



Knee High by the 4th of July: Understanding The Basics of Corn Production

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Pioneer Hi-Bred Limited**

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Overview

- **Hybrid Selection**
- **Fertility**
- **Plant Populations**
- **Planting Tips**
- **Corn Physiology**
- **Silage Management**
- **Grazing**



Hybrid Selection

Selection Criteria

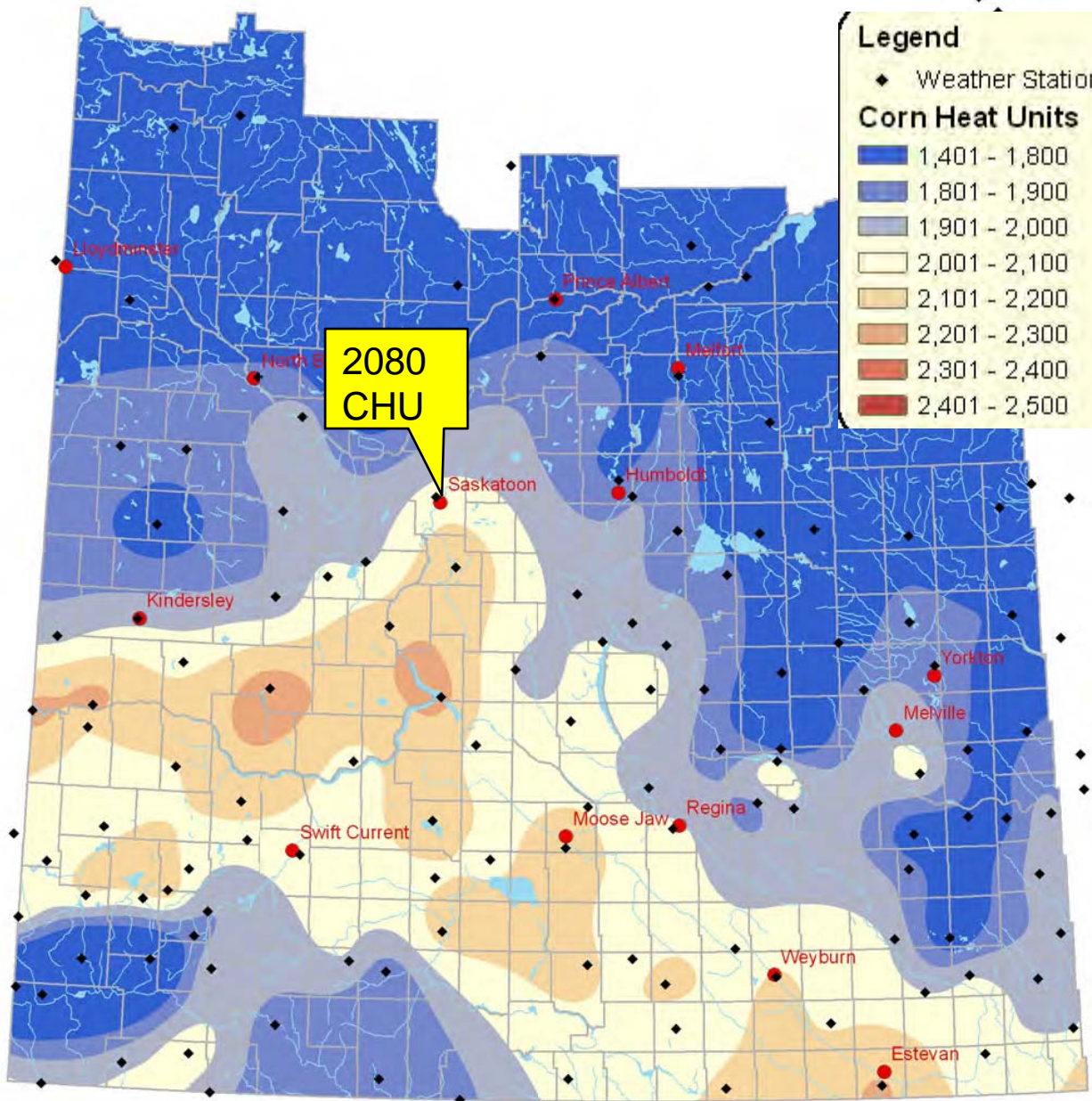
1. Grain

- Maturity is # 1 key for Grain

2. Silage

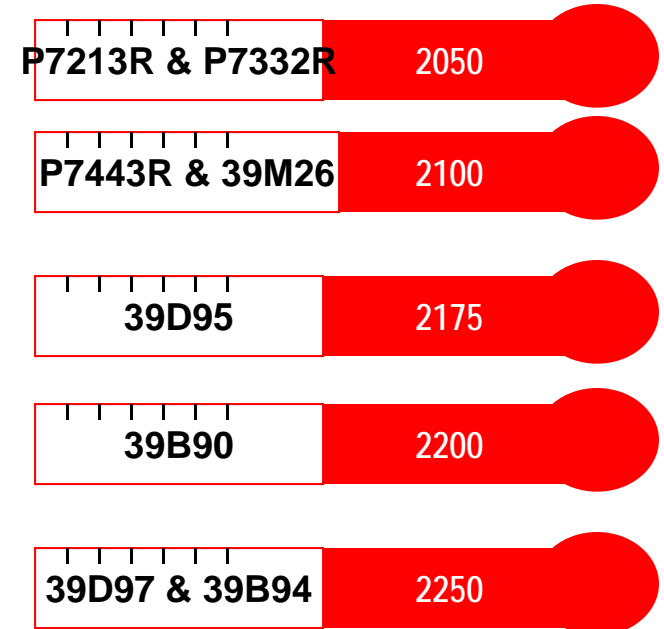
- Hybrids can have up to **150 to 200** more **CHU**.
- Plant Stage is key for quality

