

FOODS THAT CHANGED THE WORLD

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Woman and child sitting in field of *Oxalis tuberosa* in Central Mexico.

Photo by Steven R. King, 1996.

For many foods which we now enjoy and rely upon, we must thank the people of the Americas who domesticated or discovered them. Many of our everyday foods originated in the ancient New World. Of the world's top 26 crops by tonnage, eight originated in the Americas. A third of United States crop value depends on foods that were first grown in the Americas. Without food crops from the New World, Indonesian satays, Indian curries, and even pizza would be unrecognizable. Let's look at some of the incredible variety of foods from the Americas and their impact on history.

POTATOES

Today, in the United States, we grow 250 varieties of potatoes (*Solanum tuberosum*). Incredibly, Andean natives were already cultivating three thousand varieties before the Spaniards arrived. The Spaniards first encountered the potato in 1535. Initially, they fed potatoes, in combination with another well-known plant, coca, (link Medicines that Changed the World: The Wonders of the Coca Plant) to their Indian silver mine laborers, which kept the slaves working at a feverish pitch under incredibly difficult conditions. Eventually, potatoes were transported back to Spain, then dispersed throughout the world. Today at least 130 countries grow some variety of potato.



A wild crop relative of Potatoes (*Ullucus tuberosa*) .
Photo by Steven R. King, 1996.

Potatoes arrived in Ireland toward the end of the sixteenth century. By 1625, the potato was a cheap and nutritious staple. By the end of the eighteenth century, an Irish citizen might eat up to ten pounds of potatoes a day. Potatoes fueled an enormous increase in the population, particularly among the poor, with global repercussions. Partly because of limited genetic diversity, the European potato crop failed numerous times due to blight and other fungal diseases, but none matched the famine that began in 1845 and resulted in an estimated one million deaths and at least 1.5 million immediate emigrants. The potato arrived in North America in 1620 but commercial production did not begin until a hundred years later in New England. Demand for potatoes grew dramatically with the flood of Irish immigrants in the 1850's. Today, potatoes are one of the four most important food plants in the world with the Soviet Union producing the largest harvest.

THE TOMATO

The tomato (*Lycopersicon esculentum*) is native to Mexico but many varieties are found in the Andes. Crop evolution specialists still return to Andean valleys in search of wild relatives that might help modern breeders to improve crops. Tomatoes were actually accepted in Asia before they were in Europe, having been transported to the Philippines shortly after Magellan's' voyage of 1521. From there they were introduced into China, Japan, and India.

Before Columbus, the Italians had no tomato sauce, and before Marco Polo, they had no pasta either! The Spaniards brought the tomato to Europe in the 16th Century; it was grown in Italy in the mid 1500's. In the United States, tomatoes were believed to be poisonous until the 19th Century. French and Italian immigrants first popularized the tomato in North America.

THE CHILI PEPPER STORY

Chili peppers (*Capsicum annum*) transformed world cuisine through a simple historical accident. The demand for black pepper sent European explorers abroad in search of new sources of the spice. When the Spanish found themselves in the West Indies, mistaking them for the Spice Islands, they inquired about the location of pepper plants, but found none. The only spices to emerge from the Americas were allspice (*Pimenta dioica*) from the Caribbean and chili peppers from Latin America.

Chili peppers soon became a valuable item of trade. The ancestors of these crops are believed to have originated in Bolivia, but they influenced diets from the Inca to the Aztec empires, then traveled the world. Chilies provide the spicy heat which we now associate with much Indian, Chinese, Southeast Asian, and Ethiopian cuisine. China is now the world's biggest exporter of chili peppers, followed by Mexico and India. Capsaicin is the pepper's fiery active ingredient, which researchers now believe may prove useful as an anti-inflammatory against arthritis. And so, chilies may soon have as significant medical importance as they have had culinary influence.

THE PEANUT

So highly was the peanut regarded in ancient Amazonian cultures that its image was cast in precious metals and buried with royalty. There are probably more than 80 wild peanut species. Amazonian natives eat both wild and cultivated varieties, both of which harbor the genetic variations that could help improve and protect harvests elsewhere from disease, drought, and temperature changes.

Peanuts became a basic source of protein for millions of people. Just as the potato improved nutrition and spurred population growth in Ireland, the peanut increased the protein intake in Asia and Africa. It reached Africa aboard Portuguese ships and Asia aboard Spanish ships. In Europe, the peanut gained a foothold only as a source of oil and food for livestock. Today, in the United States, the major use of the peanut crop is to make peanut butter.

