Corn Fertility – Topdress Nitrogen and Other Considerations

John S. Kruse, Ph.D.

Asst. Professor, Cotton and Feedgrains

jkruse@agcenter.lsu.edu

2010 - 2011 Crop Production Acres*

Corn 530,000 – 570,000

Sorghum 100,000 – 122,000

Cotton 255,000 – 288,000

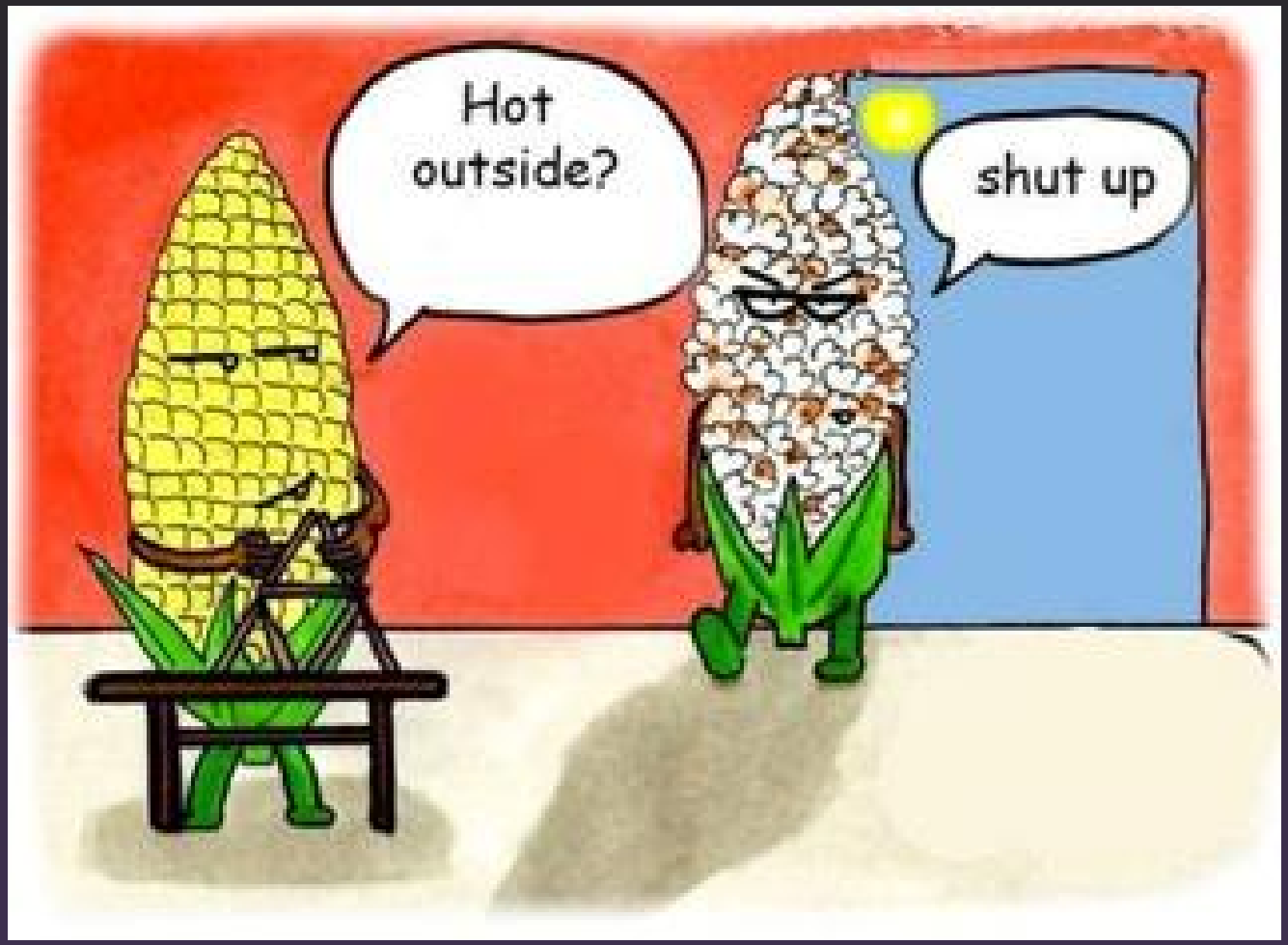
Sugarcane 415,000 – 408,000

Soybeans 1,045,000 – 1,027,000

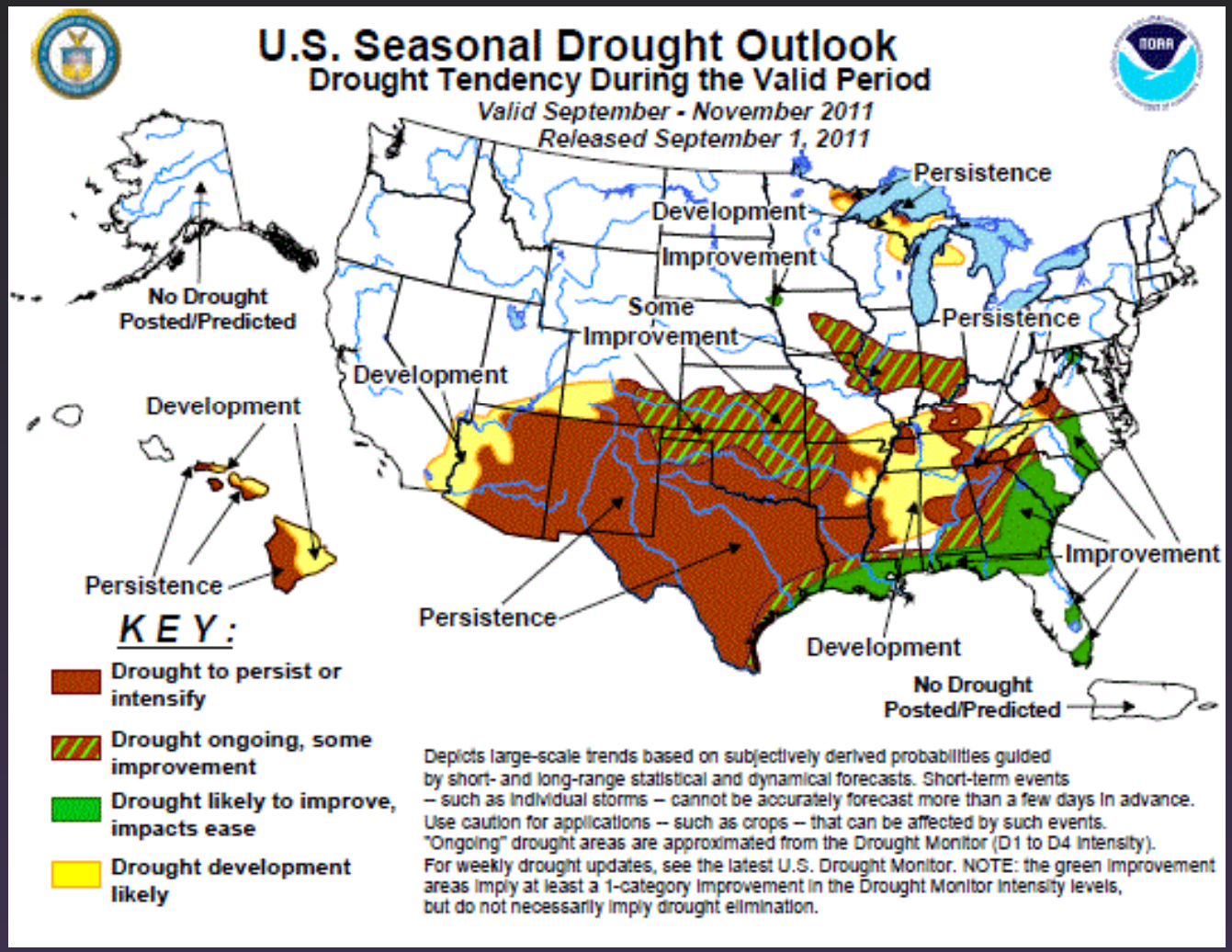
