Corn & Soybeans

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General Guidelines for Corn

- Select good genetics
- Planting Date:
  - April: western KY
  - Mid-April to Mid-May (central and eastern KY)
- Plant Population: 24,000 to 30,000 plants/A
- Row Width: 30-inch rows
- Avoid compaction or correct for it
- Nutrients: Follow AGR-1
  - If pH is low, Lime in the fall
  - If P_2O_5 or K_2O is low, apply in fall or spring
  - N must be applied in spring
  - Account for manure
- Control pests before they become a problem

General Guidelines for Soybean

- Select good genetics
- Full season
  - May 1 to June 1
  - 100,000 plants/acre, final stand, 15 inch rows
- Double crop
  - As soon as wheat is harvested
  - 140,000 plants/acre, 15 inch rows or less
- Avoid compaction or correct for it
- Nutrients, Follow AGR-1
- Control pests before they become a problem

Topics

- Do Past Results Equal Future Performance?
- Corn Nutrient Requirements
- Basic Math
- Corn Row Widths, Populations, Etc.
- Corn Fungicides and Sulfur
- Corn Hybrid Trials
- Soybean Row Width Studies
- Soybean High Yields
- Soybean Planting Date
- Problems in the Field from 2011
- Home

Do Past Results = Future Performance?

- UK got to the final four last year.
- Does that mean they will get their this year?

Do Past Results = Future Performance?

- You washed the dishes for your wife yesterday.
- Does that mean you will do it tomorrow?

Do Past Results = Future Performance?

- Your corn was planted late this year because of the spring rains.
- Does that mean you will plant late next year?

Do Past Results = Future Performance?

- Someone used a product and got 5 bu/A.
- Does that mean you will get 5 bu/A?

Past Results and Future Performance

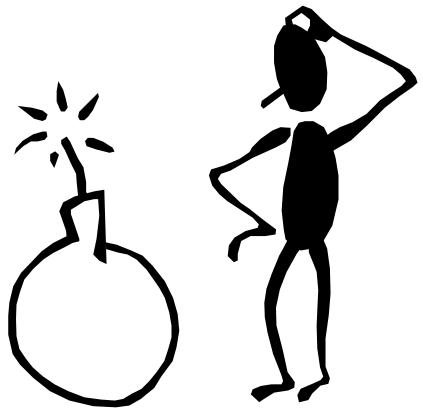
- We try to answer this question
- Statistics help us answer it

Past Results: 5 bu/A difference

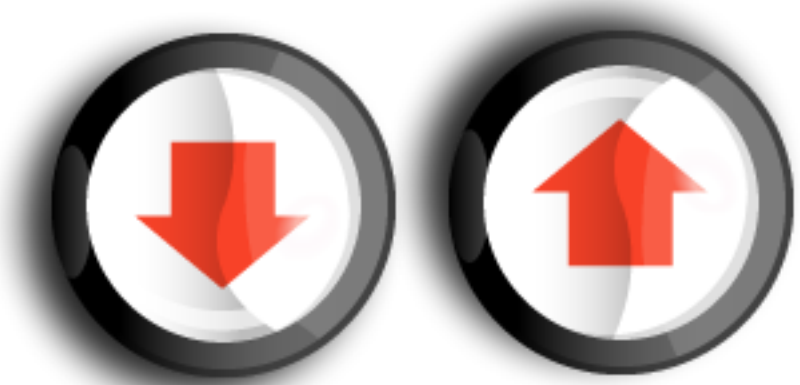
Stats say: 10 bu/A difference needed to predict future performance

We say: "5 bu/A difference is 'not significant' or that there is no difference"

You say: "What are you saying?!"



Field Research



- You want simple answers.
- Field research rarely provides simple answers.

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Growing Corn: Topics

- Nutrient Requirements
- Row Widths
- Populations
- Hybrids
- Problems from 2011

Nutrient Requirements

Corn Removal Rates

Crop		N	P_2O_5	K_2O		Yield		N	P_2O_5	K_2O
		lbs/unit						lbs/acre		
corn grain	bu	0.7	0.4	0.35		100	bu	70	40	35
						200	bu	140	80	70
						300	bu	210	120	105
corn stalks	ton	14	7	29		2.8	ton	39	20	81
						5.6	ton	78	39	162
						8.4	ton	118	59	244

AGR-1: Lime and Fertilizer Recommendations

Corn Silage Removal Rates

Crop	N	P_2O_5	K_2O		Yield		N	P_2O_5	K_2O
	lbs/ton						lbs/acre		
corn silage	7.5	3.5	8		15	ton	113	53	120
					20	ton	150	70	160
					25	ton	188	88	200
					30	ton	225	105	240

AGR-1: Lime and Fertilizer Recommendations

		Water	N	P_2O_5	K_2O
Source	unit	%	lbs/unit	lbs/unit	lbs/unit
Dairy Cattle	ton	80%	11	9	12
Beef	ton	80%	11	7	10

Assume 95% organic material in dry matter
40 to 45% carbon by weight in dry matter

			N	P_2O_5	K_2O	S	Organic Carbon
Source	Rate	unit	lbs/acre				
Dairy Cattle	2	ton	22	18	24		320
Dairy Cattle	4	ton	44	36	48		640
Beef	2	ton	22	14	20		320
Beef	4	ton	44	28	40		640

AGR-1: Lime and Fertilizer Recommendations

		Water	N	P_2O_5	K_2O	S	C
Source	**unit**	**%**	**lbs/ unit**				
Broiler litter	ton	20%	55	55	45	0.6	640

Assume 95% organic material in dry matter
40 to 45% carbon by weight in dry matter

			N	P_2O_5	K_2O	S	Organic Carbon
Source	Rate	unit	lbs/acre				
Broiler litter	2	ton	110	110	90	1.2	1280
Broiler litter	4	ton	220	220	180	2.4	2560
Broiler litter	10	ton	550	550	450	6.0	6400

How much N (or P or K or C) is coming from foliar fertilizers?