90 PER CENT CONFIDENCE FOR GRAIN PRODUCTION (9 years out of 10 you will get at least these CHUs)



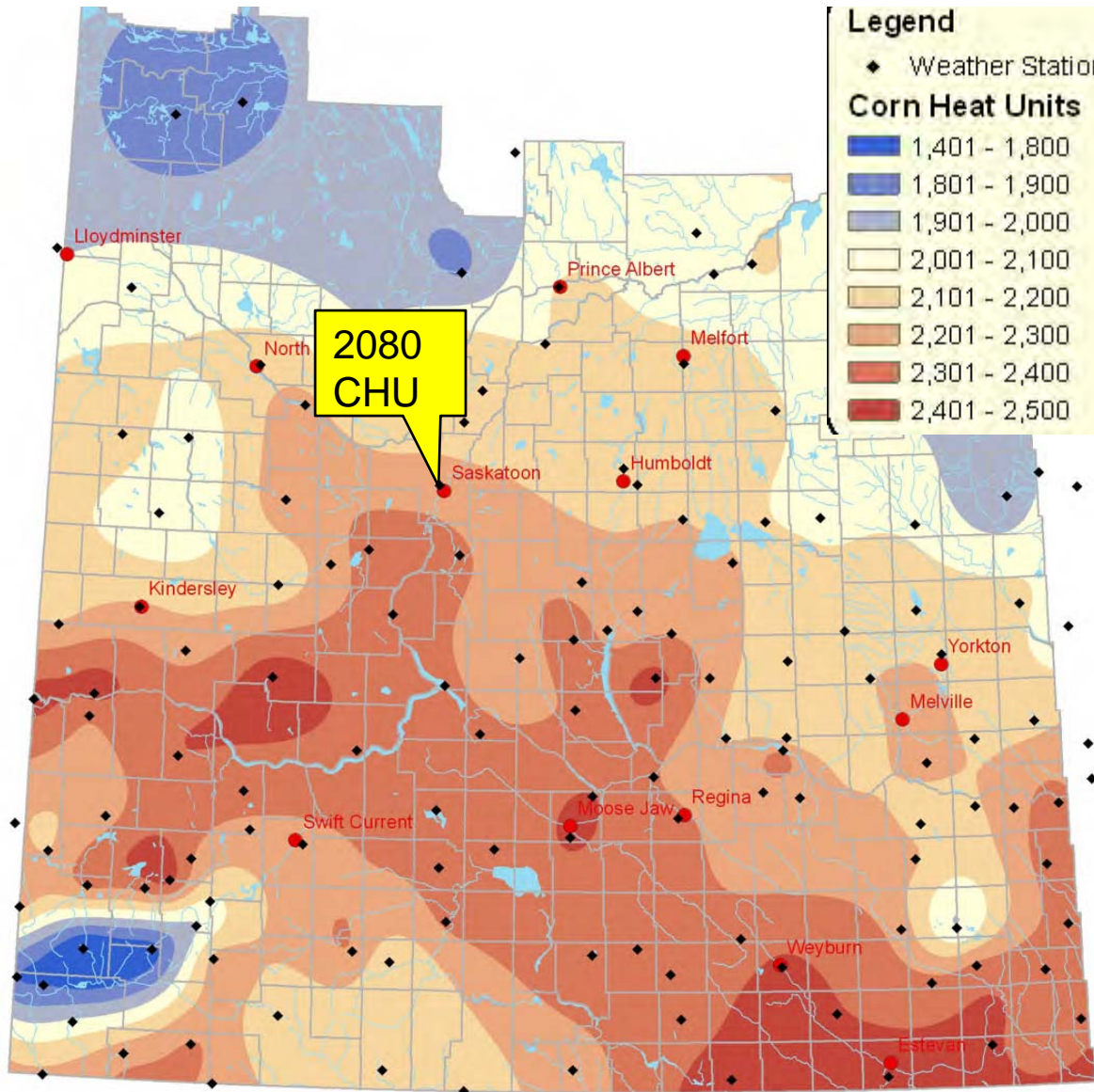
Grain Corn

Selecting corn hybrids for grazing requires slightly later maturity



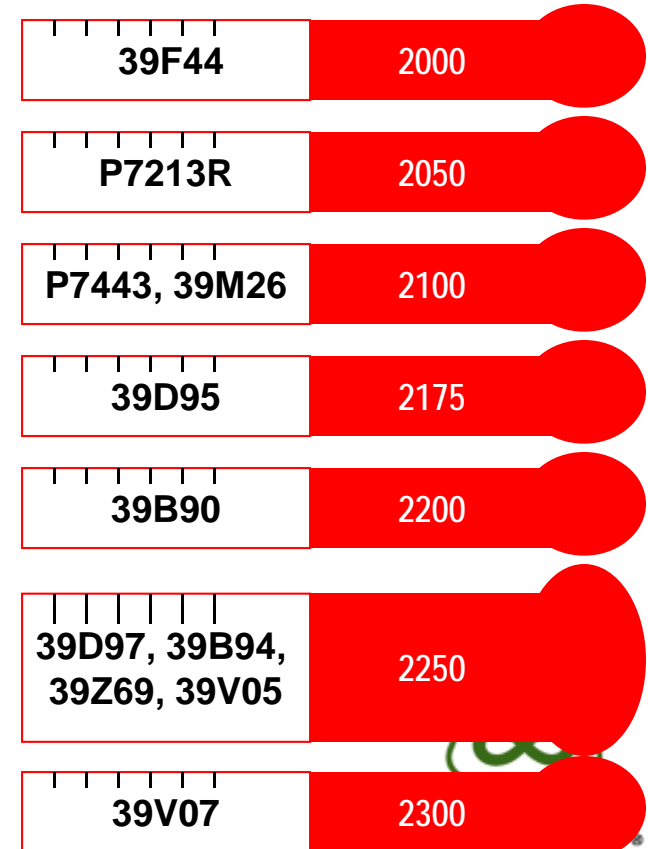
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AVERAGE ACCUMULATED CHU FOR SILAGE PRODUCTION (Half the years you will get more CHU, half the years you will get less CHU)



Silage Corn

Selecting corn hybrids for silage you want to match the hybrid to CHUs in your area to maximize quality and yield





Heat Units for Grain

(May 10th to Sept 15th growing season)

Year	North East : Melfort	Central: Saskatoon	South West: Moose Jaw	East Central: Esterhazy/ Broadview	North West: The Battlefords	South East: Weyburn / Estevan
2013					2272	
2012	2180	2279	2279	2089	2086	2233
2011	2053	2234	2234	2160	2052	2345
2010	1961	2086	2086	1999	1842	2299
2009	1768	1918	1918	1811	1820	2103
2008	1950	1971	1971	1858	1976	2130
2007	1949	2096	2096	2007	1981	2320
2006	2177	2298	2298	2190	2225	2308
2005	1819	2030	2030	2003	1886	2220
2004	1541	1660	1660	1547	1698	1819
2003	2274	2331	2331	2095	2235	2220
10 year av	1967	2080	2090	1980	2006	2200
Success	4 of 10	7 of 10	7 of 10	7 of 10	5 of 11	9 of 10



1850 CHU for en-silaging

Heat Units for Silage

(May 10th to Sept 15th growing season)

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2009	1768	1918	1918	1811	1820	2103
2008	1950	1971	1971	1858	1976	2130
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10 year av	1967	2080	2090	1980	2006	2200
Success	7 of 10	9 of 10	9 of 10	8 of 10	8 of 10	9 of 10



Match CHU for Silage

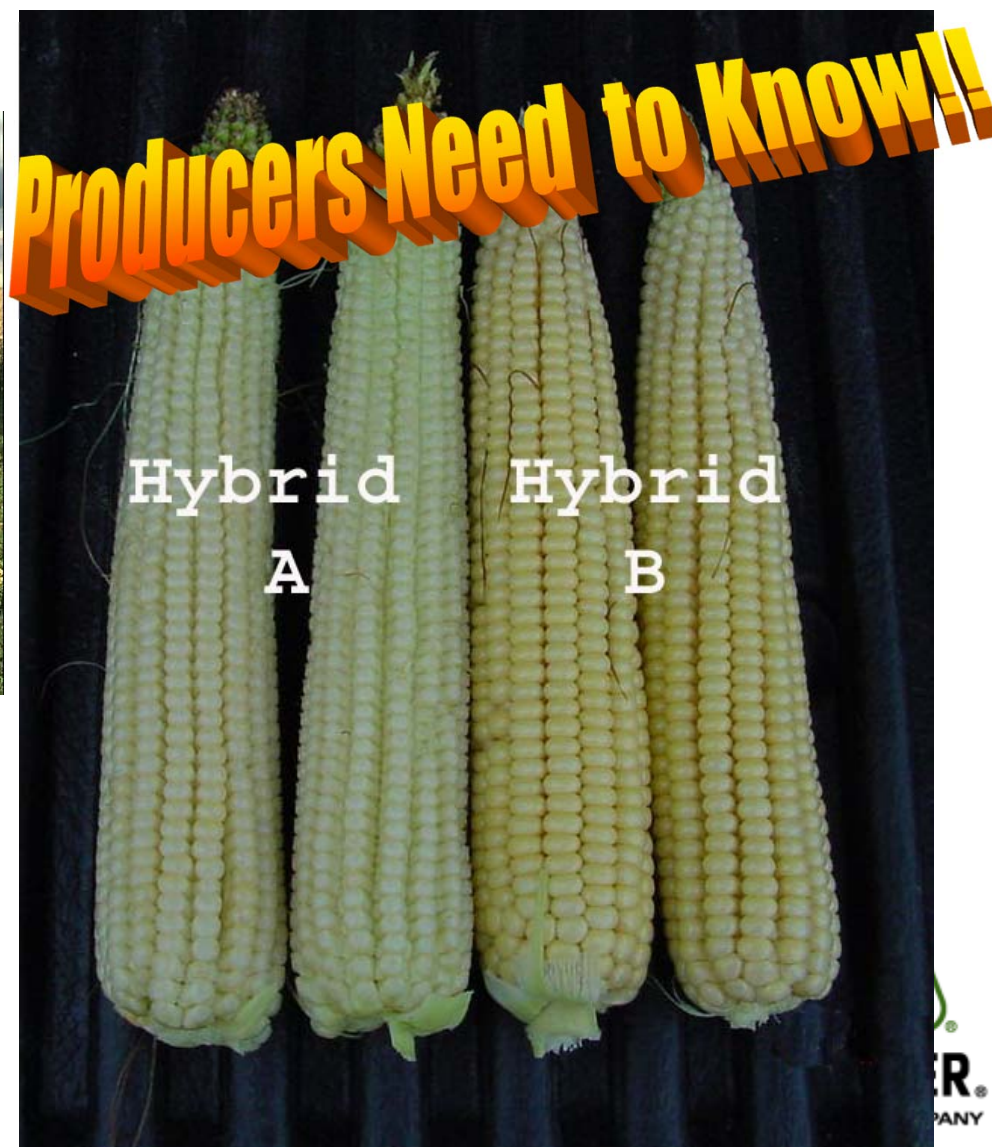
Why do we do this?



