Why Save a Seed?

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Abstract: This essay takes as its central *explanandum* the survival of an unusual personal seed collection within a larger government institution, ultimately asking why individuals and institutions save seeds. To answer this question, it considers the cultures of seed collecting and preservation among amateurs, enthusiasts, and others without professional status in botanical or agricultural research and, simultaneously, among professional breeders, geneticists, and seed scientists. The essay also reviews the roles played in saving seeds by institutional policies, technical procedures, and biological realities. Returning to the particular collection in question, the author suggests that its survival is not surprising but, instead, overdetermined given the many circumstances that drive the preservation of seeds as resources for an uncertain future.

On a 2017 trip to the U.S. National Laboratory for Genetic Resources Preservation in Fort Collins, Colorado, I encountered some seeds that I assumed had been long forgotten. This facility stores a vast collection of plant seeds, pollen, and tissues that are considered valuable to agricultural research and production as well as vulnerable to loss. It also boasts the world's largest collection of genetic materials from agricultural animals, mostly in the form of semen. These "genetic resources" are preserved for future researchers, typically through cold-vault storage or cryopreservation in liquid nitrogen. Most have been processed into standardized accessions to the collection, a status that is visually apparent in uniform packaging and bar coding. They are, by and large, the products of research taking place at the laboratory and at agricultural research stations, commercial enterprises, and universities in the United States and around the world.

Imagine my surprise, then, on asking about a collection donated in the 1970s by a traveling salesman who had taken up bean collecting on his cross-country road trips, at being escorted to a shelf bearing hundreds of seed-filled baby-food jars. These were the original donated materials, still bearing the collector's handwritten labels and, in many cases, a single bean glued to the lid as

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an additional identifier of the contents within. I wondered: What were these seeds doing here, four decades later? Why had this hodgepodge of beans and other seeds been preserved "as is" amidst the rows of foil-wrapped, bar-coded accessions to the national collection?

A satisfying historical explanation that responds to these questions requires a consideration of the cultures of seed collecting and preservation among amateurs, enthusiasts, and others without professional status in botanical or agricultural research and, simultaneously, among professional breeders, geneticists, and seed scientists. It also demands a review of the roles played in saving seeds by institutional policies, technical procedures, and biological realities. I explore these elements in what follows, explaining why the collection was made and eventually came to rest at the laboratory in Fort Collins. Through this exploration, it will become clear that my surprise was unfounded. Had I stopped to consider the myriad factors contributing to the survival of these seeds, I would have registered loss as a more striking outcome than continued existence.[1]

I will start with the originator of the bean collection. Burt Berrier of Cañon City, Colorado, had worked for much of his career as a traveling salesman, demonstrating, repairing, and selling farm machinery across the United States. He had begun gathering beans because, in his words, "each has a life in it, it's not dead as collecting clocks, dolls, guns, etc." Beans no doubt had particular appeal because they are comparatively easy to save and come with the added advantage that their diversity is readily apparent in the seeds. By 1977, then aged eighty-three, Berrier claimed a collection of 448 bean varieties.[2]

Thanks to the recently organized grassroots seed-exchange network True Seed Exchange (soon to become Seed Savers Exchange, as it is known today), Berrier was connected to others who similarly took pleasure in trading and cultivating "traditional" or "heritage" vegetables. True Seed Exchange and comparable organizations founded in this period encouraged a new perspective among these gardeners. Inspired by national and international attention to the problem of "genetic erosion"—that is, the loss of crop genetic diversity resulting from widespread adoption of uniform commercial varieties—they reconceived treasured garden vegetables as endangered resources and reimagined traditional gardening activities such as seed saving and exchange as significant acts of conservation. Here, seeds were not only the starting point of the next season's harvest but a source of cultural and environmental resiliency as well.[3]

Evidently sharing this faith in the value of saved seeds, Berrier began to worry about the fate of his collection. Regenerating aging seeds to maintain the viability of his stocks required significant labor, meaning that the seeds would die along with him unless he made other arrangements. In the mid-1970s Berrier wrote to what was then the U.S. National Seed Storage Labo-