Rice 530,000 – 420,000

*NASS Planted acres – 2010, 2011

2011 Corn Season in Louisiana



Drought and Heat



www.cpc.ncep.noaa.gov

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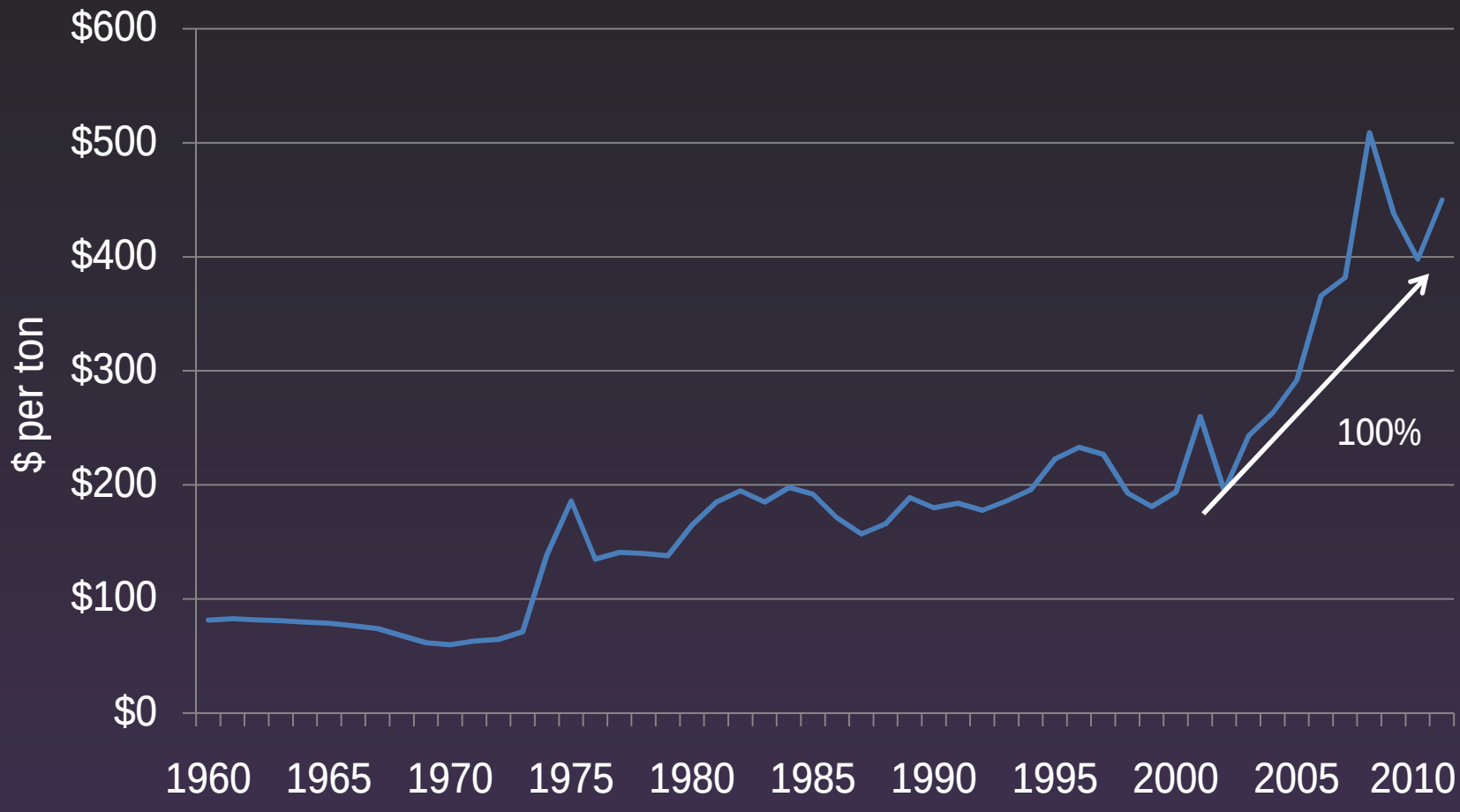
Price of Nitrogen



http://www.ers.usda.gov/Data/FertilizerUse/ & Dr. Chris Main, U of T

Corn Fertility Issues

- Nitrogen – effort on optimization
- Sulfur – overlooked
- Phosphorus – timing and placement
- Potash – symptoms despite adding K
- Zn deficiencies
- Low pH - topsoil and subsoil
- Urea at tassel?
- Compaction
- Low soil organic matter

Corn and Sorghum Fertility – Nutrient Uptake

Nutrient	N	P_2O_5	K_2O	S
Corn (180 bu/a) MSU	240	102	240	30
Corn removal (180 bu/a) MSU	162	80	52	14
Sorghum (140 bu/a) PPI	238	84	240	38