MANIOC

Manioc (*Manihot esculenta*) or cassava is one of the most important root crops in all of lowland South America. First grown in the relatively poor soils of the Amazon, the indigenous peoples there domesticated at least 40 varieties. Though some manioc varieties can be eaten directly, others contain a poison that must be thoroughly removed. Amazonians developed a number of woven fiber presses and sieves to grate, press, and dry the tubers until they were safe to eat.

Manioc has some amazing food qualities. It can be stored in the ground for several years after it has reached maturity. It is also about one-third starch and produces a great deal of calories from nutrient-poor soils, which has led to its adoption by much of the world, notably in Africa. Although manioc is one of the world's most important crops, in the United States manioc has seen little use, except in tapioca pudding.

CHOCOLATE AND VANILLA

One of the world's most cherished desserts comes from cacao (*Theobroma cacao*). We call it chocolate, a name drawn from an Aztec dialect. Cacao became a trade item for the Europeans, but the Aztec considered it a gift from the gods. Today the Amazonian Indians eat only the white seed coat. Chocolate is made from the toasted fermented seeds.

Vanilla (*Vanilla planifolia*) is harvested from an orchid and was also first domesticated in Mesoamerica (known today as Central America). There are ninety species but only two produce commercial vanilla. This plant is still cultivated by the Totonac Indians, who may have been first to domesticate it. Today, however, almost all cultivated vanilla comes from Madagascar and the Comoro Islands in the Indian Islands.

SWEET POTATOES

Europeans first sampled sweet potatoes (*Ipomoea batatas*) in the Caribbean. This tuber traveled through the Pacific to Asia, where its popularity makes it one of the world's top 15 food crops today. Native to Mexico, the sweet potato has no botanical or ecological relationship with the true potato from the Andes. The Spanish brought sweet potatoes to the Philippines and the Portuguese distributed them further across the Pacific. The Maori integrated sweet potatoes into their mythology and have elaborate ceremonies connected to its planting, harvest, and storage.

Today China grows nearly 80 percent of the world's sweet potatoes. The sweet potato reached China from Okinawa in the early 1600's. It had become popular in southern Japan partly due to its resistance to insects and to the typhoons that sometimes devastated rice crops. During a major Japanese famine in the 1730's, sweet potatoes prevented many from starving.

CORN



Drawing by David Wood,
Genentech Graphics Department

Corn (*Zea mays*) was domesticated from a wild plant called teosinte (*Zea mexicana*) at least seven thousand years ago. Considered a sacred crop, corn figured prominently in Mayan creation myths; one famous image depicts an earth god sprouting from a stalk. Adaptable to a wide range of habitats, corn converts the sun's energy more efficiently than other cereals.

Corn made its way to Europe as a curiosity with the first departing explorers' vessels. It also entered Europe with the Moors, via Turkey and North Africa. Corn quickly took root in much of Africa. Together with the peanut and cassava, it completely transformed the diet of much of Africa which had been based on grains such as sorghum and millet. Corn brought about a rapid rise in population throughout much of the continent. Africans eat a large percentage of the more than three hundred million metric tons of corn produced worldwide each year. Today corn is a dietary staple for more than two hundred million people worldwide

OTHER VALUABLE FOOD CONTRIBUTIONS

Among the other popular foods originating in South America are pineapples ([link Medicines that Changed the World: The medicinal uses of pineapple](#)) (*Ananas comosus*), cashews (*Anacardium occidentale*), avocados (*Persea americana*), and strawberries (*Fragaria chiloensis* and *F. virginiana*).

IMPLICATIONS FOR THE FUTURE

We have really just scratched the surface of potential staple foods native to Central and South America. Some of the colorful Andean tubers are still poorly known outside of their homeland. Indian grains and cereals are also just now being introduced to our markets. One example is the important Andean grain, technically a pseudocereal, called quinoa (*Chenopodium quinoa*). Quinoa provides protein for millions of people in the Andes where the crop thrives despite the high altitude, extreme cold, and high winds. The Incas considered quinoa sacred. It contains high levels of all the essential amino acids making it a more balanced food than wheat, rice, corn, sorghum or millet. In 1988, 750 tons of quinoa entered the United States, Europe, and Asia.



Drawing by David Wood,
Genentech Graphics Department

The famines we've mentioned demonstrate the danger of depending heavily on a single crop without the safety net of genes from its wild relatives. As crop monocultures become ever more vulnerable to disease, we have begun to realize the importance of agricultural techniques emphasizing biodiversity--some of which were practiced hundreds and thousands of years ago by ancient New World cultures! The genetic resources and agricultural knowledge the people of the Americas oversee remain critical to global food security. Their storehouse of knowledge is only now becoming fully appreciated by modern agricultural researchers. The time has come to form a union to not only promote research in our own societies, but to give something back to the contributing people.