

## How the Potato Changed World History

It may be hard to believe, but the humble potato is a world-changing vegetable. Today you might think that French fries and potato chips are the potato's major contributions. But in terms of plants that influenced the course of history -- socially, politically, economically, and ecologically -- few other crops can compare.



### The Columbian Exchange

Potatoes were unknown to the world outside the high elevations of the Andes and part of what is now Chile before that truly world-changing event, the arrival of Columbus to the New World. The influx of Europeans and Africans to the Americas that followed his arrival set in motion a chain of events that changed the face of the entire world. And many of these changes related to plants, including potatoes, maize, tobacco, cacao and rubber trees, crops previously unknown to the rest of the world.

The story of how the world changed when the Americas were linked first with the Europe and then with China is the subject of a fascinating book aptly titled *1493: Uncovering the New World Columbus Created* (Alfred Knopf, 2011). Author Charles Mann details the wide-ranging changes that happened all over the globe as a result of what is called the Columbian Exchange, the ecological and economic exchange of plants, people, minerals, insects, and diseases that underlay major global changes such as the development of the African slave trade, the rise of European power, and the demise of imperial China, and whose influence continues to this day. According to Mann, "To ecologists, the Columbian Exchange is arguably the most important event since the death of the dinosaurs."

### Potatoes and the Rise of the West

So how does the lowly potato fit into all of this? When Spanish explorers arrived in the Andes, they found the people there cultivating a wide range of potato varieties adapted to specific conditions of elevation and soil. Unlike grains, potatoes are much more productive on a given amount of ground, and also unlike grains, potatoes contain sufficient nutrients to serve by themselves as the basis of a reasonably healthful diet. Although the acceptance of potatoes in Europe was slow initially (it was the first food that Europeans grew from tubers, rather than seeds, and was regarded with suspicion, even denounced as "an incarnation of evil" since it was not mentioned in the Bible), once it became accepted, it played a huge role in ending the hunger and famines that had previously been routine in Europe, creating the political stability that allowed European nations to prosper. Says Mann, "The potato fueled the rise of the West."

### The Great Hunger

But potatoes were also at the heart of the Great Hunger, the 1845-1850 famine that ensued in the wake of the devastating arrival of potato blight in Europe in the mid- 19th century. This disease, another import from the Americas, is thought to have reached Europe in a load of guano, bird excrement that is mined for use as fertilizer. Found on Pacific Islands off the coast of South

America, guano had been used by Andean peoples to fertilize their potato fields. Europeans imported this cultivation technique as well, the beginning of the use of high-intensity fertilizers to improve crop yields that helped to make the potato such a staple and support Europe's rise in population.

However, unlike in the Andes, the potatoes grown in Europe had little genetic diversity – in fact, most of the Irish potato crop consisted of one especially productive variety. This genetic uniformity set the stage for an epidemic of disastrous proportions, as the potato varieties grown showed no resistance to the blight, and entire fields were wiped out in a matter of days. The suffering that ensued was horrific, especially in Ireland, which endured one of the deadliest famines in history in terms of the percentage of the population affected. More than one million Irish died, and around twice that number emigrated, many of them settling in the U.S.

## Celebrate Diversity

Can plants still change world history? Could an important crop again fall prey to a disease or insect on such an epidemic scale? According to Rob Dunn, in his timely book *Never Out of Season* (Little, Brown and Company, 2017), many important crops face just such a possibility. Modern agricultural practices that rely on just a few widely grown varieties or clones have streamlined food production for many important crops, while decreasing their genetic diversity. At the same time, we have paid too little attention to preserving the natural diversity of the ecosystems where these crops initially evolved, places where wild relatives of crop plants offer genetic resources to work with. If a new insect or disease appears on the scene that threatens a crop, or factors such as global climate change alter growing conditions significantly, plant scientists need a diverse genetic palette to work with in their efforts to breed new varieties with the resilience to meet new threats or to find new means of pest and disease control. Unless the genetic diversity of heritage agricultural varieties, along with what Dunn calls “wild nature,” is preserved, there may be little for scientists to work with.

A couple of examples bring this home. In 1970, a new fungus disease called southern corn leaf blight devastated fields of corn across the country. At that time, about 85% of the corn plants grown in the U.S. were of the same type genetically, called Texas cytoplasmic male sterile. All plants of this type were highly susceptible to the new race of fungus that had evolved, causing catastrophic crop losses. Fortunately, there were still older varieties of corn that carried resistance genes available for farmers and breeders to return to in the years that followed.

This may not be the case for one of our favorite fruits—bananas. Until about 1950, most of the bananas grown for export were of one variety, called Gros Michel. This variety, while tasty and productive, had no resistance to Panama disease, a fungal disease that began attacking banana plantations around 1900. By 1950, the Gros Michel banana was essentially commercially extinct. It was replaced with a new variety called Cavendish, considered not as high quality a fruit but immune to Panama disease. Again, this single banana variety was planted almost exclusively and is the one you find today in your local supermarket. Recently, and ominously, a new fungus disease that attacks Cavendish bananas has arisen in Asia, spread to East Africa, and will most likely make its way eventually to the banana plantations of Central America. Unfortunately, the widespread monoculture of Cavendish bananas has resulted in the loss of many other, more local banana varieties from which breeders could draw for resistance genes. Will there be another banana variety (or varieties) to fill the void if Cavendish disappears? It remains to be seen.

## Taking Action

How can you and your student gardeners help in the movement to improve the genetic diversity of crops and preserve the important resources that “wild nature” offers?

- You can “think globally and act locally” by choosing to grow genetically diverse crops from heritage seed varieties in your school garden. Purchasing these seeds supports the seed growers who are working to keep varieties with broad genetic attributes commercially viable. Make sure your students understand that reasons for including heritage seeds in their garden.
- Join and participate in a seed conservation organization, such as [Seed Savers Exchange](#), whose mission is to promote a diverse “food crop heritage for future generations by collecting, growing, and sharing heirloom seeds and plants.” A great option for students is to participate in their [Citizen Science Corps](#), helping to evaluate varieties by growing them in their school garden and reporting back on attributes such as vigor, yield, and eating quality. [Native Seeds/SEARCH](#) is a regional organization, helping to conserve crops adapted to the Southwest.
- Buy locally grown foods produced using heritage seeds or plants. Encourage your local market to carry these diverse kinds and varieties of fruits and vegetables.
- Support organizations that work to conserve important centers of crop diversity internationally. Check out this list of [twenty seed saving initiatives preserving biodiversity around the world](#) compiled by [Food Tank](#), a global community pushing for food system change.