

Agronomy 212 – Crop Growth, Productivity, and Management

Corn - Development and Selection of Genetics

Yield Determinants

Is Either of These an Interaction?

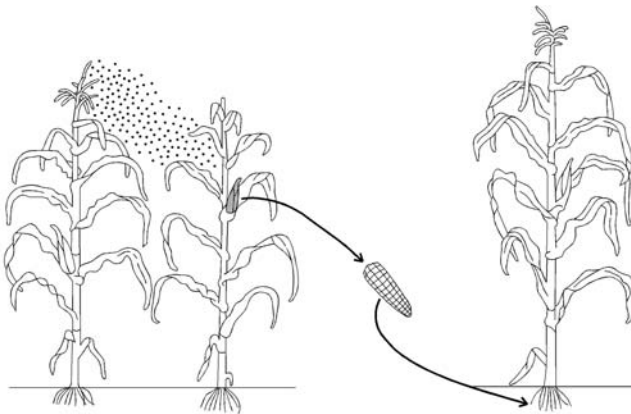
– Example 1

Genotype	Grain Yield (Bu/acre)	
	Location 1	Location 2
A	180	182
B	177	150

– Example 2

Genotype	Grain Yield (Bu/acre)	
	Location 1	Location 2
A	180	192
B	160	174

Hybrids



Hybrid Development

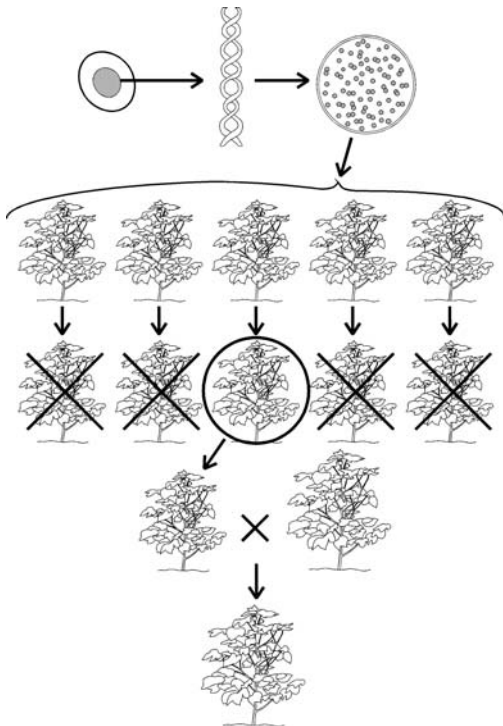
Hybrid Vigor



	AB	Ab	aB	ab
AB	160	160	160	160
Ab	160	110	160	110
aB	160	160	80	80
ab	160	110	80	60

