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Fall Management Decisions and Practices for Corn

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The 2008 production year has been one of the coolest on record. Growing degree unit accumulation is tracking about 300 GDUs behind schedule. Temperature drives the vegetative (V) developmental stages of the corn life cycle, but has less influence during the reproductive (R) developmental stages (Table 1). The number of days from silking (R1) to maturity (R6) ranges from 55 to 60 days. A farmer benchmark to gauge the season is "To be dented by Labor Day." About 26-28 days remain for the crop to mature. Optimum silage yield and quality occurs around 50% Kernel Milk (R5.5) (Figure 1).

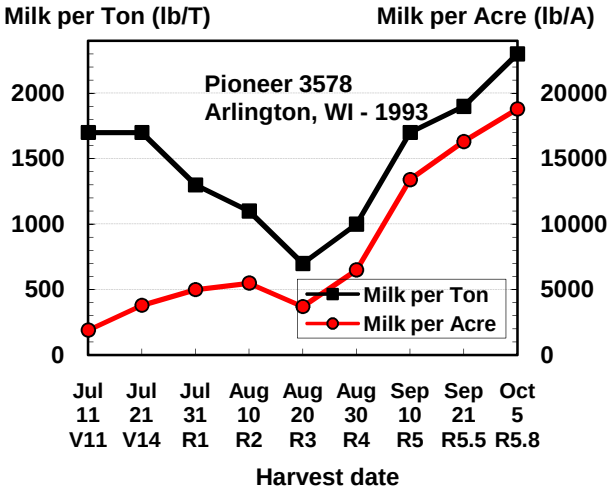

Figure 1. Corn silage yield and quality changes during development.

In-season guidelines for predicting corn silage harvest date

1) Note hybrid maturity and planting date of fields intended for silage.
2) Note tasseling (silking) date. Kernels will be at 50% kernel milk (R5.5) about 42 to 47 days after silking.
3) After milkline moves, use kernel milk triggers to time corn silage harvest (Figure 2). Use a drydown rate of 0.5% per day to predict date when field will be ready for the storage structure (Table 2). See http://www.uwex.edu/ces/ag/silagedrydown/
4) Do final check prior to chopping.

Table 2. Kernel milk stage "Triggers" for timing silage harvest.

Silo Structure	Ideal Moisture Content	Kernel Milk Stage "Trigger"
	%	%
Horizontal bunker	70 to 65	80
Bag	70 to 60	80
Upright concrete stave	65 to 60	60
Upright oxygen limiting	50 to 60	40

"Trigger": kernel milk stage to begin checking moisture
Silage moisture decreases at an average rate of 0.5% per day during September

Table 1. Relationship between corn kernel growth stage and development.

Stage	Calendar Days to Maturity	Growing Degree Units (GDUs) to Maturity: Southern Wisconsin	Growing Degree Units (GDUs) to Maturity: Northern Wisconsin	Percent of Maximum Yield: Grain	Percent of Maximum Yield: Whole Plant	Moisture Content (%): Grain	Moisture Content (%): Whole Plant
R1- Silk	55-60	1100-1200	950-1050	0	50-55	---	80-85
R2 - Blister	45-50	875-975	800-900	0-10	55-60	85-95	80-85
R3 - Milk	37-42	750-850	700-800	15-25	60-65	75-85	77-82
R4 - Dough	31-36	600-700	550-650	30-50	65-75	60-80	75-80
R5 - Dent	26-28	425-525	400-500	60-75	75-85	50-55	70-75
R5.5 - 50% Kernel milk	10-15	200-300	175-275	90-95	100	35-40	65-70
R6 - Maturity	0	0	0	100	95-100	25-35	55-65

Selecting Corn Hybrids

Past hybrid trials indicate that the average yield difference between the highest and lowest yielding corn hybrid in a trial is 70 bu/A. Your challenge is to predict performance the next growing season. Depending upon how you select hybrids, yield gains up to 12 bu/A can be achieved over an "average" hybrid.