Foliar Product†	N	P_2O_5	K_2O	S	Fe	Zn	Organic Carbon	Humic Acids
	---------- percent (%) ----------							
Monty's 4-15-12	4	15	12	0	0.30	0.05		
Monty's 8-16-8	8	16	8	0	0.30	0.05		
Monty's 2-15-15	2	15	15	0	0.30	0.05		
Monty's Liquid Carbon	0	0	0	0	0.00	0.00	1.00	2.00
Agro-Culture Liquid High NRG-N	27	0	0	1	0	0		
Agro-Culture Liquid accesS	0	0	0	17	0	0		

† Mention of a trade name is not an endorsement by the University of Kentucky Cooperative Extension Service.

Foliar Product	Rate	Unit	N	P_2O_5	K_2O	S	Organic Carbon	Humic Acids
			lb/acre	lb/acre	lb/acre	lb/acre	lb/acre	lb/acre
Monty's 4-15-12	32	oz	0.114	0.4275	0.342	0		
Monty's 8-16-8	32	oz	0.224	0.448	0.224	0		
Monty's 2-15-15	32	oz	0.058	0.435	0.435	0		
Monty's Liquid Carbon	32	oz	0	0	0	0	0.02125	0.0425
Agro-Culture Liquid High NRG-N	32	oz	0.54	0	0	0.02		
Agro-Culture Liquid accesS	4	gal	0	0	0	6.8		

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Foliar Product	Rate	Unit	N	P_2O_5	K_2O	S	Organic Carbon	Humic Acids
			lb/acre	lb/acre	lb/acre	lb/acre	lb/acre	lb/acre
Monty's 4-15-12	32	oz	0.114	0.4275	0.342	0		
Monty's 8-16-8	32	oz	0.224	0.448	0.224	0		
Monty's 2-15-15	32	oz	0.058	0.435	0.435	0		
Monty's Liquid Carbon	32	oz	0	0	0	0	0.02125	0.0425
Agro-Culture Liquid High NRG-N	32	oz	0.54	0	0	0.02		
Agro-Culture Liquid accesS	4	gal	0	0	0	6.8		

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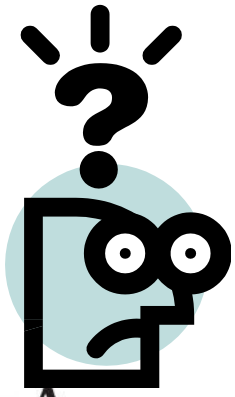

1 acre of soil at 2% OM contains about 23,200 lbs (11.6 tons) of Organic Carbon

… or 32 oz/acre of liquid carbon is equivalent to about ½ pound of silt loam soil

Definitions

- Organic Carbon:
  - refers to the carbon in organic matter.
  - Organic matter = 1.724 × Organic Carbon.
  - Or OC = OM × 58%
- Humic acids:
  - Dark-colored amorphous materials that can be extracted from the soil by a variety of reagents. Humic acids are implied to have phenolic or carboxylic groups and molecules have molecular weights of 20,000 to 1,360,000.

http://www.soils.wisc.edu/courses/SS325/organic.htm
http://www.eoearth.org/article/Soil_organic_carbon

Acre Math: Soil with 2% SOM

- One acre furrow slice (43,560 ft^2 x 6.7 inches deep) of silt loam soil weighs about 2 million pounds.
- If the soil contains 2% soil organic matter (SOM), then that is 40,000 pounds of organic matter.
- Soil organic matter generally contains about 58% organic carbon
- OC = 40,000×58% = 23,200 lbs of organic carbon

http://cropsoil.psu.edu/turf/extension/factsheets/acre-furrow-slice
http://www.eoearth.org/article/Soil_organic_carbon

		Water	N	P_2O_5	K_2O
Source	unit	%	lbs/unit	lbs/unit	lbs/unit
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Assume 95% organic material in dry matter
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AGR-1: Lime and Fertilizer Recommendations

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Source	**unit**	**%**	**lbs/ unit**				
Broiler litter	ton	20%	55	55	45	0.6	640

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			N	P_2O_5	K_2O	S	Organic Carbon
Source	Rate	unit	lbs/acre				
Broiler litter	2	ton	110	110	90	1.2	1280
Broiler litter	4	ton	220	220	180	2.4	2560
Broiler litter	10	ton	550	550	450	6.0	6400

Nutrients for Corn

- Follow AGR-1, soil test now to know what your crop needs.
- Avoid 19-19-19
- Avoid foliar fertilizers

Topics

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Corn Research, Sponsored by the Kentucky Corn Growers Association

Graduate Students, Corn Row Widths, 2011

Corn Research, 2011

Row Widths, Populations, Hybrids

1. **Hybrids**
   1. DeKalb DKC 66-96
   2. DeKalb DKC 62-96
   3. Pioneer 33D49
   4. Pioneer 1480
   5. AgriGold 6533
   6. AgriGold 6632
2. **Row Widths**
   1. 30 inch rows
   2. Twin (8-inch twins on 30-inch centers)
3. **Plant Density**
   1. 30,000 plants/acre
   2. 45,000 plants/acre

Table 1. ANOVA for p values.