Conventional Breeding Improvements to Corn

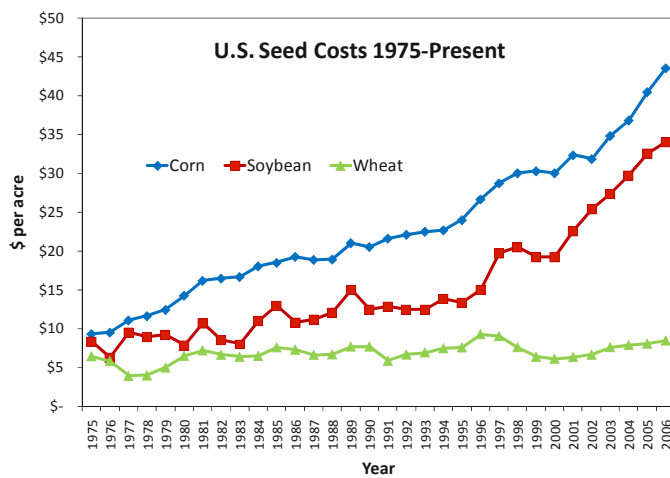
Transgenic plants



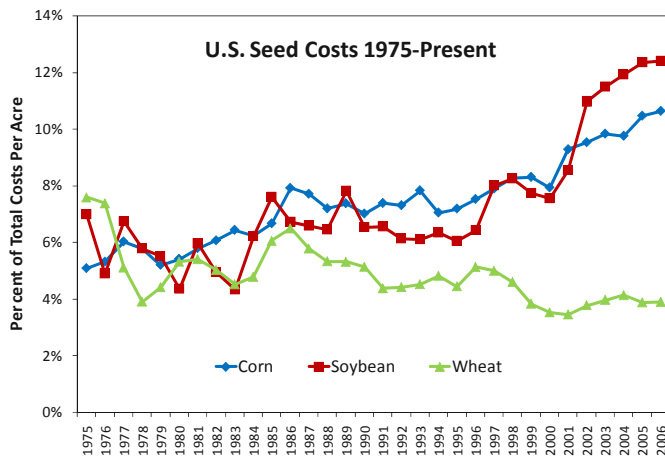
Bt Technology

1. The Bt gene that produces the desired lethal protein is joined to a marker gene for antibiotic resistance.
2. Bt gene + marker is inserted into plant cells.
3. Plant cells are grown in the presence of antibiotic.
4. Cells that carry the Bt gene + antibiotic resistance gene survive and are grown into plants.

The diagram shows the Bt technology process. It starts with a plant branch labeled 'Bt' and a separate 'Marker' gene. An arrow points to a plant cell where the Bt gene and marker gene are being inserted. Below this, a petri dish shows plant cells growing in the presence of antibiotic. A second petri dish shows that only the cells that have successfully integrated the Bt gene and marker gene survive. Finally, an arrow points to a corn cob and a potato, representing the final transgenic crops.