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[1] My thinking on seed banking is influenced by many works not directly cited here. On seeds see Courtney Fullilove, *The Profit of the Earth: The Global Seeds of American Agriculture* (Chicago: Univ. Chicago Press, 2017); and the work of Christophe Bonneuil, including Marianna Fenzi and Bonneuil, "From 'Genetic Resources' to 'Ecosystems Services': A Century of Science and Global Policies for Crop Diversity Conservation," *Culture, Agriculture, Food, and Environment (CAFE)*, 2016, 38:72–83. On freezing see Joanna Radin, *Life on Ice: A History of New Uses for Cold Blood* (Chicago: Univ. Chicago Press, 2017); and contributions to Radin and Emma Kowal, eds., *Cryopolitics: Frozen Life in a Melting World* (Cambridge, Mass.: MIT Press, 2017).

[2] Kent Whealy, ed., *Third Annual True Seed Exchange* (Princeton, Miss., 1978), p. 18. On Berrier see Beth Ryan, "A Man and His Beans: Burt Berrier," 4 Apr. 2016, Seed Savers Exchange Blog, http://blog.seedsavers.org/blog/burtberrier. A full account of the history sketched in this piece can be found in Helen Anne Curry, "From Bean Collection to Seed Bank: Transformations in Heirloom Vegetable Conservation, 1970–1985," forthcoming in *BJHS Themes* (2019).

[3] Helen Anne Curry, "Garden Variety Diversity: Conserving Vegetable Heritage at the Henry Doubleday Research Association, 1970–1985," forthcoming in *CAFE* (2019). Useful starting points on communities of seed savers include Virginia D. Nazarea, *Heirloom Seeds and Their Keepers: Marginality and Memory in the Conservation of Biological Diversity* (Tucson: Univ. Arizona Press, 2005); and contributions to Nazarea, Robert E. Rhoades, and Jenna E. Andrews-Swann, eds., *Seeds of Resistance, Seeds of Hope: Place and Agency in the Conservation of Biodiversity* (Tucson: Univ. Arizona Press, 2013).

ratory in Fort Collins to ask if it would accept his collection for long-term safekeeping. Although it required some prodding from U.S. Department of Agriculture (USDA) bean breeders outside the laboratory, and was sufficiently delayed that Berrier passed away in the meantime, representatives from the National Seed Storage Laboratory arrived in Cañon City in 1978 to pick up the collection as Berrier had left it. It remains more or less in this form, as I discovered in 2017.

Although this exploration of the motivations behind amateur seed saving in the later twentieth century begins to answer the "Why?" question set out above, it does not fully resolve it. There remains a question of why the USDA has kept Berrier's collection as it has, not fully incorporating it into the larger collection but also never slating it for removal. At this juncture, my explanation requires an account of the U.S. government's preeminent seed storage facility in Fort Collins and what researchers hoped to glean from Berrier's seeds.

When researchers and administrators within the USDA began agitating for a long-term seed storage facility in the late 1940s, they argued that this would end expensive, needless, and increasingly irreversible losses of actual and potential breeding stock. As one advocate of the storage facility summed up in 1956, "Precious germ plasm is being lost in the United States. Plant genes which are irreplaceable today have died."[4] Given the labor involved in regenerating collections, breeders could be counted on to maintain only what was immediately relevant to their work. This resulted in, among other things, the loss of old breeding stocks, obsolete commercial lines, seeds gathered by plant explorers, and even entire collections when researchers retired or died. Compounding these local losses were absolute losses believed to be happening in farm fields worldwide, as farmers transitioned from diverse and long-established local varieties to more widely used commercial lines. The National Seed Storage Laboratory was created to stem the tide of these losses by warehousing all potentially useful genetic material in the United States.[5] This institutional mandate explains why it seemed like a good repository for Berrier's seeds. The USDA bean breeders who urged the preservation of his collection hoped that it included old commercial varieties that were increasingly difficult to find and that they thought would be valuable in the study of bean viruses.[6]

Accessioning and evaluating the collection was far more time consuming than accepting its donation. When queried by a USDA researcher in 1977 for details about his collection, Berrier had responded: "Have no list of the 200 kinds of beans I have. Most have no names, as they have been sent to me with no information."[7] With little knowledge of what the collection contained, and often very few seeds representing a given variety, bringing it into the national collection entailed growing out the varieties to increase the available seed and then sharing these with USDA bean experts. The researchers then evaluated subsequent generations, to determine what had potential value and therefore ought to be accessioned into the official U.S. Plant Inventory. As a result of these investigations, USDA staff have assigned Plant Inventory numbers to 110 of Berrier's bean varieties since the 1980s. Most of these are maintained as part of the national *Phaseolus* collection at Pullman, Washington, with duplicates stored for long-term preservation at what is today the National Laboratory for Genetic Resources Preservation in Fort Collins.