Significance of ANOVA

		Stalk diameter	Plant height	Ear height	Plant-to-plant spacing	GDD_{Silk}	Plants ha^{-1}	Ears ha^{-1}	Ears per plant	Ear mass	Ear mass ha^{-1}	Ear moisture
Source	**DF**						**p value ***					
Replication (R)	2	0.3574	0.3043	0.5092	0.2599	0.3617	0.3893	0.5738	0.8904	0.5715	0.2449	0.021
Hybrid (H)	5	0.9249	0.0532	0.0592	0.5978	<.0001	0.2532	0.4325	0.0147	0.5427	0.6711	0.0221
R*H	10	0.9437	0.3902	0.745	0.2284	0.0292	0.0341	0.1269	0.8321	0.3024	0.8426	0.3539
Row Width (W)	1	0.4243	0.3085	0.861	0.0005	0.0045	<.0001	0.0001	0.7019	0.0666	<.0001	0.044
R*H*W	12	0.9999	0.7293	0.8703	0.2686	0.7319	0.0677	0.1501	0.1432	0.2244	0.548	0.3719
Density (D)	1	0.0652	0.1992	0.2553	0.0012	<.0001	<.0001	<.0001	<.0001	<.0001	0.0363	0.2657
H*D	5	0.786	0.7008	0.9613	0.5359	0.914	0.1723	0.0065	0.0052	0.875	0.2824	0.0997
W*D	1	0.6667	0.6861	0.6528	0.029	0.0855	0.0137	0.0605	0.2567	0.2124	0.9551	0.1785
H*W*D	5	0.8654	0.9089	0.9894	0.2407	0.9455	0.0096	0.0326	0.4015	0.2946	0.6507	0.7099

* Values ≤ 0.1 are considered significant.

Table 2. GDD's to silk among six hybrids and two row widths.

Hybrid	Row Width*	
	30 in	Twin
	GDD_{silk}**	
DKC66-96	1413	1404
DKC62-96	1366	1356
33D94	1434	1426
1480HR	1451	1438
A6533	1413	1418
A6632	1421	1390
LSD (0.10)	17	22

*Twin rows are 8 inches apart and the twins are on 30-inch centers.

**Silking determined for an average of 20 plants per plot.

Table 3. GDD's to silk among six hybrids and two plant densities.

Hybrid	Density, 1000 plants/acre*	
	30	45
	GDD_{silk}**	
DKC66-96	1395	1422
DKC62-96	1352	1371
33D94	1422	1438
1480HR	1434	1455
A6533	1409	1422
A6632	1394	1417
LSD (0.10)	21	16

*Target density.

**Silking determined for an average of 20 plants per plot.

Table 4. Ear dry weight and ear yield among two row widths, 2011.

Row width	Ear mass lb/ear	Ear yield* Mg ha^{-1}
30 inches	0.4	17.2
Twin (22 and 8 inches)	0.4	19.9
LSD (0.10)	ns	1.0

*Dry Weight basis

Table 5. Ear dry weight and ear yield among two plant densities, 2011.

Target density Plants/acre	Ear mass lb/ear	Ear yield* Mg ha^{-1}
30,000	0.47	17.9
45,000	0.34	19.2
LSD (0.10)	ns	1.0

*Dry Weight basis

Good rainfall & irrigated Yields averaged over 6 hybrids

Corn Research, Sponsored by the Kentucky Corn Growers Association

Corn Germination

Row Width, Hybrid & Population

- **Hybrids**
  - DeKalb DKC 62-97
  - Pioneer P1480HR
  - AgriGold A6533VT3
- **Row Widths**
  - 30 inches
  - 15 inches
  - Twin (8-inch twins on 30-inch centers)
- **Plant Density** (seeds/acre)
  - 30,000
  - 35,000
  - 40,000
  - 45,000
- **Locations**
  - Lexington
  - Larue County
  - Princeton

June 16, 2011, Larue County, KY
Same study at Lexington and Princeton

ANOVA (Abbreviated) for corn yield from different hybrids, row widths and plant densities at three locations, 2011.

	Larue	Larue	Larue		Lexington	Lexington
	DKC62-97	A6533	P1480HR		DKC62-97	A6533
	p value†	p value	p value		p value	p value
Model	0.5868	0.0229	0.2615		0.0292	0.006
	p value	p value	p value		p value	p value
Rep	0.1683	<.0001	0.1798		0.0005	<.0001
Row	0.6269	0.0504	0.433		0.4406	0.0212
Rep*Row	0.5274	0.7841	0.5985		0.2587	0.0021
Pop	0.7677	0.459	0.0758		0.5905	0.0084
Row*Pop	0.5226	0.1468	0.1455		0.0916	0.2607
Rep*Pop	0.5354	0.8004	0.7291		0.143	0.1243

PRELIMINARY . PRELIMINARY . PRELIMINARY . PRELIMINARY . PRELIMINARY

† $p \leq 0.10$ is considered significant.