Different Companies, Different Maturity Scales.



- CHU to 1/2 milk line or B.L.???
- GDU's to silk or Black Layer
- Look at dry matter at harvest to get a clearer picture on maturity



CORN

NEW



Featured Pioneer® brand Hybrids*

39F44	Ultra-early platform especially suited for Alberta. Very good silage characteristics and stress emergence score.
39F45	
P7213R	Early hybrid with very good yield potential for maturity. Balanced agronomic package and very good root strength.
P7443R	Hybrid with excellent yield potential and very good drought tolerance.
39M26	Early hybrid. Average root strength and husk cover. Excellent choice if considering grazing corn.
P7535R	Hybrid with extraordinary yield potential for the maturity. Balanced agronomic package.
39D97	Leader hybrid for maturity. Good drydown and average test weight. Maintains stable yields across all yield environments.
39D95	
39Z69	Early hybrid with exceptional yield potential. Very good root strength with strong drought tolerance and grain drydown.

1 Technology Segment				Characteristics	
Pioneer® brand Hybrids	Herculex® 1	LibertyLink®	Roundup Ready® Corn 2	PIONEER IndustrySelect ² End-Use Segment	Heat Units
39F44					2000
39F45					2000
P7213R					2050
P7443R					2100
39M26					2100
P7535R					2100
39D97					2250
39D95					2175
39Z69					2250



Corn Technologies

- **Pioneer puts a lot of effort into developing industry leading hybrids with traits like:**

- Stalk strength
- Root strength
- Test weight
- Drydown
- Drought tolerance
- Disease resistance
- Stress emergence
- Total Digestible Nutrients
- Whole Plant Digestibility
- Available Energy
- Yield



Corn Fertility

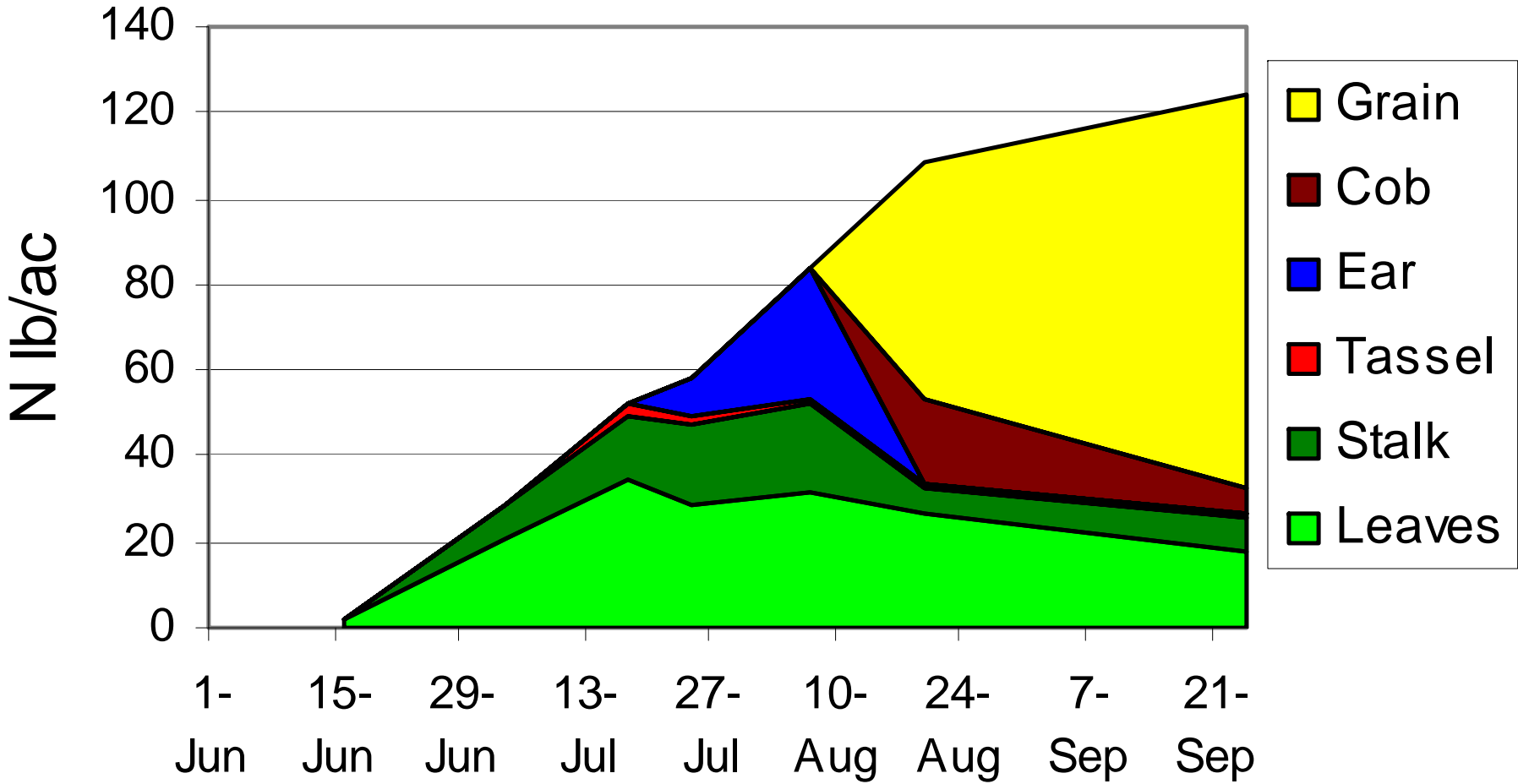


Corn Fertility

- General rule of thumb – 1 lb of N = 1Bu/ac Corn
- Starter fertilizer will enhance early growth
 - Best banded 2” over and 2” down due to the salt toxicity of N and K

Starter Fertilizer Placement	Soil Type	Max amount of N + K₂O (lbs/ac)
With Seed	Sandy	5
With Seed	Clay or loam	8
Within 1 inch of seed	All Types	20
2 in X 2 in band	Sand to Clay	40 to 70

Corn Nitrogen Uptake





Corn Fertility

- Manure
 - Excellent source of available nutrients
 - May increase weed pressure
 - May need to watch P levels
- Side by Side Results:

<u>Fertilizer</u>	<u>Rate</u>	<u>Yield</u> bu/ac	<u>MST</u> %	<u>Tst</u> Wt
Com. Blend	per soil test	107.1	20.9	58.0
Hog Manure	6600 gal/ac	144.8	20.2	61.5

