

High Yield Soybean



Chad Lee, Ph.D.

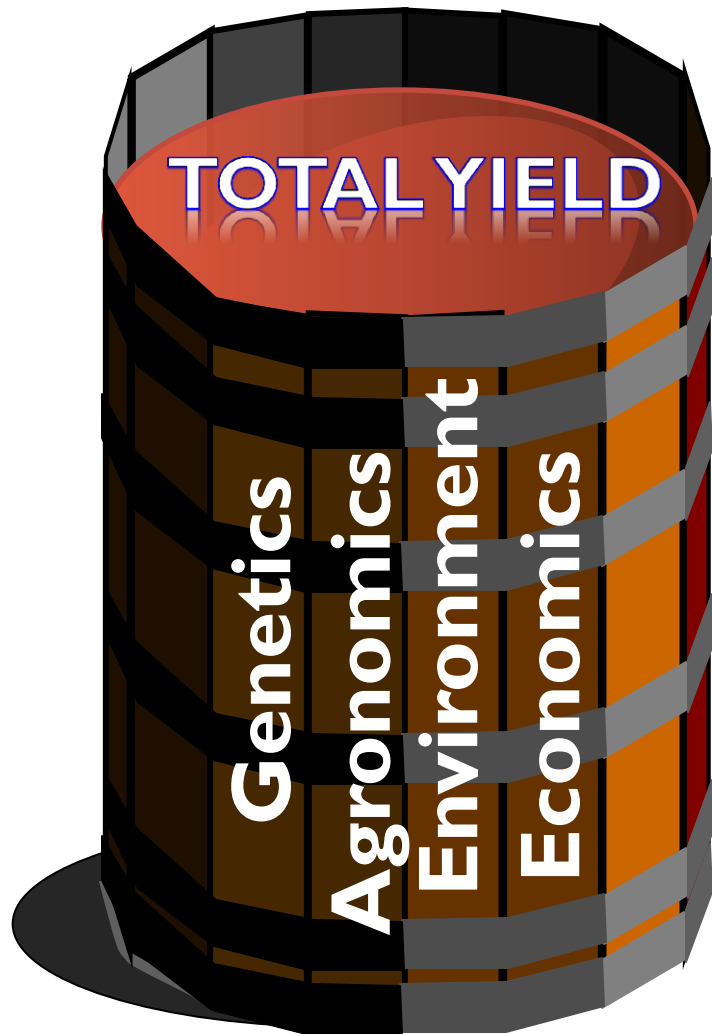
Extension Agronomist

University of Kentucky

cdlee2@uky.edu