Row Width and Population Effect on Yield, Larue County and Lexington, KY, 2011

	Larue	Larue	Larue		Lexington	Lexington
	DKC62-97	A6533	P1480HR		DKC62-97	A6533
Row Width	Bu/A	Bu/A	Bu/A		Bu/A	Bu/A
30	226.5	221.7	181.8		263.2	264.8
15	236.0	239.2	188.2		264.8	280.7
Twin	236.0	239.2	194.6		256.8	269.5
LSD (0.10)	36.7	9.6	19.1		14.4	31.9
	p value†	p value	p value		p value	p value
Row	0.6269	0.0504	0.433		0.4406	0.0212

†p value ≤ 0.10 is considered significant

Row Width and Population Effect on Yield, Larue County and Lexington, KY, 2011

	Larue	Larue	Larue		Lexington	Lexington
	DKC62-97	A6533	P1480HR		DKC62-97	A6533
Plants/Acre	Bu/A	Bu/A	Bu/A		Bu/A	Bu/A
30,000	227.7	235.3	197.8		260.0	263.2
35,000	254.8	240.7	203.1		260.0	263.2
40,000	221.9	227.5	180.4		260.0	285.5
45,000	229.1	230.2	171.5		267.9	275.9
LSD (0.10)	38.3	28.7	28.7		11.2	11.2
					ns	

Light Interception in Corn

Light Interception

Interception of Photosynthetically Active Radiation (IPAR)

Hybrid	Target Density Plants/Acre							
	30,000		35,000		40,000		45,000	
	IPAR at Ear Height							
DKC 62-97	81%	B	84%	AB	83%	AB	86%	A
A6533VT3	77%	B	80%	B	89%	A	87%	A
P1480HR	75%	C	78%	BC	82%	A	81%	AB

*Means followed by the same letter in the same row are not significantly different ($p \leq 0.10$)

Corn Harvest

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Corn Fungicides

Table 2. ANOVA of fungicide and replication, 2011

Source	DF	Type III SS	Mean Square	F Value	Pr > F
fungicide	7	1017.1	145.3	1.03	0.4409
rep	3	870.7	290.2	2.05	0.137

Corn Fungicides

- Over the past 4 years, no significant differences between fungicide and non-treated when disease pressure is low.

When to use fungicides

- Odds for disease development are high…
  - No-till corn
  - Weak disease ratings of hybrid
  - Weather favors disease development
  - High yield potential
  - Continuous corn

Sulfur?

June 10, 2011, Lexington, KY

Table 1. Sulfur (ammonium sulfate) effect on test weight, moisture and yield of corn at Spindletop Farm, Lexington, KY, 2011.

Sulfur Treatment	Test Weight	Moisture	Yield
	lbs/bu	%	bu/acre
1.5 lb S/A	57.6	23.0	221.5
3.0 lb S/A	57.7	22.6	223.7
6.0 lb S/A	57.8	22.7	216.6
UTC	57.6	23.1	217.9
LSD (0.10)	ns	ns	ns
ANOVA	P value	P value	P value
trt	0.9331	0.9339	0.1395
rep	0.7971	0.8721	0.0341

UTC = Untreated Control (no Sulfur added)

Table 2. Leaf nutrient analysis from V6 corn plants sampled on June 14, 2011 (7 days after sulfur treatment)†

Sulfur Treatment	N	P	K	Mg	Ca	S	Na	Fe	Mn	B	Cu	Zn
	%							ppm				
1.5 lb S/A	3.02	0.45	2.77	0.27	0.42	0.13	0.001	95	33	6	7	31
3.0 lb S/A	3.13	0.48	2.96	0.27	0.40	0.12	0.001	94	43	6	8	34
6.0 lb S/A	2.79	0.42	2.67	0.29	0.38	0.11	0.001	131	36	4	8	37
UTC	3.37	0.42	3.12	0.18	0.34	0.13	0.002	105	43	7	12	33
Sufficient Level	4.25	0.42	3.20	0.30	0.60	0.29	0.008	175	95	12	11	33
	D	S	S	S-L	L	D	S	D	D	D	L	S

† Leaf samples analyzed by Midwest Laboratories, Omaha, NE.

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Corn Hybrids for Grain

Table 4M-1YR. Summary, 2011, Medium Hybrids (113-117 Days to Maturity), All Locations

BRAND/HYBRID	YIELD BU/AC 2011	MOIST % 2011	STAND % 2011	LODG % 2011	TEST WT LBS/BU 2011
SEED CONSULTANTS SCS 11HR63™	218.2*	19.8	99.8	0.2	54.6
STEYER 11406VT3PRO	216.0*	18.1	100.0	0.2	55.5
STEWART 8V886VT3PRO	215.4*	18.8	99.7	0.1	55.0
PIONEER P1404HR HX1,LL,RR2	214.7*	18.6	100.0	0.1	55.3
PIONEER 1615HR HX1,LL,RR2	214.0*	19.4	100.0	0.2	55.0
DEKALB DKC63-87 (VT2PRO)	213.4*	17.7	100.0	0.1	55.4
PIONEER P1319HR HX1,LL,RR2	212.2*	18.4	100.0	0.1	55.4
CHANNEL BIO 214-14VT3P	211.3*	17.0	100.0	0.1	55.9
PIONEER 1745HR HX1,LL,RR2	211.1*	19.3	100.0	0.6	54.9
AGRIGOLD A6573VT3	211.1*	19.4	99.0	0.1	54.8
PIONEER P1412HR HX1,LL,RR2	210.9*	18.8	100.0	0.0	55.2
DYNA-GRO D54VP81	210.0*	18.3	99.8	0.3	55.4
N78S-3111	208.7*	21.3	98.1	0.1	54.1
BIO GENE BG 850V3	207.9*	17.5	99.4	0.1	55.8
REV®26HR82™	207.8*	20.3	99.7	0.0	54.5
MEDIUM AVERAGE	200.5	19	99.6	0.2	55
LSD (0.10)	10.6	0.7	0.4	1.7	0.3

