MU Corn Gene Zoo (2018)

Japonica variegated	fine stripe	iojap stripe	argentia variegated	yellow striped	lineate leaves	Yellow green	lesion	sunburn	golden plant	purple plant	crinkled leaf	liguleless	wrinkled plant	knotted	dwarf	nana plant	brachytic	male sterile	tassel seed	barren inflorescence	branched silkless	anther ear	tunicate
Missouri corn cob pipe		Bloody Butcher		Hopi blue corn	ornamental	ornamental	flour corn	strawberry popcorn	popcorn	sweet corn	waxy corn	amylomaize	102 CRM (early)		111 CRM (mid)		118 CRM (late)		Bt (rootworm)	Bt (corn borer)	Roundup Ready™	LibertyLink™	no biotech
Teosinte	Tabloncillo	Mayo Tuxpeno	Olotillo	Harinoso de ocho	Chapalote pinole maiz	Peptillo	Z01-010	Kokoma	KLongfellow	Yellow Thompson	Smut Nose	Hickory King	Gourdseed	Shoepeg	Yellow Ceole	Golden Prolific	Latham's Double	Winnebago mixed	Lancaster Sure Crop	Reids Yellow Dent	MO17	B73	MO17 X B73

Demonstration of corn history from domestication to modern hybrids

Teosinte: Teosinte is widely accepted as the wild progenitor of modern corn. It produces small ears with hard kernels.

Corn races: Corn was domesticated by Native Americans in Mexico and Central America and then spread throughout the Western Hemisphere. Representative old corn varieties and their races include: **Harinoso de ocho**, **Peptillo**, **Tabloncillo, Mayo Tuxpeno**, and **Olotillo** (early Mexican varieties); **Kokoma** and **Z01-010** (Pima-Papago); **Longfellow**, **Yellow Thompson**, and **Smut nose** (Northern Flints); **Gourdseed**, **Shoepeg**, and **Hickory King** (Southern Dents); **Yellow Creole** and **Golden Prolific** (Southeastern Flints and Fours); **Latham's double** (Derived Southern Dents); **Winnebago mixed** (Great Plains Flints and Flours).

Reid's Yellow Dent: Reid's Yellow Dent, a productive OP variety, resulted from an unplanned, but fortuitous, crossing of a northern flint and southern dent. This variety was the source for many popular inbreds, including B73.

Lancaster Sure Crop: Lancaster Sure Crop was developed by Isaac Hershey in Lancaster County, Pennsylvania. Many modern hybrids have at least one inbred that traces back to this open-pollinated variety.

Inbreds for use in corn breeding were developed as early as the 1920's. Inbreds are derived by forcing corn plants to self pollinate. **B73** (1972) and **Mo17** (1964) are examples of inbreds that were commonly used. A cross between B73 and Mo17 demonstrates hybrid vigor.

Hybrids: The first commercially successful hybrids were double (4-way) crosses that used four inbreds and required two years to complete. Double cross corn hybrids were more economical to produce than single cross hybrids. Double cross corn hybrids were commonly grown in the USA during the 1940s and 1950s. Single cross (2-way) hybrids possess less inbreeding depression, more hybrid vigor, and greater yield potential than double cross hybrids. They use just two inbreds. Today, nearly all of the corn acres planted in the USA is planted with single cross corn hybrids.

Demonstration of the use of biotech traits

Corn hybrids that contain one or more biotechnology traits became commercially available in the late 1990's. Two herbicide resistant traits, Roundup Ready™ (resistant to glyphosate) and Liberty Link™ (resistant to glufosinate), are currently available to corn growers in the USA. The genes that confer herbicide resistance were derived from two different species of bacteria.

Biotech traits that confer insect resistance originated from *Bacillus thuringiesis* and are often referred to as Bt traits. The first Bt trait conferred resistance to feeding by Lepidoptera (moths and butterflies) larva. The primary target insect species is European corn borer. A second Bt trait confers resistance to feeding by Coleoptera (beetles) larva. The primary target insect species is corn rootworm. Both Bt traits confer resistance to several insects other than the primary target species.

Demonstration of adaptation

Modern corn hybrids are nearly day-neutral, meaning that photoperiod length has little effect on the timing of flowering and other stages. Corn development is controlled by the accumulation of heat units. Hybrids adapted to the southern portion of the USA require more heat units to mature than hybrids adapted in the northern Corn Belt. Corn Relative Maturity (CRM) uses the unit "days", but is an estimation of relative maturity and does not mean calendar days.

Demonstration of special uses

Sweet corn hybrids possess one or more genes that slow the conversion of sugars to starch in the kernels. The sugars (e.g. sucrose) have a much sweeter taste than starch. Hybrids with the following genes are displayed at the MU Corn Gene Zou: su, se, sh2, and a combination of su/se/sh2.

Flint corn plants produce kernels that do not dent. Commonly, ears with brightly colored kernels are used as autumn decoration (**ornamental flint**).

Flour corn plants produce soft kernels that are easy to grind into flour. Blue Hopi is exhibited in the MU Corn Gene Zou.

Popcorn is a type of flint corn. When heated, water in the kernels is vaporized to steam. The pericarp restrains the vapor inside the kernel until the pressure is great enough to rupture the kernel. **Strawberry popcorn** plants produce ears that are strawberry fruit shaped with red kernels.

Missouri Corn Cob Pipe Corn produces ears with cobs that are broad in diameter and suitable for making corn cob pipes.

Bloody Butcher plants produce bright red kernels.

The endosperm of **waxy** hybrids produce more than normal amounts of amylopectin starch. The endosperm of **amylomaize** hybrids produce more than normal amounts of amylose starch.

Demonstration of the effects of single genes on plant development and morphology

The MU Corn Gene Zou displays a number of mutants corn lines. The trait gene and name are given in the table below. Please read the sign in front of plants for more a description.

Gene	Name	Gene	Name	Gene	Name
al1	albescent plant	*hs1*	hairy sheath	*sdw1*	semidwarf plants
an1	anther ear	*hsf1*	hairy sheath, slashed	*sk1*	silkless
ar1	argentia	*id1*	indeterminate growth	*sl1*	slashed
ba2	barren stalk	*ij1*	iojap striping	*sr1*	striate leaves
bd1	branched silkless	*j1*	japonica striping	*tb1*	teosinte branched
bif1	barren inflorescence	*kn1*	knotted	*tlr1*	tillered
bk2	brittle stalk	*la1*	lazy plants	*tp1*	teopod
blh1	bleached leaf	*les1*	lesion	*ts1*	tassel seed
bm1	brown midrib	*lg3*	liguleless	*ts6*	tassel seed
br1	brachytic	*li1*	lineate leaves	*tu1*	tunicate
cg1	corngrass	*lw2*	lemon white	*v5*	virescent
clt1	clumped tassel	*lxm1*	lax midrib	*vsr1*	virescent striped
cr1	crinkly leaves	*ms8*	male sterile	*wd1*	white deficiency
ct1	compact plant	*na1*	nana plant	*wi2*	wilted
d8	dwarf	*nl2*	narrow leaf	*wrp1*	wrinkled plant
d10	dwarf	*og1*	old gold stripe	*ws3*	white sheath
eg1	expanded glumes	*pl1*	purple plant	*wt2*	white tips
f1	fine stripe	*ra1*	ramosa	*yg2*	yellow green
g2	golden plant	*rg1*	ragged leaves	*ys1*	yellow striped
gs1	green stripe	*sbd1*	sunburn	*ysk1*	yellow streaked