011. “‘Hummus Is Best When It Is Fresh and Made by Arabs’: The Gourmetization of Hummus in Israel and the Return of the Repressed Arab.” *American Ethnologist* 38(4): 617–30.
- Hobsbawm, E. J. 2012. *Nations and Nationalism since 1780: Programme, Myth, Reality*. Cambridge: Cambridge University Press.
- Hovey, Charles Mason, ed. 1841. *Magazine of Horticulture, Botany and All Useful Discoveries and Improvements in Rural Affairs*, vol. 7. Boston: Hovey and Co.
- Janick, Jules, and Robert E. Paull. 2008. *The Encyclopedia of Fruit and Nuts*. Wallingford, UK: CABI.
- Kadesh, Avigayil. 2010. “The Dripless Tomato Arrives.” *Israeli Ministry of Foreign Affairs*, December 5. www.mfa.gov.il/MFA/InnovativeIsrael/Dripless_tomato-Dec_2010.htm.
- Long, Janet. 2000. “Tomatoes.” In *The Cambridge World History of Food*, ed. Kenneth F. Kiple and Kriemhild Coneè Ornelas, 351–59. Cambridge: Cambridge University Press.
- Mawe, Thomas, and John Abercrombie. 1778. *The Universal Gardener and Botanist: Or, a General Dictionary of Gardening and Botany*. London.
- Meehans' Monthly: A Magazine of Horticulture, Botany, and Kindred Subjects. 1896. “History of the Tomato.”
- Miller, Philip. 1768. *The Gardeners Dictionary: Containing the Best and Newest Methods of Cultivating and Improving the Kitchen, Fruit, Flower Garden, and Nursery*. London.
- Pilcher, Jeffrey M. 1998. *Que Viva Los Tamales!: Food and the Making of Mexican Identity*. Albuquerque: University of New Mexico Press.
- Ranc, Nicolas, Stéphane Muñoz, Sylvain Santoni, and Mathilde Causse. 2008. “A Clarified Position for Solanum lycopersicum var. cerasiforme in the Evolutionary History of Tomatoes (Solanaceae).” *BMC Plant Biology* 8(1): 130.
- Raviv, Yael. 2002. “National Identity on a Plate.” *Palestine-Israel Journal of Politics, Economics, and Culture* 8(4): 164.
- . 2003. “Falafel: A National Icon.” *Gastronomica: The Journal of Food and Culture* 3(3): 20–25.
- Simonne, Amy H., Bridget K. Behe, and Maurice M. Marshall. 2006. “Consumers Prefer Low-Priced and Highlyycopene-Content Fresh-Market Tomatoes.” *HortTechnology* 16(4): 674–81.
- Smith, Andrew F. 2001. *The Tomato in America: Early History, Culture, and Cookery*. Urbana: University of Illinois Press.
- Student's Farm Journal. 1887. “Student's Farm Journal.”
- Sturtevant, E. Lewis. 1891. “The History of Garden Vegetables.” *American Naturalist* 25(296): 719–44.
- US Department of Agriculture. 1915. “A Report on the Work and Expenditures of the Agricultural Experiment Stations during the Fiscal Year Ended June 30, 1914.” Washington, DC: US Department of Agriculture.
- . 2010. “U.S. Tomato Statistics, 1960–2006, Table 75: Monthly Shipments of Small (cherry and Grape) Tomatoes 1978–2010.” US Department of Agriculture, Economic Research Service. <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1210>.
- . 2012. “USA Vegetables and Pulses Yearbook Data, Table 172: Specialty and Minor. US Department of Agriculture, Economic Research Service. <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1858>.
- White, Charles A. 1903. “Aggregate Atavic Mutation of the Tomato.” *Science* 17: 76–78.