<http://graincrops.blogspot.com/>

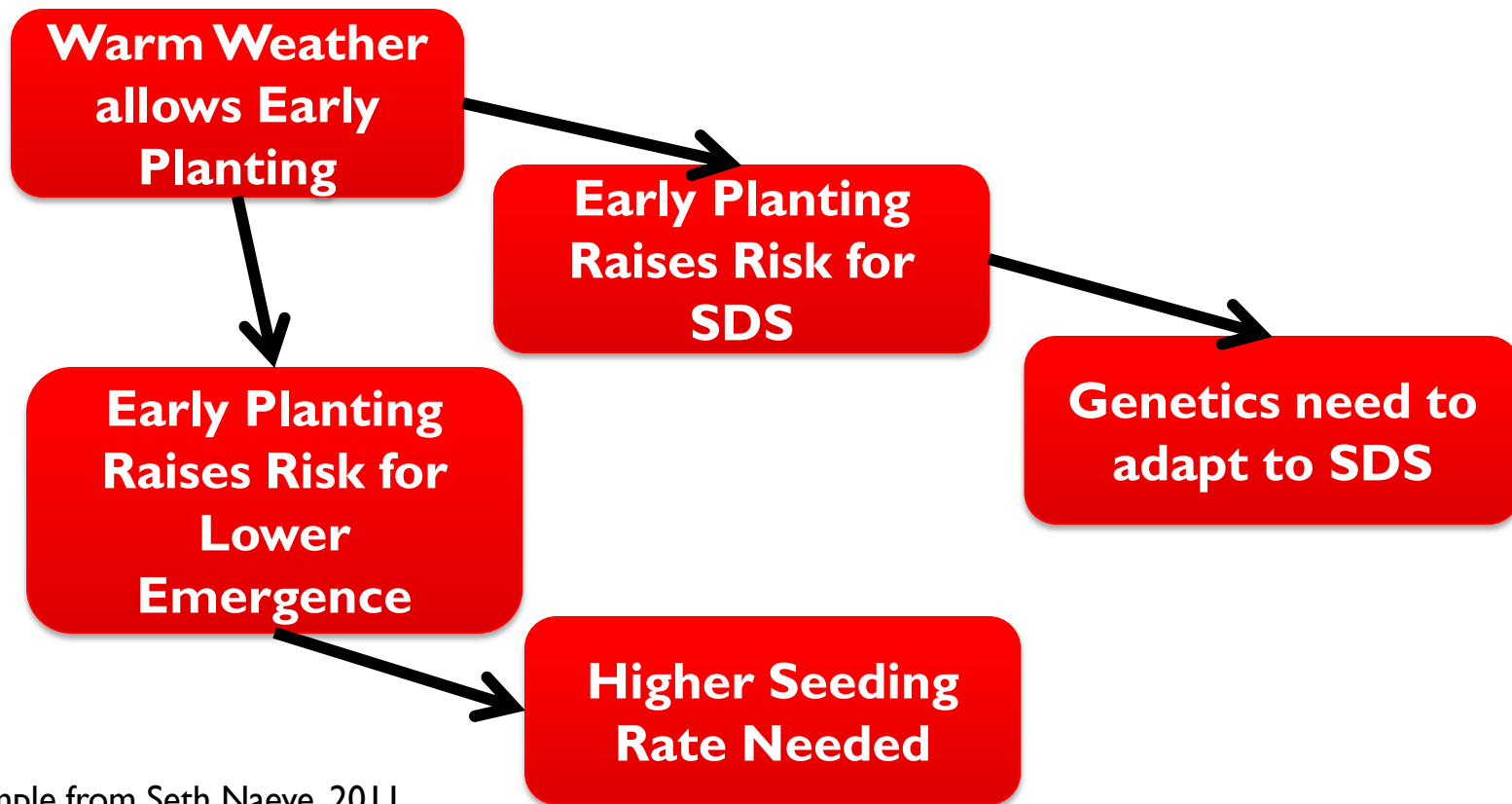
Yield Limitations







Management, Genetics, Environment, etc. Interact with Each Other...



