



CROPS IN CRISIS: MAIZE

ORIGINS OF MAIZE

The history of modern-day maize, or corn, begins at the dawn of human agriculture, about 10,000 years ago. Ancient farmers in what is now Mexico took the first steps in domesticating maize when they simply chose which kernels (seeds) to plant. These farmers noticed that not all plants were the same. Some plants may have grown larger than others, or maybe some kernels tasted better or were easier to grind. The farmers saved kernels from plants with desirable characteristics and planted them for the next season's harvest. This process is known as selective breeding, or artificial selection. Maize cobs became larger over time, with more rows of kernels, eventually taking on the form of modern maize.

Later changes in the evolution of modern maize involved many genes (perhaps thousands), each creating a small effect. These minor changes include the following:

- Types and amounts of starch production
- Ability to grow in different climates and types of soil
- Length and number of kernel rows
- Kernel size, shape, and color
- Resistance to pests

These examples fit with the traditional view of evolution as gradual change over time. Local groups of farmers selected for characteristics that they preferred, and that worked best in their particular environment. Over thousands of years, selective breeding generated the broad diversity of corn varieties that are still grown around the world today.



WHY IS MAIZE A “CROP IN CRISIS”?

Prolonged drought, changes in precipitation, heat waves and severe storms linked to climate change, diseases, invasive weeds and insect pests are intensifying maize production problems throughout the world, particularly in Africa, where 300 million people depend on it as their primary food source. Most maize production is dependent on rainfall, so changing weather patterns have a pronounced impact on the crop. Even farmers in the United States — the world's leading producer of corn — are experiencing problems linked to reduced rainfall and diminishing water supplies for irrigation. Breeders have worked to develop maize varieties that are resistant to drought and insects, particularly the destructive western corn rootworm. However, this resistance diminishes over time. Additionally, some countries have opposed the introduction of crops with genetically engineered traits, leaving farmers with few options for dealing with threats.





NUTRITIONAL INFORMATION ABOUT MAIZE

Fresh sweet corn has far fewer calories than field corn and other cereal grains, such as wheat, rice, etc. The calories chiefly come from simple carbohydrates like glucose and sucrose, as opposed to the complex sugars, like amylose and amylopectin, found in cereals.

Sweet corn features a high-quality phyto-nutrition profile comprising dietary fiber, vitamins and antioxidants in addition to minerals in moderate proportions. It is one of the finest sources of dietary fibers; 100 g kernels carry 2 g, or 5% of the daily requirement, of dietary-fiber. However, corn, like white rice and potatoes, is one of high glycemic index food items, making it of limited value to diabetic patients.

Yellow variety maize has high levels of phenolic flavonoid pigment antioxidants, such as β -carotenes, and lutein, xanthins and cryptoxanthin pigments, along with vitamin A.

One hundred grams of fresh kernels provide 187 IU, or 6% of the daily requirement, of vitamin-A. Altogether, these compounds are required for maintaining healthy mucosa, skin and vision. Consumption of natural foods rich in flavonoids help protect from lung and oral cavity cancers.

Maize is a good source of phenolic flavonoid antioxidant, ferulic acid. Several research studies suggest that ferulic acid plays a vital role in preventing cancers and inflammation in humans. Maize also contains good levels of some of the valuable B-complex group of vitamins, such as thiamin, niacin, pantothenic acid, folates, riboflavin, and pyridoxine. Many of these vitamins function as co-factors to enzymes during substrate metabolism.

Further, it contains healthy amounts of some important minerals, such as zinc, magnesium, copper, iron and manganese.

FUN FACTS ABOUT MAIZE

- The long threads on top of an ear of maize are called silks.
- There is one silk strand for each kernel of maize.
- Corn can be yellow, white, red or bluish/black.
- A typical healthy maize plant is between 6-12 feet tall.
- The root system of healthy maize can grow 5-1/2 feet into the ground.
- Most ears of corn have about 800 kernels in 16 rows.
- Maize is an ingredient in over 3,000 grocery items.
- One acre of maize removes about 8 tons of carbon dioxide from the air during the growing season.
- Antarctica is the only place in the world maize isn't grown.
- Cornflakes are only about 8% maize.

CROPS IN CRISIS: A ROLE FOR BIOTECHNOLOGY?

allianceforscience.cornell.edu

[f /ScienceAlly](#) [t /scienceally](#) [y /user/scienceally](#)