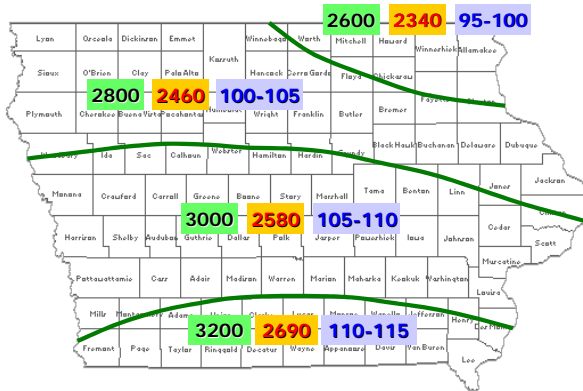
Source: USDAERS



Corn Hybrid Maturity

Seasonal Growing Degree Days

May 10 - October 10 **Total** **Safely Available** **Days**



Map courtesy of Iowa PROfiles - <http://www.profiles.iastate.edu>

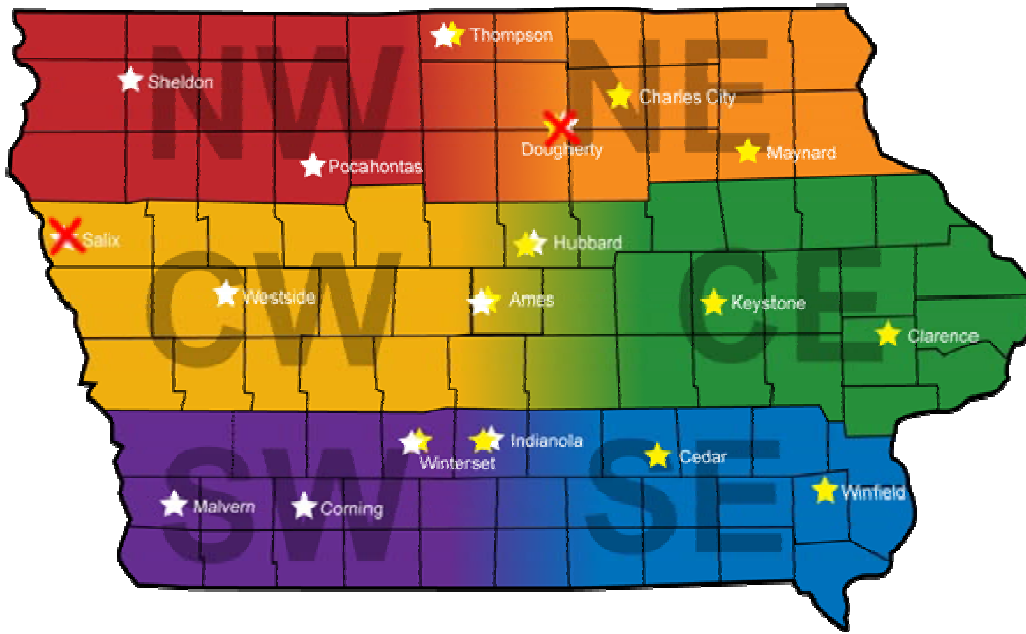
Checklist for Selecting Genetics

Selecting Superior Genetics

Independent Hybrid Tests

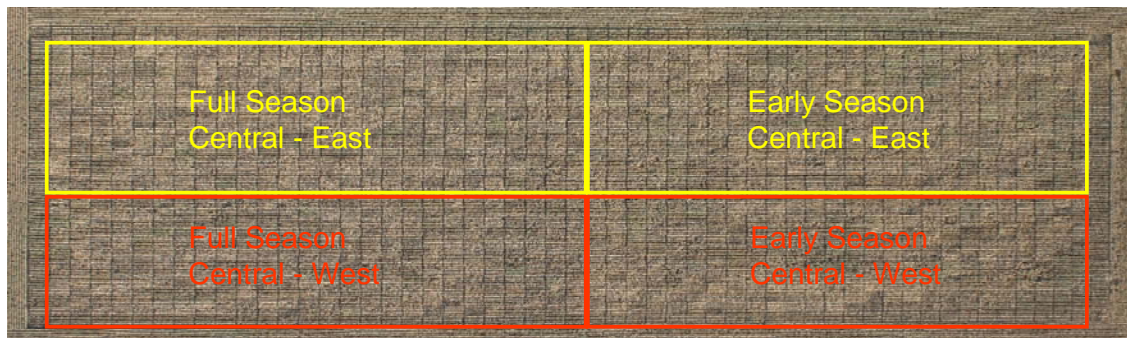
F.I.R.S.T

Iowa Crop Performance Test - Corn

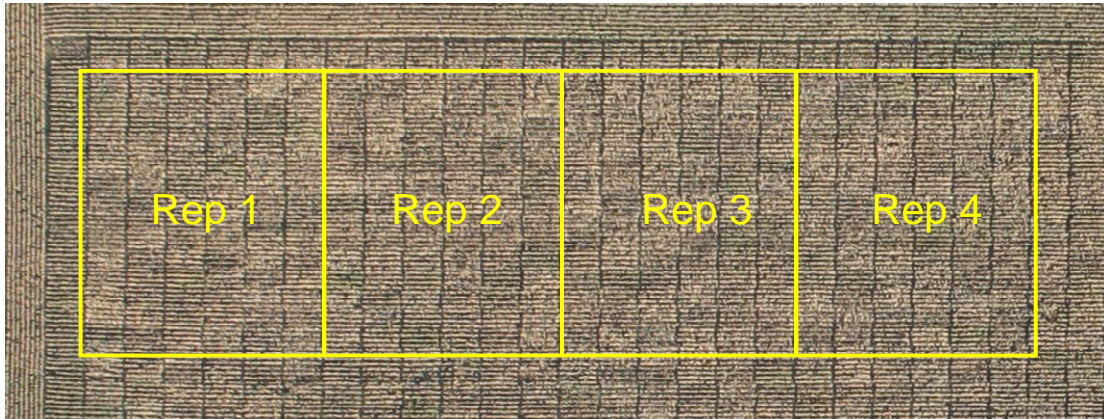


Districts and Locations

Site Layout - Ames



Test Layout



Adjusted gross value = gross value – drying cost

Gross value = dry yield x price per bushel

Dry yield = ((100-total shrink)/100) x wet yield

Total shrink = water shrink + handling loss

Water shrink = shrink factor x (%moisture – 15.5)

Shrink factor = 1.183

Handling loss = 0.5

Drying cost = wet yield x (%moisture - 15.5) x drying cost per point per bushel

Analysis and Use of Crop Performance Tests

Seed Cost

	Hybrid B	Hybrid A	Difference
Seed cost/bag (80,000 units)	\$130.00		
Yield history or performance test results	170 Bu/A		
Revenue/A at \$2.25/Bu			
Seed cost at 32,000/A			