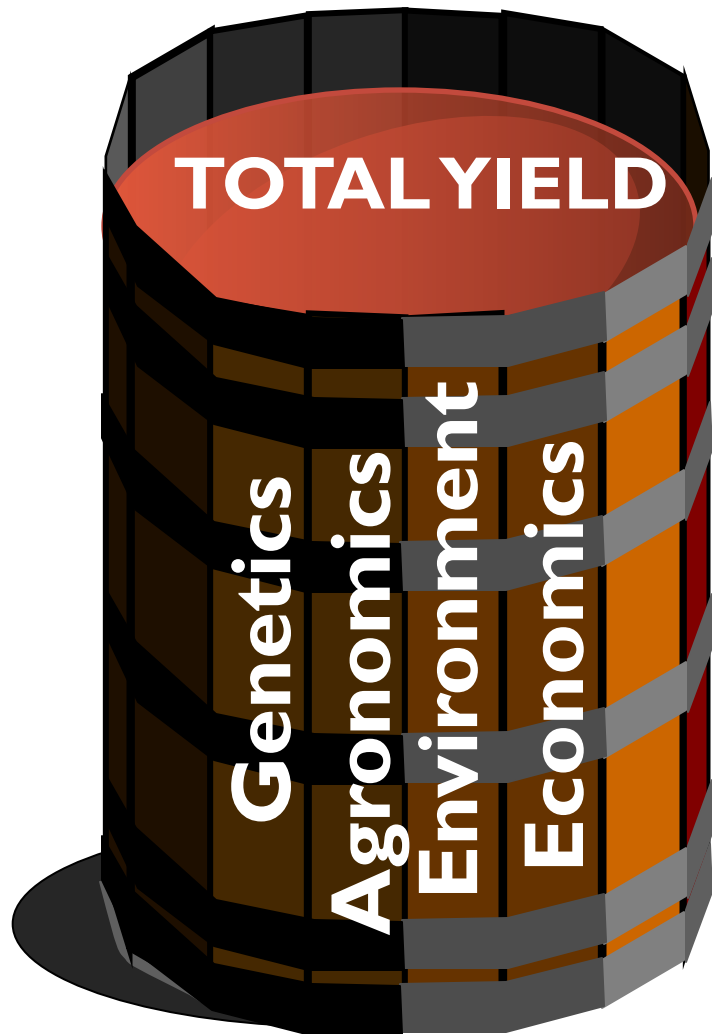
Example from Seth Naeve, 2011

Environment

- Rainfall (or Irrigation)
 - Amount
 - Intensity
 - Timing
- Temperatures
 - Day
 - Night
- Sunlight
 - Per Day
 - Per Season

- How was 2009?
- How was 2010?
- How was 2011?
- What will 2012 bring?

High Yield System





High yield system

- **Key components**

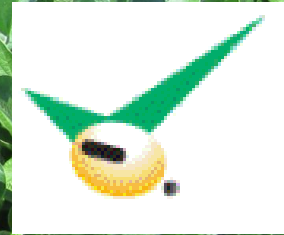
- Productive soils (deep, proper pH, adequate fertility, no compaction)
- Adequate, timely rainfall (or irrigation)
- Using good genetics
- Rotating crops
- Planting on time (not necessarily early)
- Accurate planting (good placement, proper seeding rates)
- Planting in narrow rows (20 inches or less)
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- Pay attention to the crop, treat it as a primary crop

High Yield System

- When we are doing all the basics, is there some way to get even more yield?



Kitchen Sink Soybeans



Maximum Soybean Yields (Kitchen Sink)

- Rationale: With high grain prices and a perception of stagnant yields, farmers are attempting to buy their way to greater yields – often with little (or no) scientific basis.
- The Kitchen Sink is an attempt to examine maximum yields through current products and to tease-out the product(s) that provide the greatest chance of increasing yields.

Example from Seth Naeve, 2011

The Kitchen Sink

- Examines multiple inputs
 - By ‘drop out’
 - In systems
 - Early-season intensive management
 - Late-season intensive management
- 3 locations per state
- 6 replications

Kitchen Sink Soybeans

- 6 states
 - Michigan State
 - Minnesota
 - Iowa State
 - Kentucky
 - Arkansas
 - Louisiana State
- Part of a larger set of studies

Basic Comparisons

- Narrow rows
 - 15” or 20” (vs. 30”)
- High seeding rates
 - 200K (vs. 100K) - 2009
 - 240K (vs. 140K) - 2010
 - 240K (vs. 140K) - 2011

Kitchen Sink Treatment

- **Seed treatment:**
 - Trilex 6000 (Bayer) 2009
 - Cruiser Maxx (Syngenta) 2010, 2011
- **Inoculant:**
 - Vault LV (Becker Underwood)
- **Additional soil-applied fertilizer:**
 - P_2O_5 , K_2O , S, B, Mn, Zn
- **Foliar Fertilizer:**
 - Task Force 2 (Loveland) applied at R1
- **Foliar Fungicide:**
 - Headline (BASF) at R3
- **Narrow or Wide Rows**
- **Target Plant Density**
 - 100,000 plants/acre