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[4] U.S. House of Representatives, *Department of Agriculture Appropriations for 1956: Hearings before the Subcommittee of the Committee on Appropriations*, 84th Cong., 1st sess., Pt. 4 (Washington, D.C.: Government Printing Office, 1955), p. 1848.

[5] Edwin James, "Appendix I: Organisation of the United States National Seed Storage Laboratory," in *Viability of Seeds*, ed. E. H. Roberts (London: Chapman & Hall, 1972), pp. 397–404. A key reference work on the history of genetic resources conservation by state institutions and international agencies is R. Pistorius and J. van Wijk, *The Exploitation of Plant Genetic Information: Political Strategies in Crop Development* (Wallingford, Oxfordshire: CABI, 1999).

[6] S. M. Dietz to Louis Bass, 4 Jan. 1976, National Laboratory for Genetic Resources Preservation (NLGRP), Fort Collins, Colorado, Folder: Berrier Bean Collection 2. All of the information about the life of the Berrier seed collection after its donation comes from the files held at the NLGRP.

[7] Burt Berrier to Bass, 8 Jan. 1977, NLGRP, Folder: Berrier Bean Collection 2.

This incorporation of potential research and breeding material into the national collection, and its ready availability for what the USDA calls *bona fide* research purposes, is what USDA breeders had in mind when they urged the collection's preservation in the 1970s. These distribution-ready seeds are not the seeds that I admired on my visit to the National Laboratory for Genetic Resources Preservation, however. The efficient technical procedures of the laboratory may explain why Berrier's seed jars were initially left intact (presumably their original placement in the freezer was to maintain them until the official accessioning was complete) but not really why they remain so decades later. The seeds left in the hand-labeled jars are not scheduled for continuous regeneration, nor are they easily available to individuals outside the laboratory. Their likely trajectory is a slow death in cold storage.

The procedural challenges of deaccessioning or discarding donations to the laboratory no doubt offer some insight into this ultimate fate. But getting rid of collected seeds is especially difficult when they are gathered in an institution with a conservation mandate as encompassing as that of the National Laboratory for Genetic Resources Preservation. Here the benign neglect that results from laboratory protocols is entangled with more compelling uncertainties: We do not know what the future will bring. Who can say whether a seed may yet contain something important for our survival? Since the 1960s, pervasive uncertainty about the future of food and the environment has both inspired seed saving and justified it, whether this takes place in backyard gardens or government vaults.[8] Existential fears, keenly felt by individuals and communities and also regularly deployed in politics and institution building, are one more essential piece of my explanation.

Like so many historical accounts, this effort to home in on a particular circumstance—seeds that remain entombed in baby-food jars on shelves otherwise packed tight with standardized, barcoded foil packages—instead flies outward in many directions. My search for a cause locates multiple causes: the personal motivation of an enthusiast; the biology of beans; the reinforcement of beliefs and norms within a community of seed savers; the mandate of a government facility; the technical execution of genetic conservation by professional researchers; an existential imperative reinforced by conservation science and politics. These many causes converged toward what now seems to me to be the expected outcome: discovering Burt Berrier's beans resting in peace in Fort Collins, Colorado.

[8] See, e.g., Nurcan Atalan Helicke, "Seed Exchange Networks and Food System Resilience in the United States," *Journal of Environmental Studies and Sciences*, 2015, 5:636–649; and Rodney Harrison, "Freezing Seeds and Making Futures: Endangerment, Hope, Security, and Time in Agrobiodiversity Conservation Practices," *CAFE*, 2017, 39:80–89.