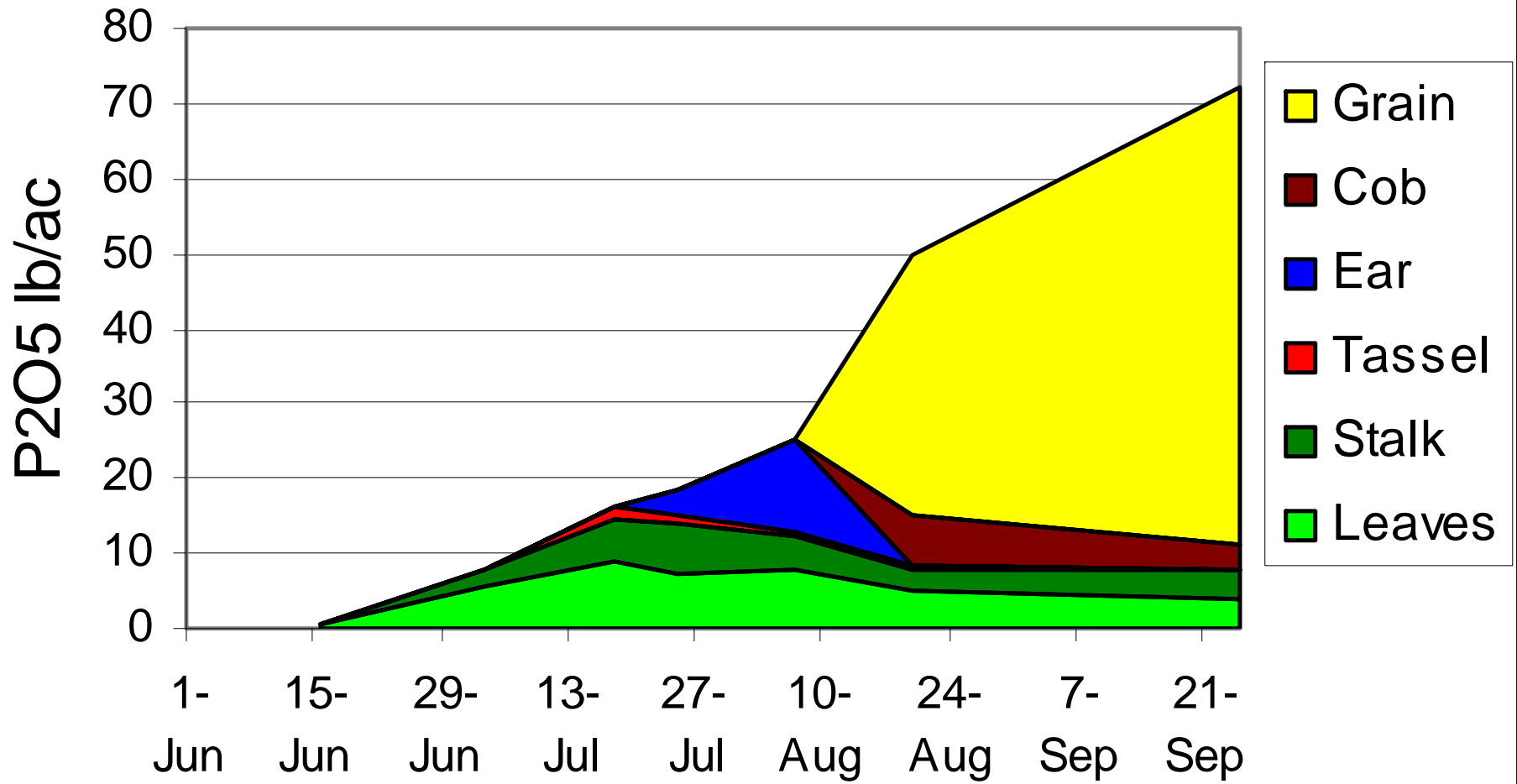


Purple Corn



- Plant is lacking phosphorus
- Occurs in canola stubble.
- Make sure to side dress P on canola stubble.
- Cold wet compacted soils.
- Cultivate early.

Corn Phosphorus Uptake





Corn Hybrid Response to Plant Population



Why are Plant populations so critical?

- Formula for Estimating Grain Yield
- Based on 1000th of an acre

Viabale plants in 17.5 feet X Viabale cobs in 17.5 feet X # of kernels around center of cob

90 (conversion factor)



Why are Plant populations so critical?

- This example shows value of “Paying” attention to the “Details” at seeding!
 - Target seeding rate of 26,000 plants

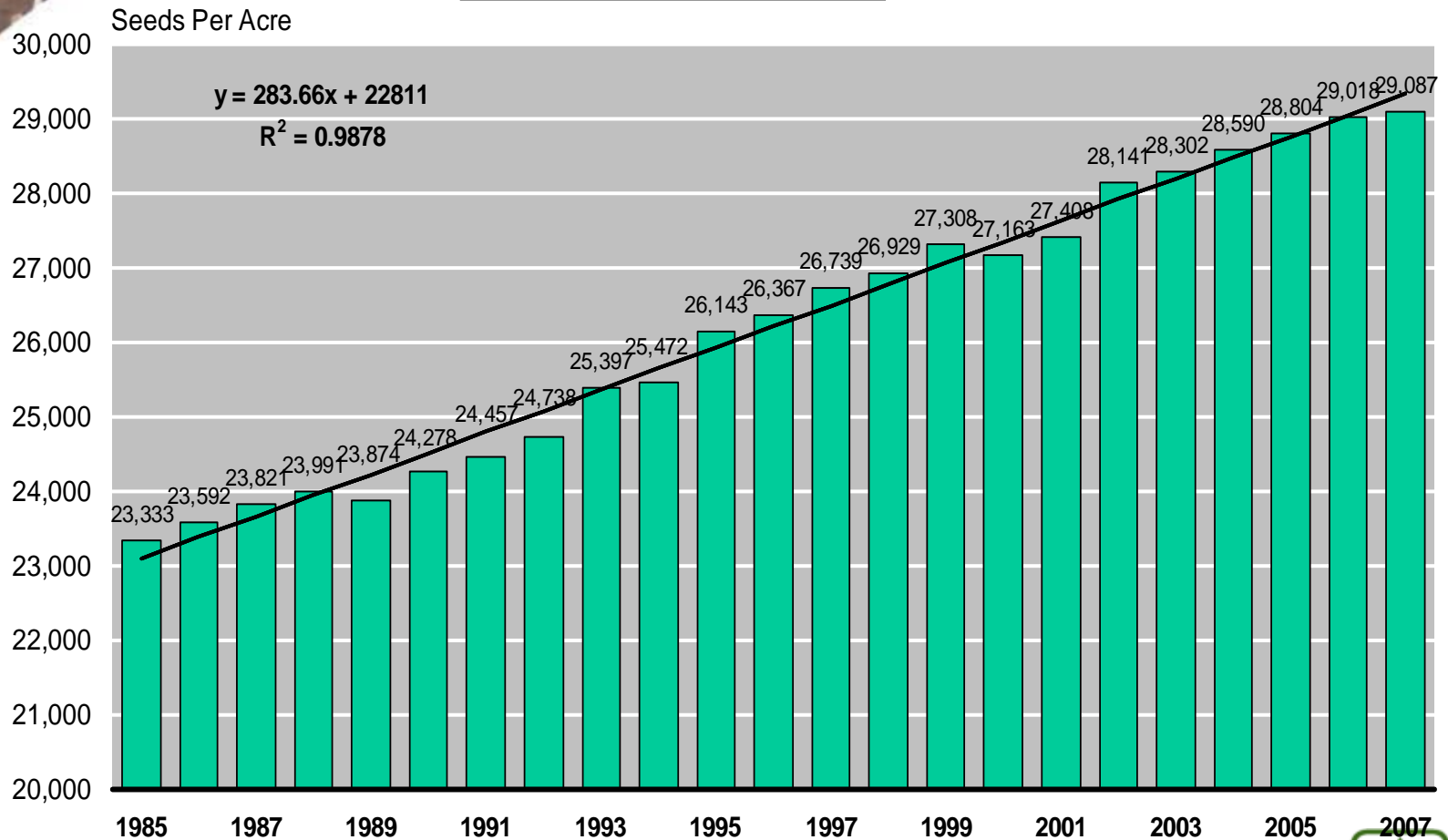
$$\frac{26 \times 26 \times 16}{90} = 120 \text{ bu/ac}$$





Average Corn Seeding Rate

NA - 1985-2007



SOURCE: Brand Concentration Survey; Doane Seed Corn Study
Market Research, Economics & Analysis