Kitchen Sink Plus

- Kitchen Sink +

- Additional 100,000 plants/acre (targeting a total of 200,000 plants/acre)
- 15” rows

- Kitchen Sink ++

- Additional 100,000 plants/acre (targeting a total of 200,000 plants/acre)
- Additional foliar fungicide
 - Headline @ R3
 - Quilt @ R5
- 15” rows

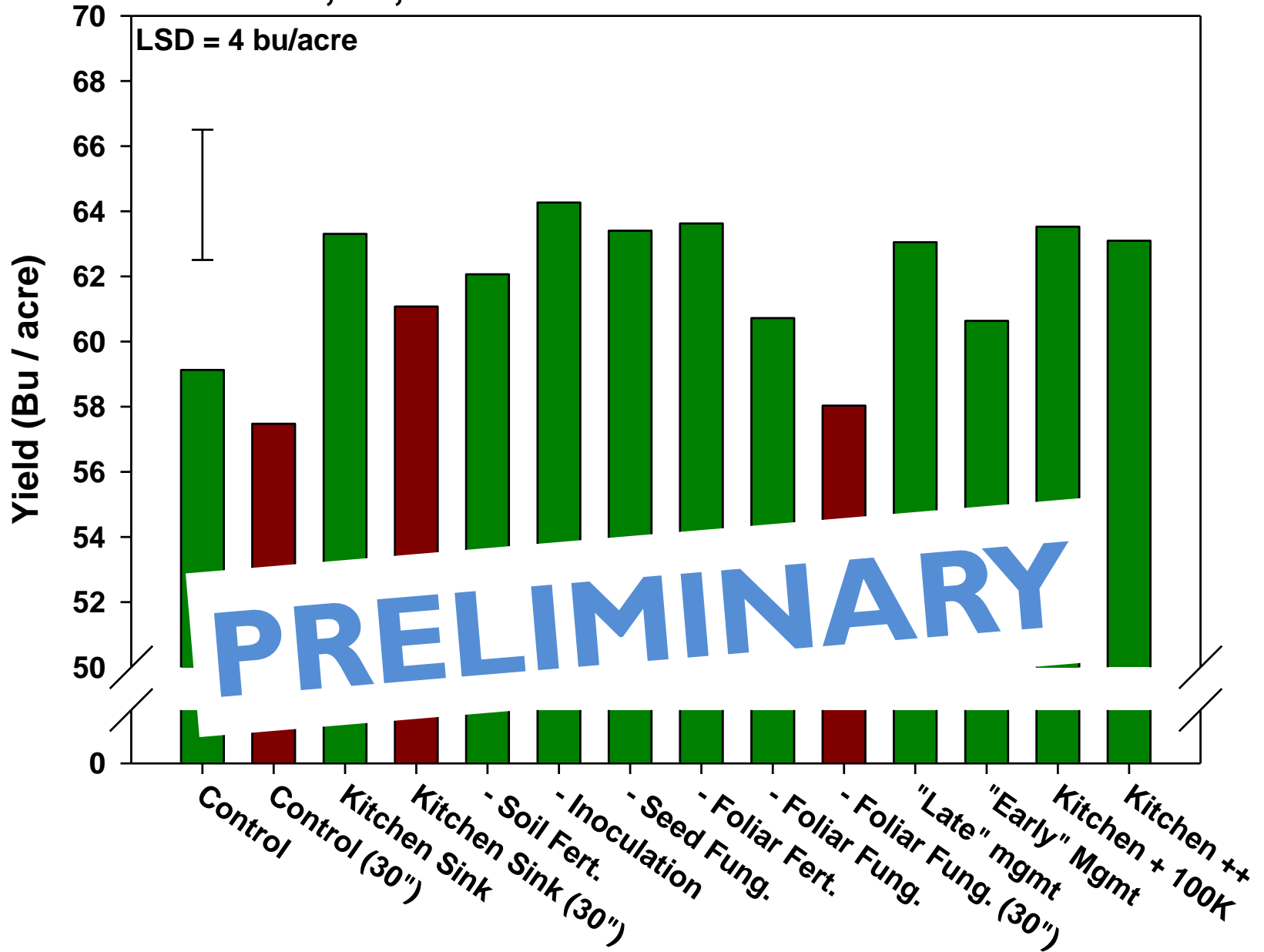
No.	Treatment	Abbreviation
12	Standard input, 15" rows (control 15")	Control 15"
1	Standard input, 30" rows (control 30")	Control 30"
2	High input, 15" rows (Kitchen Sink 15")	Kitchen Sink 15"
3	High input, 30" rows (Kitchen Sink 30")	Kitchen Sink 30"
5	High input, 15" rows w/o additional soil fertility	KS - Soil Fert.
6	High input, 15" rows w/o inoculant	KS - Inoc.
8	High input, 15" rows w/o seed treatment	KS - Seed Trt
4	High input, 15" rows w/o foliar fertility	KS - Fol. Fert.
7	High input, 15" rows w/o foliar fungicide	KS - Fol. Fung.
11	High input, 30" rows w/o foliar fungicide	KS - Fol. Fung. 30"
9	Late season management, 15" rows	Late
10	Early season management, 15" rows	Early
13	Ultra high input, 15" rows	Kitchen Sink +
14	Ultra high input, 15" rows + add'l fungicide	Kitchen Sink ++