100 hybrids
5 locations
15 top hybrids

2011 Kentucky Corn Hybrid Performance Test

	Early	Medium	Late
	Bu/A	Bu/A	Bu/A
Highest	218.8	218.2	211.4
Lowest	177.8	182.0	188.9
Difference	41.0	36.2	22.5
LSD (0.10)	7.1	10.6	8.7
	3%	5%	4%

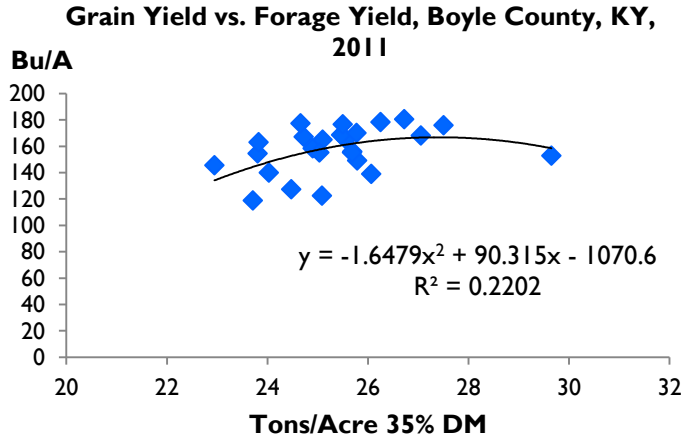
Corn Hybrids for Silage

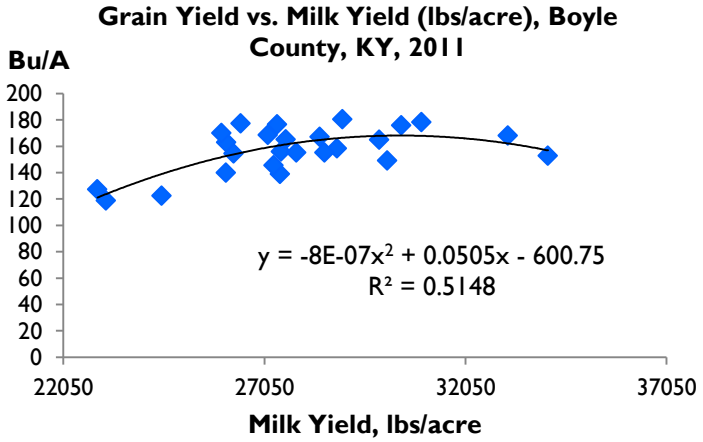
Table 1. Corn Hybrid Performance for Silage, Combined Locations (Boyle & Mason counties), Kentucky, 2011.

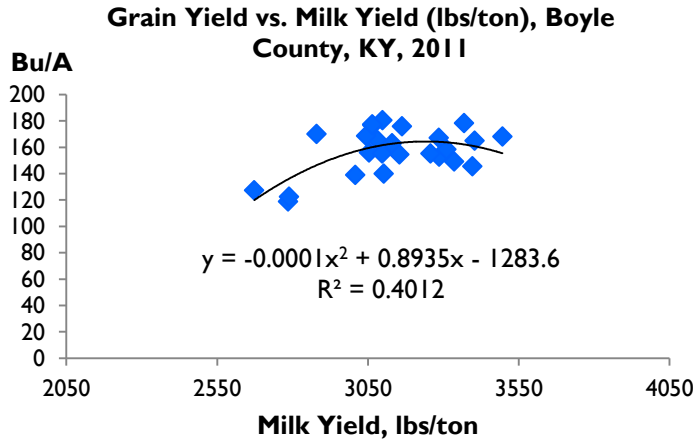
		Milk	Tons/A	Milk Yield [3]		NEL [4]	NEG	Quality, % [5]			
Brand	Hybrid	Line [1]	35% DM [2]	lbs/Ton	lbs/A	Mcal/lb	Mcal/lb	CP	ADF	NDF	Lignin
Asgrow	RX 940 RR2	0.38	24.1	3314	27939	0.77	0.50	7.8	25	42	3.4
Becks	6733 HXR	0.42	23.5	3486	28577	0.79	0.53	8.1	24	40	3.3
Becks	6903 HR	0.42	25.3	3406	30085	0.77	0.50	7.8	24	41	3.3
Cavern. Farms	CF 1026 GT	0.25	21.1	2918	21405	0.66	0.41	6.9	30	50	4.3
Cavern. Farms	CF 907 GTCBLL	0.50	21.9	3135	24004	0.73	0.46	7.7	26	45	3.6
Cavern. Farms	CF 926 GT	0.30	22.0	3315	25606	0.76	0.49	7.6	25	42	3.4
DeKalb	DKC 64-69	0.54	24.1	3176	26735	0.75	0.49	7.5	25	44	3.3
DeKalb	DKC 66-96	0.38	25.4	3544	31421	0.82	0.55	7.5	20	36	2.9
Dyna-Gro	D58VP30	0.33	26.8	3445	32309	0.81	0.54	7.8	22	38	2.9
Dyna-Gro	V5683VT3	0.42	25.5	3245	28907	0.77	0.51	7.7	24	41	3.2
Mycogen	TMF2H918	0.25	25.2	3084	27198	0.70	0.43	8.1	28	46	4.6
Mycogen	TMF2W727	0.25	24.1	3411	28739	0.78	0.51	7.9	25	41	3.6
Northrup King	N73V-3000GT	0.46	23.6	3109	25642	0.71	0.46	7.6	28	47	3.9
Northrup King	N82V-3000GT	0.42	26.1	3390	30842	0.80	0.53	7.5	22	38	3.1
Pioneer	31G67AMI BLEND	0.38	22.1	3263	25142	0.74	0.48	7.8	26	44	3.5
Pioneer	P1615 HR	0.46	24.1	3286	27558	0.76	0.49	7.5	25	42	3.3
Seed Consult.	SCS11HQ38	0.46	21.5	3316	24894	0.76	0.49	8.0	26	43	4.2
Seed Consult.	SCS11HR70	0.42	24.7	3290	28320	0.75	0.49	7.3	24	41	3.6
Southern States	SS 818 GENVT3PRO	0.38	23.5	3180	26113	0.74	0.47	7.7	27	44	3.9
Southern States	SS 868 GENVT3PRO	0.42	23.9	3180	26454	0.76	0.49	7.4	24	41	3.3
Wyffels Hybrids	W7213	0.42	25.2	3390	29873	0.80	0.52	8.1	21	37	3.1
Wyffels Hybrids	W8681	0.46	22.0	3469	26729	0.78	0.51	7.8	25	42	3.4
	LSD (0.10)	0.09	3.7								
	CV	24	11.6								
	Grand Mean	0.39	23.9	3288.5	27477	0.8	0.5	7.7	24.8	42.1	3.5