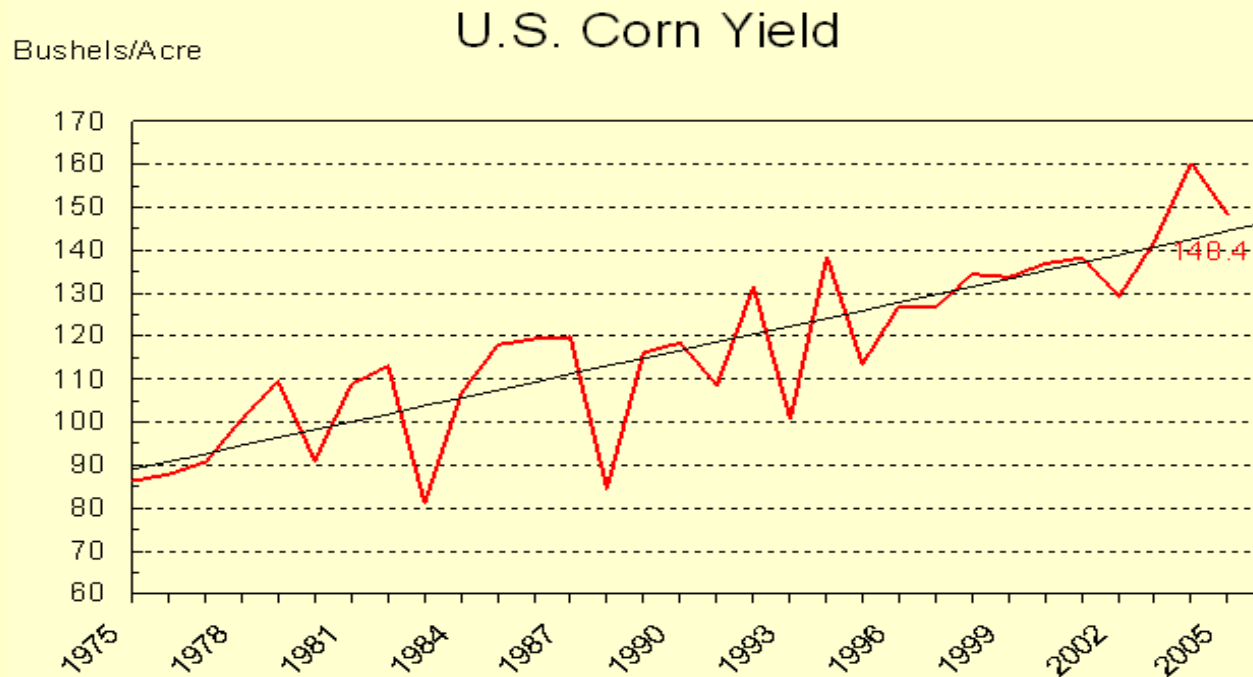
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Corn Yield Trend



USDA-NASS
11-10-05



Corn Plant Population Research

- Higher plant populations increase competition among plants for water, sunlight, and soil nutrients reducing individual plant yield.
- However the higher plant populations have increased the yield per unit area by optimizing the following yield components:
 - # of ears per unit area
 - # of kernels per ear
 - Weight of each kernel



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28,000

15 lbs

32,000

17 lbs

36,000

21 lbs

MAKE
YOUR
STAND

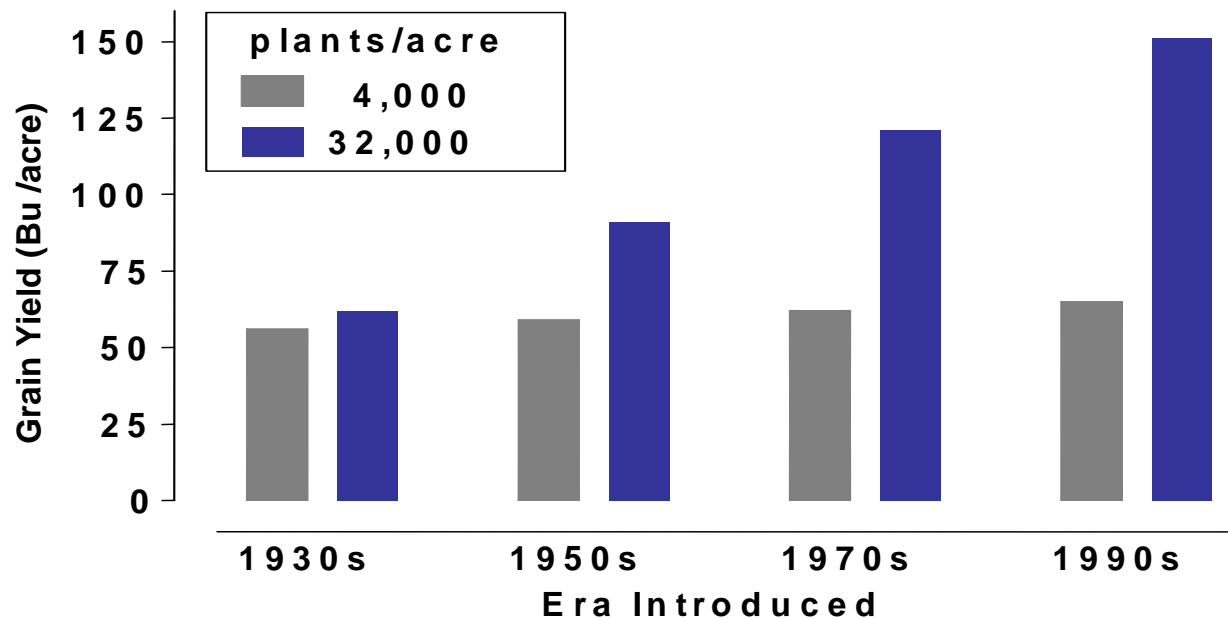


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Plant Population Research

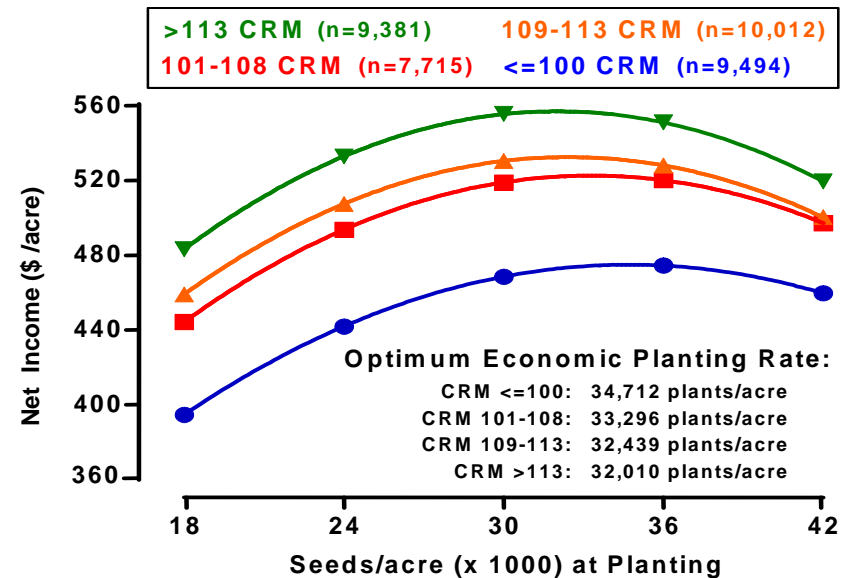
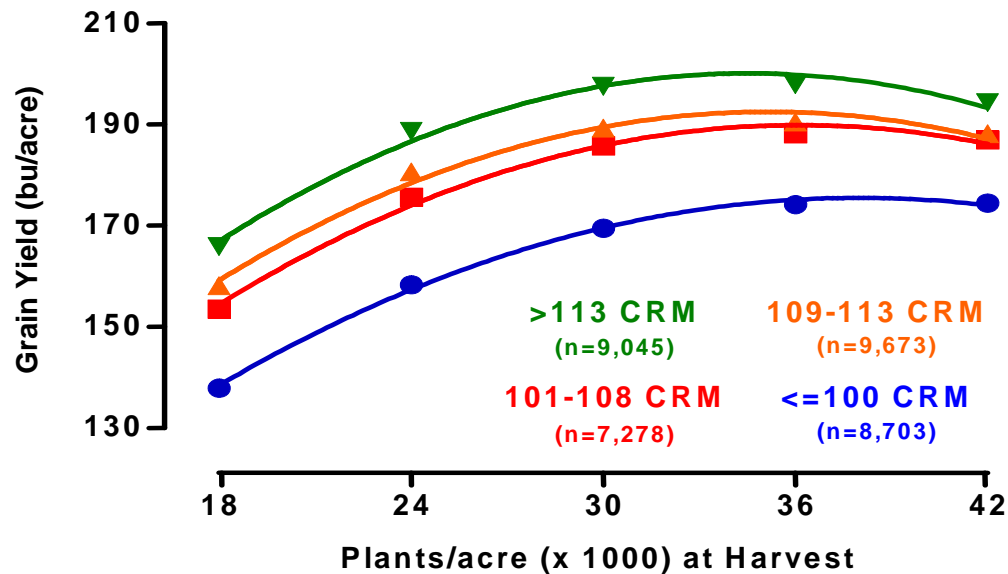
- Genetic improvement of corn hybrids for superior stress tolerance has contributed to increased yields by allowing hybrids to be planted at higher plant populations.