Preliminary Results

- o These results in the following slides are preliminary.
- o Additional analyses are needed.
- o Graduate students will be writing theses and publishing data that may be analyzed differently than what is presented here.

MN, MI, and IA -- Kitchen Sink -- 2009-2010

PRELIMINARY



Kitchen Sink – Northern summary

PRELIMINARY

- Application of a foliar fungicide appeared to provide the largest fraction of yield increases by the “kitchen sink” treatment (for MN, MI and IA)
- One of the largest synergistic effects was through narrow row spacing (for MN, MI and IA).

2011 Kitchen Sink Soybean

PRELIMINARY

Treatment

Hopkinsville

36°39'54" N,
87°26'34" W

New Haven

37°39'28" N,
85°35'27" W

Lexington

37°59'19" N,
84°28'39" W

		bu/acre		bu/acre		bu/acre	
12	Control 15"	39.2	cbcde	77.4	ef	69.4	bcd
1	Control 30"	40.4	bcde	73.3	f	39.7	f
2	Kitchen Sink 15"	46.9	abcd	82.7	abcdef	61.5	cd
3	Kitchen Sink 30"	34.0	ed	77.7	def	46.3	ef
5	KS - Soil Fert.	53.8	a	83.3	abcdef	68.3	bcd
6	KS - Inoc.	43.7	abcde	89.5	ab	58.0	cde
8	KS - Seed Trt	38.1	cde	79.9	bcdef	68.3	bcd
4	KS - Fol. Fert.	44.9	abcde	89.1	abc	57.7	cde
7	KS - Fol. Fung.	32.3	ed	80.7	bcdef	61.4	cd
11	KS - Fol. Fung. 30"	48.5	abc	77.8	def	36.4	f
9	Late	40.1	bcde	87.6	abcd	71.7	abc
10	Early	52.0	ab	87.8	abcd	56.7	ed
13	KS + 100K	46.8	abcd	92.7	a	84.9	a
14	KS++	42.4	abcde	87.3	abcde	81.0	ab
	LSD (0.10)	13.1		10.1		14.1	
	MEAN	43.3		83.2		61.3	
	ANOVA Treatment p value	0.081		<.0001		<.0001	

Kitchen Sink Soybean

PRELIMINARY

- In Kentucky, 8 site-years
 - 2009, 2010, 2011
 - 3 locations each year
 - 1 site in 2010 “lost” to dry weather
- Significant differences in 6 out of 8 site-years
- In those 8 site-years:
 - KS + was among the highest yields
 - Implies that (in Kentucky) higher seeding rate may be needed with higher inputs to get more yield
 - KY was only no-till sites. Perhaps no-till is influencing population response to inputs.