[1] Milk line measures the starch formation on the corn kernel. 0.75 milk line is considered ideal for silage.
[2] Yields adjusted to 35% dry matter; highest numerical yield is bold with gray box; bold yields are not significantly different from highest yield.
[3] Milk Yield was calculated with Milk 2000. Milk per ton of silage was rounded to the nearest ten and milk per acre was rounded to the nearest hundred.
[4] Net energy for lactation (NEL) and gain (NEG).
[5] Quality measurements based on dry weight and are calculated from composite samples at each site

Silage and Grain Yield







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Comparing Row Widths

Shelby County, Kentucky

Comparing Row Widths

30 inch rows

15 inch rows

Shelby County, August 16, 2011, R6 Growth Stage

15 inches vs. 30 inches

2010 Soybean Row Spacing Study Ellis Farms, Field 23	
Row Width, inches	Yield, Bu/A*
15	93.6
30	93.5
LSD (0.10)	ns

*Adjusted to 13% moisture.

2011 Soybean Row Spacing Study Ellis Farms, Field 23		
Row Width, inches	Moisture, %	Yield, Bu/A*
15	10.7	45.5
30	10.8	43.6
LSD (0.10)	ns	1.6

*Adjusted to 13% moisture

Row Width Comparions

High Yield Soybeans

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High-Yield Soybean

- 6 states, 3 locations per state
- Based on 2009, 2010 data…
- Narrow rows & foliar fungicide seem to contribute most to increased yields.
- Treatments resulting in no yield increases
  - Foliar fertilizers
  - Seed treatments
  - Inoculants

Planting timely, but not early.
Planted into well-drained soils.
Planted into fields with history of soybean.
Soil fertility was adequate to excessive.

Very high manure rate, resulting in high N

Typical fertility with no manure

Non-nodulating soybean in both images.
Non-nod soybeans must rely on nitrate in the soil for N

University of Arkansas

How much N, P and K do soybeans use?

Crop	N	P_2O_5	K_2O		Yield		N	P_2O_5	K_2O
	lbs/bu				Bu/acre		lbs/acre		
soybean seed	3	0.7	1.1		30		90	21	33
soybean seed					50		150	35	55
soybean seed					80		240	56	88
soybean seed					150		450	105	165

The value of manure

Source	Rate	unit	N	P_2O_5	K_2O	S	Carbon
			lbs/acre				
Broiler litter	2	ton	110	110	90	1.2	1280
Broiler litter	4	ton	220	220	180	2.4	2560
Broiler litter	10	ton	550	550	450	6	6400

		Water	N	P_2O_5	K_2O	S	C
Source	unit	%	lbs/ unit				
Broiler litter	ton	20%	55	55	45	0.6	640

assume 95% organic material in the dry matter

40 to 45% C by weight of dry matter part

How much N (or P or K or C) is coming from foliar fertilizers?

Foliar Product†	N	P_2O_5	K_2O	S	Fe	Zn	Organic Carbon	Humic Acids
	---------- percent (%) ----------							
Monty's 4-15-12	4	15	12	0	0.30	0.05		
Monty's 8-16-8	8	16	8	0	0.30	0.05		
Monty's 2-15-15	2	15	15	0	0.30	0.05		
Monty's Liquid Carbon	0	0	0	0	0.00	0.00	1.00	2.00
Agro-Culture Liquid High NRG-N	27	0	0	1	0	0		
Agro-Culture Liquid accesS	0	0	0	17	0	0		

† Mention of a trade name is not an endorsement by the University of Kentucky Cooperative Extension Service.