Plant Population Response by Hybrid Maturity

Agronomic vs. Economic Optimum



- Data also allow us to break it down by economic optimum as well as agronomic optimum.
 - <100 CRM = 38,000 Agronomic and 34,712 Economic



Seeding Rate Recommendations

- What are some early factors that can cause reductions in plant populations?
 - Frost
 - Cold and/or Wet Soils (10+ degrees C)
 - Seedling Pests (disease and insects)



Plant Populations... practical for our environment

- We can base seeding rates around picking different maturity's with corn varieties to maximize feed value.
- An initial target of 26,000- 30,000 plants/ac for grain and 28,000 to 32,000 plants/ac for silage and grazing is a good starting point
 - May need to adjust depending on conditions
 - **Wet - Cool temps** increase plant pops by 10%
 - **Dry** conditions use lower target seeding rates to allow plants more access to available moisture
 - **Ideal** conditions corn will respond to increased plant populations
 - **New Genetics** are built better to respond to environmental stress
- This means a seeding rate of 2.5 to 3.5 ac/bag (based on 80,000 seeds/bag)



Planting Tips

- Plant early when soil reaches 10^o C.
 - Plant one and half to two inches deep.
 - Good brace root development
 - Plant into adequate moisture.
 - Plant 10% more seed in cold soils.
 - Plant slow - 4 to 5 mph.
 - Slower planting speeds produce more uniform seed placement
 - Seed to soil contact essential
- Check planter out.
 - Make sure spacing is proper.
 - Check disc openers for wear.
 - Get seed settings from seed company.



Planter Tune up

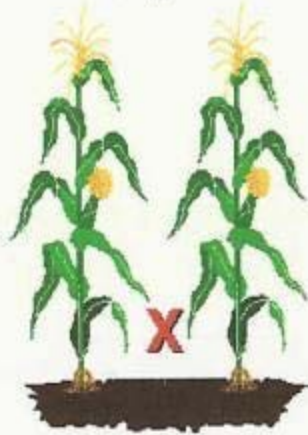


- Tune up planter before you hit the field.
- Good spacing is key to high yields.

Misplaced Plants



Missing Plants

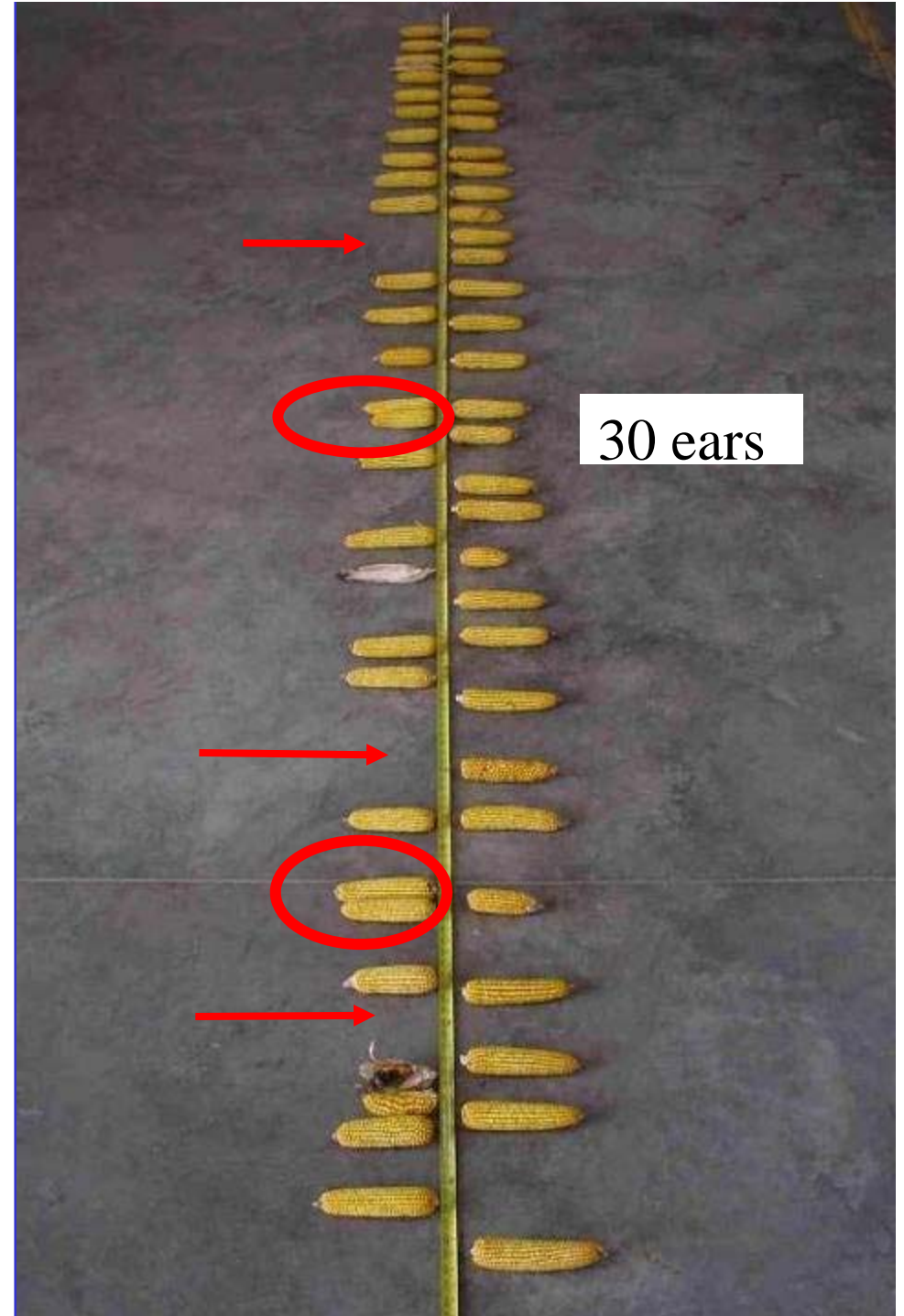


Extra Plants





- Poor Seed Spacing





Planter vs. Seeder

- Uniform corn plant stands are essential to attaining maximum productivity from a corn crop.
 - Air seeders do not provide enough:
 - Uniformly placed seed depth
 - Properly spaced seed placement
 - Even emergence
 - Corn will not compensate like other crops
 - Wheat
 - Canola



Planter vs. Air Seeder

Kenton, Manitoba - 2008

Product	Planting Method	Plant Population	Silage Weight (30% DM)	Whole Plant Moisture
Hybrid A	Planter	29,900 ppa	16.75	70.5%
Hybrid A	Air Seeder	29,900 ppa	14.80	71.9%
Hybrid B	Planter	29,900 ppa	16.80	66.8%
Hybrid B	Air Seeder	29,900 ppa	13.23	68.7%



