

# Fruits and vegetables used to look so different

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A teenage boy sells vegetables at a market in Peshawar, Pakistan, April 21, 2009. REUTERS/Ali Imam

When we're kids, we learn that carrots are orange, bananas are yellow, and eggplants are big and purple. And that's how we always think about them. Look back into history, even recent history, and you'll find that the fruits and vegetables we eat today were pretty different.

Humans have been changing the genetics of fruits and vegetables for thousands of years through selective breeding. Farmers would carefully select which seeds to plant depending on the taste of the current crops, a process called "selective breeding." They would replant the seeds of the carrots, plums or eggplants that had the best taste, most pleasing texture and highest yield. In agriculture, the yield is the amount of food harvested. The plum tree with the most plums has the highest yield, and is the most likely plum tree to be replanted.

## Bred For The Best Color And Taste

Carefully choosing the seeds of only the best fruits and vegetables to replant made fruits and vegetables more colorful and tasty over time. As anyone who has tried a wild plum can tell you, wild fruits are often more sour with thick, bitter skins. The fruit and vegetable varieties we see in

our grocery stores have been selectively bred over generations into nature's candy. Compared with their wild ancestors, they are huge, sweet and easy to eat.

Each fruit and vegetable has its own story. The eggplant, for example, got its English name because the original plant looked like a small white egg. Since then, selective breeding has turned it into a large fleshy, purple vegetable. The shape and color changed as farmers chose to replant varieties with less bitter flesh and bigger fruits.

It's not just our tastes influencing how fruit and vegetables have been cultivated. Size, shape and color have also played a role in selective breeding. Wild carrots grow in a variety of colors, from yellow to purple to white, but they are not naturally orange. Dutch folklore says that the orange carrot was selectively bred in the Netherlands during the 17th century to honor William of Orange, who led the cause of Dutch independence.

### **Rewriting The Genetic Code**

Politics often determine the choices made about which fruits and vegetables are acceptable or unacceptable as well. As selective breeding started taking place in labs, it became more controversial. In 1994, the first genetically modified tomato, the "Flavr Savr," hit grocery stores. Scientists at Calgene, Inc. in Davis, California, had inserted a gene in the Flavr Savr that stopped the tomatoes from ripening too quickly. It was a scientific success, but it did not become a commercial success. The public viewed the genetic engineering as suspicious.

Despite the controversy, genetically modified foods can be seen as the extension of the long history of selective breeding. Humans have been genetically modifying foods since farming began about 12,000 years ago. Selectively breeding crops that were more desirable changed their genetics. Gregor Mendel experimented with breeding pea plants in the mid-1860s. He showed how dominant and recessive genetic traits in the pea plants were passed on through selective breeding. Those experiments paved the way for our modern understanding of genetics.

Genetically modified foods (GMOs) have become more common since the 1990s. Today, corn is the most widely grown crop in the United States, and about 90 percent of corn crops are genetically modified. The majority of U.S. corn is used to feed livestock, and the rest makes its way to our plates as corn on the cob, or in the form of products like corn syrup and cornstarch.

Even though respected scientific bodies such as the American Medical Association have found no scientific reason to not eat them, a 2015 Pew Research Center poll found that more than half of consumers (57 percent) consider GMOs potentially dangerous. This is in part because genetically engineered crops often rely on growing only one specific variety of crop at a time, a practice called a monoculture. Monoculture's reliance on a single variety can decrease the crop's resistance to disease.

### **Send In The Clones**

The banana is perhaps the best example of a fruit grown through monoculture. The yellow Cavendish banana found in grocery stores was named after the Englishman William Cavendish, a devoted horticulturalist and the sixth duke of Devonshire. The duke's gardeners were the first to grow the Cavendish variety in the extraordinary greenhouses at Chatsworth House in Derbyshire, England, in the 1830s. The banana was then shipped to Samoa and the Canary Islands and brought into large-scale cultivation soon after.

Although fruits, including wild bananas, have seeds, the Cavendish bananas lacked them because they are cultivated from clones. Each banana plant is genetically identical and grows asexually from the roots of a mother plant. This results in the same fruit produced generation after generation.

