



Increasing crop yields and farmer profitability through hybrid maize

Since the 1930s, hybrid maize varieties have led to significant increases in crop yields for farmers on every continent.

Hybrids are the offspring of a cross between two different parent plants. Commercial maize hybrids are produced by crossing two genetically pure parent lines, called “inbreds.”

Maize farmers have benefited from new seed technologies that have raised their productivity and profitability.

Maize breeding focuses on improving plant characteristics. The goal of maize breeding is to create hybrids with strong yield potential and characteristics specific to the local environment, such as disease and drought resistance.

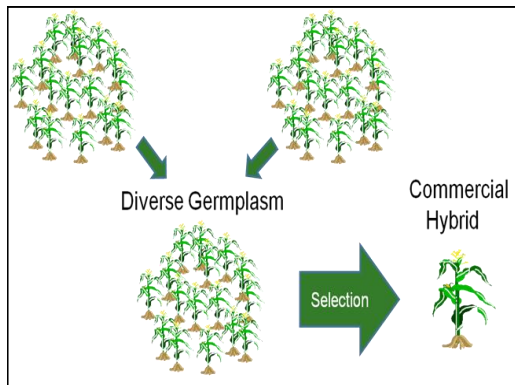
In some crop plants, such as maize, farmers prefer hybrids because they are stronger and perform better across different environments than their parents. This improved performance of hybrids is called heterosis or hybrid vigor.

Hybrid seeds are produced by pollen from one parent plant fertilizing the egg of another parent plant. In order for breeders to ensure the genetic makeup of the hybrid offspring, and thus the traits, the hybridization process must be carefully controlled. In maize production fields, this includes physically removing the male reproductive components, a process called detasselling, from the female parent plant. After pollination, the male parent plants are removed from the field, and only the female plants are harvested with useable hybrid seed.

Germplasm

One of the essential terms in seed breeding is germplasm. Germplasm is the entire collection of genetic resources for an organism, in other words its genetic profile or DNA. The Pioneer maize germplasm, for example, is its entire collection of genetic resources for maize. Pioneer maintains its germplasm as a collection of seeds. Pioneer carefully documents the characteristics, or phenotype, of each of those seeds and stores the information in its information management system to be used in the research program.

The larger and more diverse a germplasm collection is, the more possibility scientists have of identifying novel traits. The Pioneer maize germplasm collection was begun in the 1920s. Today it represents one of the longest standing, most genetically diverse, and most productive private germplasm collections in the world.



Traditional Breeding

Traditional breeding for maize inbreds takes multiple cycles. It takes about ten years to develop a commercial hybrid.