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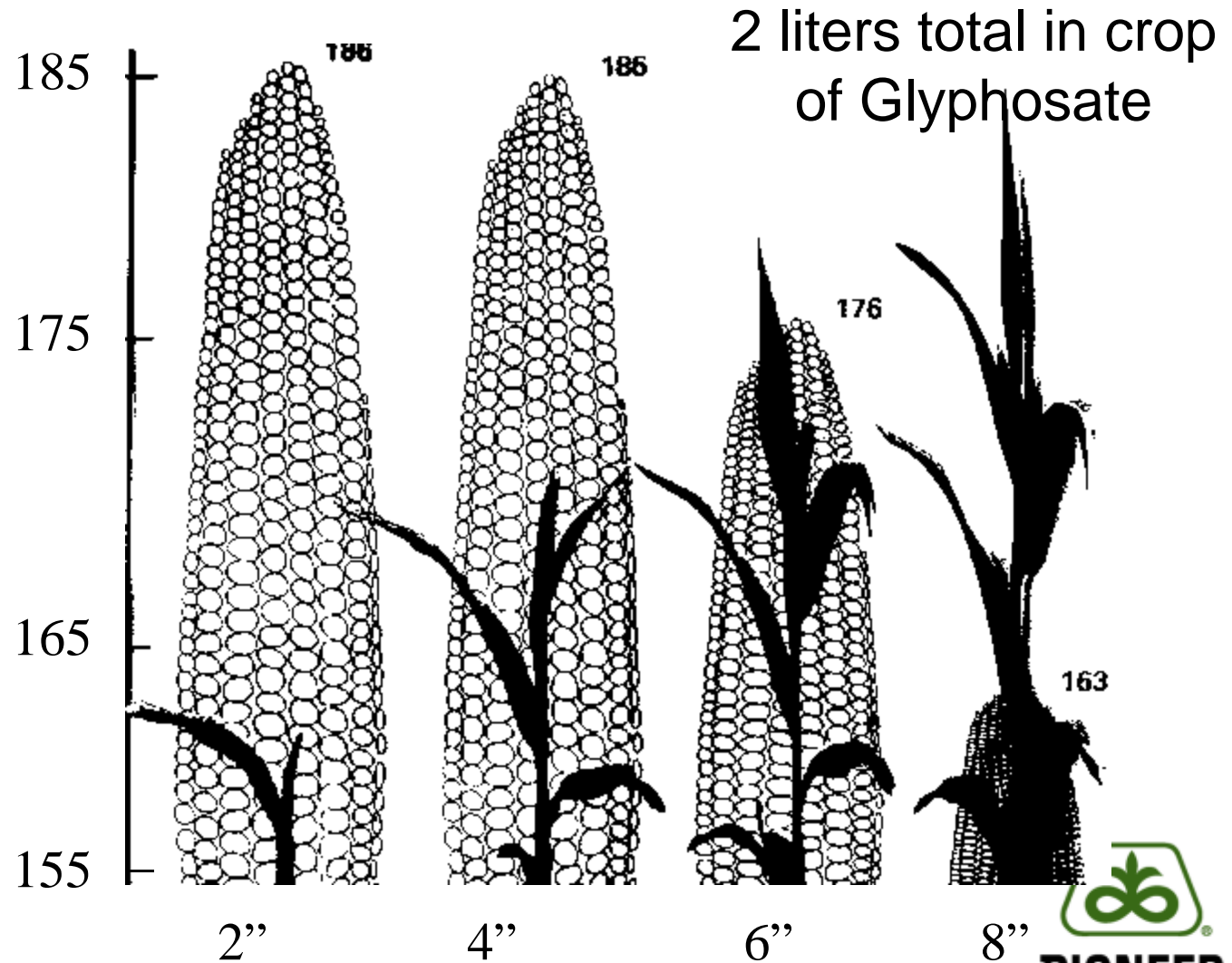


Corn Herbicides



Herbicide Application Timing effects on Corn Yield

- Weed competition in corn is most damaging early in the growing season.
- Corn yields can be reduced by weeds allowed to grow past 4”.
- Herbicides should be applied before weed canopy exceeds 4” for consistent weed control and max corn yield.



Weed Canopy Height At Herbicide Application





RR canola control

- Banvel can be used but is hard on corn
- 2-4D is a no! no! after corn had 2 leaves
 - It can cause buggy whipping and brittle snap
- Best options:
 - Pardner (Bromoxynil)
 - Can not tank mix with glyphosate (to hot on corn)
 - Basagran Forte
 - Can tank mix
 - NEW! Impact (UAP)

Following slide shows in-crop impact

P7443R - 10 Days Post Application



Glyphosate Only

Glyphosate + Banvel

Glyphosate + 2,4-D



Corn Silage Management

What Makes Corn Feed so Good?

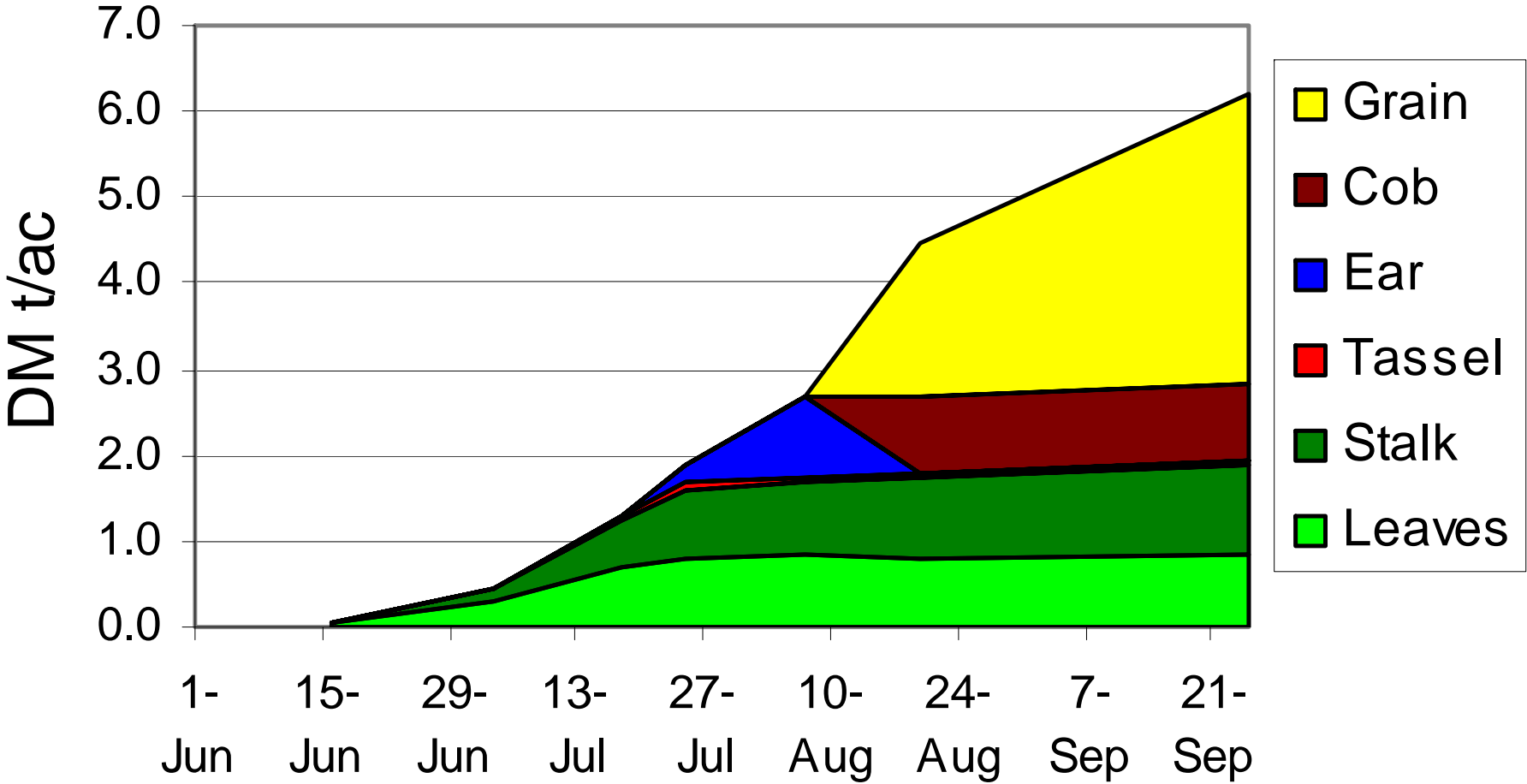


<u>Part</u>	<u>% of DM</u>	<u>Digestibility</u>	
		<u>NDF (%)</u>	<u>DM</u>
Tassel	<1	78.4	63.5
Leaf sheath	6.1	78.1	69.0
Husk	5.8	80.5	75.4
Leaf blades	8.5	66.7	82.1
Cobs	12.1	89.3	39.2
Stalk	18.3	66.5	74.4
Grain	48.5	11.8	90.0