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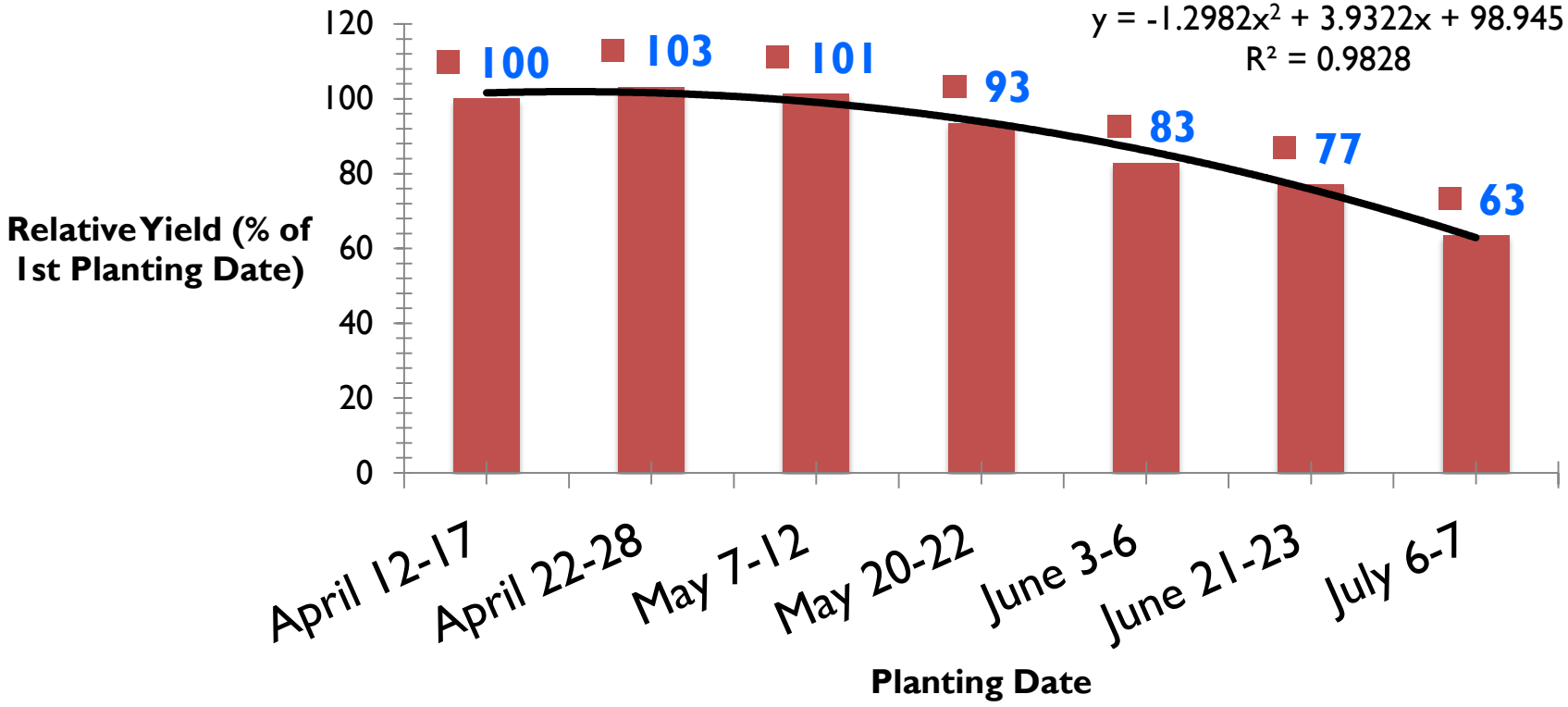
Updated soybean planting publication

Figure 1. Planting date effect on mid-IV maturity group soybean yield, University of Kentucky Research and Education Center, Princeton, KY, 2008-2010.



[1] Location was the University of Kentucky Research and Education Center at Princeton, Kentucky. Soybean varieties were Pioneer 94M50 (2008, 2009) and Pioneer 94Y60 (2010). Rainfall for June through Sept. was -7.5 inches in 2008, plus 7.0 inches in 2009 and -4.5 inches in 2010 relative to 30-year average. Seeding rate was about 200,000 seeds per acre. Yields from each planting date are based as a percentage of yields from the first planting date.

Based on research results from Princeton, Kentucky, full season soybean planting can begin about 5 to 7 days after the median (50%) date for final spring freeze (Table 1).

Kentucky Location	Probability Level for Last Freeze (32°F or less)[1]		
	90%	50%	10%
Ashland	Apr 16	May 04	May 21
Bardstown	Apr 3	Apr 20	May 6
Beaver Dam	Apr 1	Apr 14	Apr 28
Bowling Green	Mar 26	Apr 11	Apr 26
Covington	Apr 4	Apr 20	May 6
Danville	Mar 30	Apr 12	Apr 26
Glasgow	Apr 4	Apr 16	Apr 28
Henderson	Mar 29	Apr 9	Apr 20
Hopkinsville	Mar 29	Apr 10	Apr 22
Leitchfield	Apr 7	Apr 22	May 6
Lexington	Apr 2	Apr 15	Apr 28
Madisonville	Mar 31	Apr 12	Apr 24
Mayfield	Apr 1	Apr 13	Apr 25
Monticello	Apr 5	Apr 20	May 6
Murray	Mar 24	Apr 5	Apr 17
Nolin River Lake	Apr 8	Apr 26	May 13
Princeton	Mar 31	Apr 13	Apr 25
Russellville	Mar 30	Apr 13	Apr 26
Shelbyville	Apr 14	Apr 29	May 14
Somerset	Apr 7	Apr 22	May 7

Trade-off of earlier planting

- About 10% chance of killing freeze
- Slower germination and emergence
- Lower emergence (about 75% emergence in the studies, with a low of 50% one year).
- Higher seeding rate needed.
- You need to calculate the cost to benefits.