Unfortunately, though, this also means that each successive generation is the same, so the plant cannot adapt to protect itself from diseases and pests.

The Cavendish banana became popular worldwide in the 1950s because it was resistant to Panama Disease, a fungus that decimated the previous popular variety, Gros Michel (or "Big Mike"). The Cavendish certainly did not become the most popular banana variety because of its taste, which is apparently relatively plain compared with the Gros Michel.

With its thicker skin, the Cavendish was easier for growers to ship because it didn't bruise as much as other varieties. Today, the Cavendish variety represents 99 percent of commercially exported bananas, but its reign as king banana may come to an end. Years of monoculture have made the Cavendish unable to fight a new strain of Panama Disease. Once the Panama Disease fungus reaches crops in Latin America, the Cavendish could be extinct in a matter of decades.

## Quiz

- 1 What do plums, carrots, and eggplants all have in common?
- (A) They were derived, through selective breeding, from wild relatives that had different features.  
(B) They were intentionally invented, through selective breeding, from other types of fruits and vegetables.  
(C) They were all named after famous historical people who were pioneers of selective breeding.  
(D) They all used to have thick, bitter skins, bitter flesh, and high sugar content.
- 2 Read the following sentence from the article.
- Today, the Cavendish variety represents 99 percent of commercially exported bananas, but its reign as king banana may come to an end.*
- What is the MOST reasonable inference based on this sentence?
- (A) Demand for Cavendish bananas is expected to increase.  
(B) Growers are currently slowing production of Cavendish bananas.  
(C) Other varieties of bananas are beginning to replace Cavendish bananas.  
(D) Production of Cavendish bananas will likely decrease in the future.
- 3 How could GMOs best be characterized in relation to selective breeding?
- (A) Making GMOs is a type of selective breeding that relies on natural populations of fruits and vegetables cross-pollinating.  
(B) Selective breeding is a type of GMO production that relies on natural populations of fruits and vegetables cross-pollinating.  
(C) Making GMOs is a type of selective breeding that relies on scientists' ability to insert genes into other organisms.  
(D) Selective breeding is a type of GMO production that relies on scientists' ability to insert genes into other organisms.
- 4 Which idea is BEST supported by the section "Rewriting The Genetic Code"?
- (A) Most modern foods that are selectively bred are able to retain the same genes as their ancient relatives.  
(B) Farmers are able to breed a large amount of genetically modified foods since multiple varieties of crops are grown simultaneously.  
(C) Selective breeding has resulted in a divide between public view and scientific perspectives.  
(D) Genetic modification of foods poses a health risk to humans and other organisms.
- 5 How have breeders and producers ensured a steady supply of high quality Cavendish bananas?
- (A) through sexual reproduction, in which offspring have the same genetic makeup as parents  
(B) through sexual reproduction, in which the genetic makeup of offspring is better than their parents  
(C) through asexual reproduction, in which offspring have the same genetic makeup as parents  
(D) through asexual reproduction, in which the genetic makeup of offspring is better than their parents

Read this sentence from the section "Bred For The Best Color And Taste."

*The eggplant, for example, got its English name because the original plant looked like a small white egg.*

Does this sentence support the MAIN idea of the article? Why or why not?

- (A) No, because it provides a detail about a particular food's history.
- (B) Yes, because it gives an example of a genetically modified food.
- (C) No, because it compares two very different types of food.
- (D) Yes, because it explains the origins of a food's name.

What farming practices might put supplies of corn and bananas at risk?

- (A) that neither corn nor bananas have been sufficiently sprayed for pests
- (B) that neither corn nor bananas have enough genetic diversity to withstand disease
- (C) that both corn and bananas are grown in places with lots of fungi
- (D) that both corn and bananas lack seeds that allow them to propagate easily

What is the central idea of the section "Send In The Clones"?

- (A) There is a diverse range of bananas sold in stores worldwide.
- (B) The popular and widespread Cavendish banana is growing less resistant to disease.
- (C) Panama Disease is threatening banana varieties, including the Gros Michel and the Cavendish.
- (D) Bananas reproduce asexually in Latin America, Samoa and the Canary Islands.