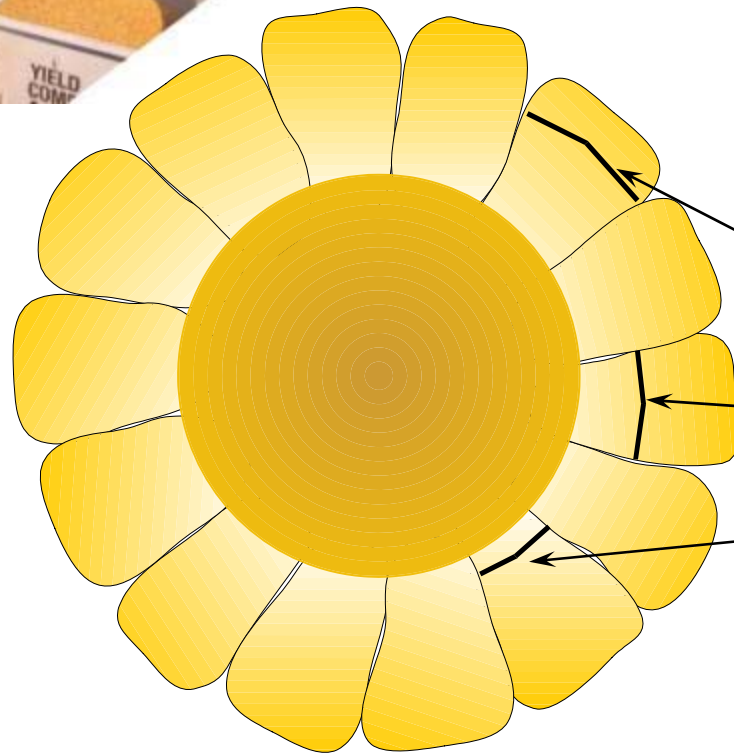
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Dry Matter Accumulation





Assess Milkline for Harvest Maturity...



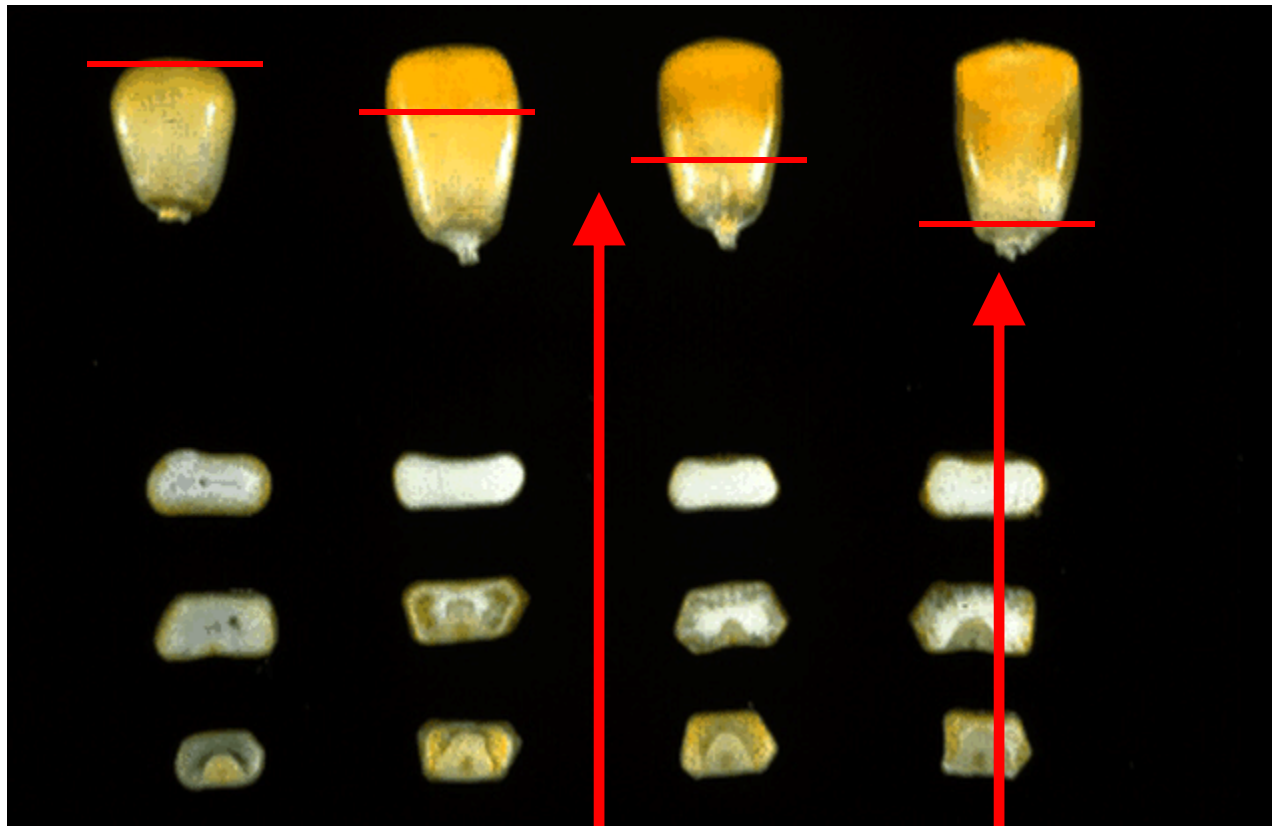
Type of Structure	Optimum Plant Moisture for Corn Silage
Bunker or Bag	68 - 72%
Upright Silo	63 - 68%
Oxygen-limiting Silo	50 - 60%

Source: Pioneer Forage Manual

* For upright silos taller than 50 feet, plant moisture should be reduced 1%point for each 10 feet of height above 50 feet.



Milk Line



Proper Ensiling
Stage (68 –
71% WPM)

Physiological
Maturity (30-
34% MST)

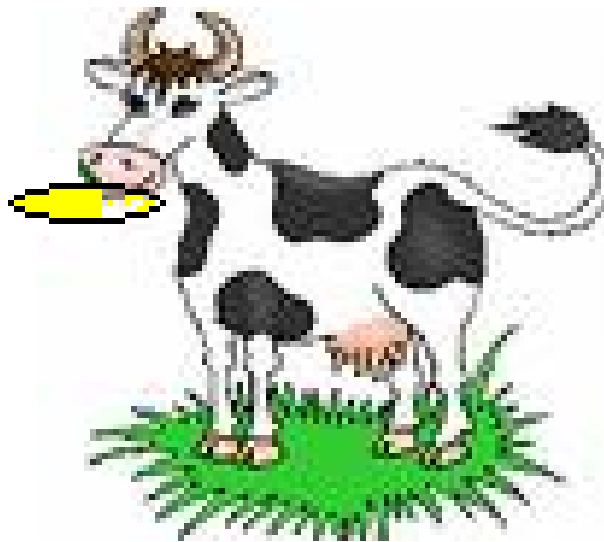


Factors That Determine Silage Quality

1. Proper bunker dimension - Not too big!
2. Harvest at proper maturity -
3. Harvest at proper moisture - 68-72 % WPM
4. Cut at proper chop length
5. Ensile rapidly
6. Inoculate
7. Pack Firmly
8. Cover securely
9. Proper rate and method of feedout



Questions?



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