When choosing hybrids for the next growing season:

1. Select hybrids using multi-location average data. Consider single location results with extreme caution.
2. Evaluate consistency over years and other trials. Be wary of hybrids that are not top performers in all trials.
3. Buy the traits you need (Table 3). Traits protect yield, they do not add to yield. Can you grow corn the "old-fashioned" way?
    a. Rotation
    b. Weed control
    c. European Corn Borer
4. Every hybrid must "stand on its own" for performance (Table 4).

Remember that you don't know what weather conditions (rainfall, temperature) will be like next year. Therefore, the most reliable way to predict hybrid performance next year on your farm is to consider past performance over a wide range of locations and climatic conditions.

Recommended Practices v. Trends v. "Snake Oils"

The 2008 corn production and marketing season is unique. On one hand, it is the most expensive corn crop ever planted, and on the other, it has the potential to be the most profitable due to strong market price. If input costs continue to increase, profit margin will be back to previous years, except with more risk.

So for this year, we have strong prices relative to input costs, thus any production increase can be more easily paid for. We have to be careful about practices that can be recommended versus practices that intuitively may trend to greater yields, but are not statistically significant and thus cannot be recommended. These trends produce responses too small to be statistically significant.

Table 3. Economic advantage ($/A) of Hybrid A or (Hybrid B). Seed price difference = $50 bag: A = $150, (B) = $200

Yield advantage		Corn Price ($/bu)						
Hybrids	(bu/A)	$1.00	$2.00	$3.00	$4.00	$5.00	$6.00	$7.00
	(14)	$8	($6)	($20)	($34)	($48)	($62)	($76)
	(12)	$10	($2)	($14)	($26)	($38)	($50)	($62)
	(10)	$12	$2	($8)	($18)	($28)	($38)	($48)
A < (B)	(8)	$14	$6	($2)	($10)	($18)	($26)	($34)
	(6)	$16	$10	$4	($2)	($8)	($14)	($20)
	(4)	$18	$14	$10	$6	$2	($2)	($6)
	(2)	$20	$18	$16	$14	$12	$10	$8
A = (B)	0	$22	$22	$22	$22	$22	$22	$22
	2	$24	$26	$28	$30	$32	$34	$36
	4	$26	$30	$34	$38	$42	$46	$50
	6	$28	$34	$40	$46	$52	$58	$64
A > (B)	8	$30	$38	$46	$54	$62	$70	$78
	10	$32	$42	$52	$62	$72	$82	$92
	12	$34	$46	$58	$70	$82	$94	$106
	14	$36	$50	$64	$78	$92	$106	$120

In agronomic research it is very difficult to detect treatment differences less than 5%. So in a 200 bu/A yield environment, that means at least 10 bu/A is required before statistical differences can be detected. What about trends less than 10 bu/A? At today's prices a difference of even 5 bu/A can pay for many inputs.

Every year in Wisconsin, products are touted to producers as being the cure for crop production and economic woes. The adage "If it sounds too good to be true, then it probably is." How do you know whether a particular product is a viable fertilizer and supplies crop nutrients, or has some proven effect on soil that will improve productivity? The standard advice is to demand unbiased research results that document all claims, and to discount testimonials. If well-documented research isn't available, then be suspicious of claims. An electronic compendium is available that provides information on non-traditional materials marketed for use in crop production in the north central region of the USA. It is a collection of research abstracts and reports released by scientists in State Agricultural Experiment. See the website: http://extension.agron.iastate.edu/compendium/index.aspx

Table 4. Relative performance among corn hybrid "Families" compared to the normal line grown in the same trial

Family	Specialty Trait	N	Grain yield	Grain moisture	Lodging
			Bu/A	%	%
A12	DBT418	6	1	1	2
A12	Mon810	6	20	1	-3
A12	MonGA21	25	2	0	-1
B99	Mon810	3	15	3	-2
B99	Mon810+T25	3	-2	1	-1
C284	Mon810	24	17	1	-1
C284	Mon810+IT	6	-3	0	-1