Partial Expenses per Acre†	Kitchen Sink +	Kitchen Sink
Trilex 6000 (or Cruiser Maxx)	\$15.00	\$7.50
Vault LV	\$5.85	\$3.40
Task Force 2, 2 qt/A	\$4.63	\$4.63
Headline, 6 oz/A	\$14.53	\$14.53
84 lbs P ₂ O ₅ (DAP)	\$79.06	\$79.06
56 lbs K ₂ O (KCl)	\$25.43	\$25.43
0.5 lb B (Borax, 11%B)	\$1.82	\$1.82
2 lb Mn (MnSO ₄)	\$5.31	\$5.31
0.5 lb Zn (ZnSO ₄)	\$1.70	\$1.70
Fol. Fert. Application	\$7.00	\$7.00
Fol. Fung. Application	\$7.00	\$7.00
Additional 100K Seed (\$60/bag)	\$37.50	-
Total Extra Costs, \$/acre	\$204.83	\$157.38

† Most costs were estimated in January 2011, by averaging values from some several interviews with retail outlets. The seed treatment price was adjusted December 2011.

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Basics must be in place before trying more inputs.

- **Key components**

- Productive soils (deep, proper pH, adequate fertility, no compaction)
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Soy MVP



- Soybean Management Verification Program
- Compares University of Kentucky guidelines to producer practices.
- 2009 and 2010: an economic advantage to U.K.

University Guidelines



June 24, 2010 – VI3, R2

Producer Practice



June 24, 2010 – VI3, R2

Soy MVP, 2009

Location	University Guidelines	Producer Practice	University Guidelines	Producer Practice
	Yield, bu/acre		Partial Net Return, \$/acre	
Graves County A	72.1	76.6	641.11	660.42
Graves County B	59.2	50.1	511.55	418.49
Hickman County A	51.0	50.8	427.17	425.25
Hickman County B	50.6	50.8	423.33	425.25
Lyon County	42.8	42.5	339.78	333.64
Muhlenberg County A	47.0	45.1	389.46	360.42
Muhlenberg County B	38.9	39.3	311.70	304.74
Trigg County	54.8	57.1	438.34	454.35
Average	52.1	51.6	435.31	422.82
Average Difference	+0.5 bu/acre		+ \$12.49/acre	

Soy MVP, 2010

Location	University Guidelines	Producer Practice	University Guidelines	Producer Practice
	Yield, bu/acre		Partial Net Return, \$/acre	
Muhlenberg ¹	48.1	49.8	404.69	414.97
Trigg ²	23.9	28.0	169.24	177.58
Marshall ³	19.7	19.0	133.86	97.44
Calloway ⁴	26.7	24.3	203.86	150.44
Butler ⁵	44.7	46.6	365.33	371.73
Henderson 1 ⁶	71.5	70.9	629.72	593.15
Henderson 2 ⁷	75.2	80.4	681.72	688.15
Average	44.3	45.6	369.77	356.21
Average Difference	-1.3 bu/acre		+ \$13.56/acre	

¹Seeding rate 135K (FP) vs. 120K (UK)

²Seeding rate 150K (FP) vs. 120K (UK),fungicide, insecticide on FP

³Fungicide seed treatment for FP, 160K (FP) vs. 120K (UK)

⁴Fungicide seed treatment for FP, 160K (FP) vs. 120K (UK)

⁵Seeding rate 150K (FP) vs. 120K (UK), fungicide used on both sides

⁶Insecticide used for FP, 165K (FP) vs. 120K (UK), fungicide and foliar P, K on both sides

⁷FP used fungicide, insecticide, foliar fertilizer, 165K (FP) vs. 120K (UK)

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Thank You