Seed Cost [1]	Seed Size	Seed Rate			Seed Cost [2]
$/50-lb bag	seeds/lb	seeds/acre	lb/acre	bags/acre	$/acre
70.00	3200	120,000	38	0.75	52.50
		140,000	44	0.88	61.25
		160,000	50	1.00	70.00
		180,000	56	1.13	78.75
		200,000	63	1.25	87.50
		220,000	69	1.38	96.25
60.00	3200	120,000	38	0.75	45.00
		140,000	44	0.88	52.50
		160,000	50	1.00	60.00
		180,000	56	1.13	67.50
		200,000	63	1.25	75.00
		220,000	69	1.38	82.50
50.00	3200	120,000	38	0.75	37.50
		140,000	44	0.88	43.75
		160,000	50	1.00	50.00
		180,000	56	1.13	56.25
		200,000	63	1.25	62.50
		220,000	69	1.38	68.75

See the new Soybean Planting Publication (AGR-130)

- Available online at Grain Crops Extension website
- http://www.uky.edu/Ag/GrainCrops/
- or search google for
  - Grain Crops
  - Grain Crops Extension
  - Kentucky Soybean Planting

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Under Water

Owensboro, Kentucky, May 10, 2011

Water Damage

Owensboro, Kentucky, May 10, 2011

Water Damage

Owensboro, Kentucky, May 10, 2011

Flooded Corn

Christian County, May 20, 2011,

Flooded areas are common this spring. Some spots have since been replanted.

Flooded Areas

Christian County, May 20, 2011

Sidedress N goes up to the wet spot.

Flooded Corn

Christian County, May 20, 2011

Flooded-out corn near the foreground in this image.

Ammonia Burn

Christian County, May 20, 2011

Ammonia burn on the leaves near the end of the field where the machine makes turns and raises out of the ground.

Sidewall Compaction

Breckinridge County, June 16, 2011; 90 lbs of K_2O / acre applied earlier in the spring

Sidewall Compaction

Breckinridge County, June 16, 2011; 90 lbs of K_2O / acre applied earlier in the spring. The roots on this plant were confined to the sides of the seed furrow but are breaking through the bottom of the furrow. K deficiency evident on lower leaves.

Sidewall Compaction

Breckinridge County, June 16, 2011; 90 lbs of K_2O / acre applied earlier in the spring. Most roots are confined to the sides of the seed furrow, but a few have broken through the bottom of the furrow and one has broken through the sides.

Sidewall Compaction

Breckinridge County, June 16, 2011; 90 lbs of K_2O / acre applied earlier in the spring.

June 17, 2011

Edmonson County

Edmonson County

June 17, 2011

Edmonson County

June 17, 2011

Will foliar fertilizer help with sidewall compaction?

Crop		N	P_2O_5	K_2O		Yield		N	P_2O_5	K_2O
		lbs/unit						lbs/acre		
corn grain	bu	0.7	0.4	0.35		100	bu	70	40	35
						200	bu	140	80	70
						300	bu	210	120	105
corn stalks	ton	14	7	29		2.8	ton	39	20	81
						5.6	ton	78	39	162
						8.4	ton	118	59	244

Foliar Product	Rate	Unit	N	P_2O_5	K_2O	S	Organic Carbon	Humic Acids
			lb/acre	lb/acre	lb/acre	lb/acre	lb/acre	lb/acre
Monty's 4-15-12	32	oz	0.114	0.4275	0.342	0		
Monty's 8-16-8	32	oz	0.224	0.448	0.224	0		
Monty's 2-15-15	32	oz	0.058	0.435	0.435	0		
Monty's Liquid Carbon	32	oz	0	0	0	0	0.02125	0.0425
Agro-Culture Liquid High NRG-N	32	oz	0.54	0	0	0.02		
Agro-Culture Liquid accesS	4	gal	0	0	0	6.8		

† Mention of a trade name is not an endorsement by the University of Kentucky Cooperative Extension Service.

Sulfur?

June 10, 2011, Lexington, KY

Corn

June 10, 2011, Lexington, KY

S Deficiency?

Fayette County, June 6, 2011. Suspected sulfur deficiency. The heavy spring rains washed some of the S out of the soil surface. More root growth will solve this problem. No yield losses expected here.

N Deficiency?

Larue County, June 16, 2011
Yellow corn appears to line up with the width of N application equipment, not with planter passes.

N Deficiency?

Larue County, June 16, 2011
Some yellow streaks were not consistent with low areas of the field.

N Deficiency?

Larue County, June 16, 2011

On the right half of the field, there appears to be some yellow streaks consistent with the N applicator. On the left side of the field, low areas were water stood appears to have caused the yellow streaks.

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Hail Damage

Wayne County, June 3, 2011
Corn received hail about 5 days before these images were taken.

Hail Damage

Wayne County, June 3, 2011
Hail ripped leaves and but killed very few plants. Yield loss will be zero or very minimal.

Hail Damage

Pollination

August 18, 2011

“Tip-Back”

2 Ears Better Than 1?

Two large ears but very low population.

Downed Corn

August 16, 2011
Shelby County, Kentucky

Downed Corn

August 18, 2011, about 80 bu/acre yields
Shelby County, KY

Downed Corn

August 25, 2011, 190 bu/acre yields
Bourbon & Scott Counties, Kentucky

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Fayette County

Soybean Emergence, 2011

Soybeans

Some early insect feeding, but no yield losses.

Hart County

Around July 28, 2011, potassium (K) deficiency. In this case, the field was low in potassium.

Hart County

Around July 28, 2011. Potassium deficiency. In this case, low soil test values.

Hart County

Around July 28, 2011. Similar soil type with higher soil test K values.

Clinton County

2009: Concern about yellow streaks in the field. Inoculaton?

Clinton County,
Sidewall Compaction

2009: Similar observations this year. The sidewall compaction was causing the potassium deficiency. Additional potassium wasn't going to help much.

Pulaski County

2004: similar observations this year. Compaction at about 2 inches deep caused these roots to stop growing down.

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