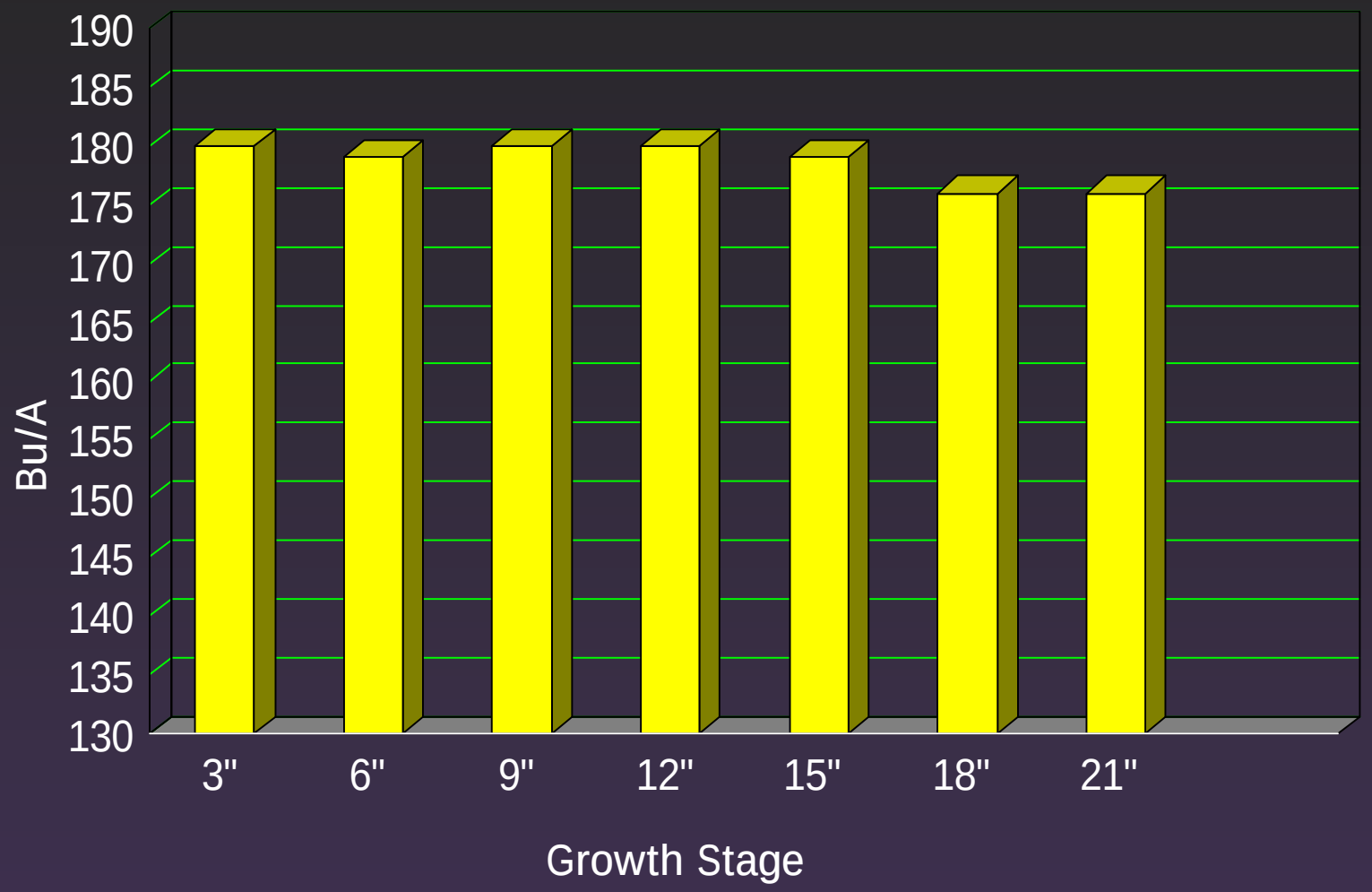
Credit: Wayne Ebelhar and IPNI

General Corn N Recommendations

Soil	Irrigation	N (lbs/acre)
Alluvial	Yes	180 – 240
	No	160 – 200
Other	Yes	180 – 240
	No	120 – 160

Source: LSU AgCenter

Fertilizer application timing



Research conducted from 2005 to 2007 at the Dean Lee Research and Ext. Ctr.

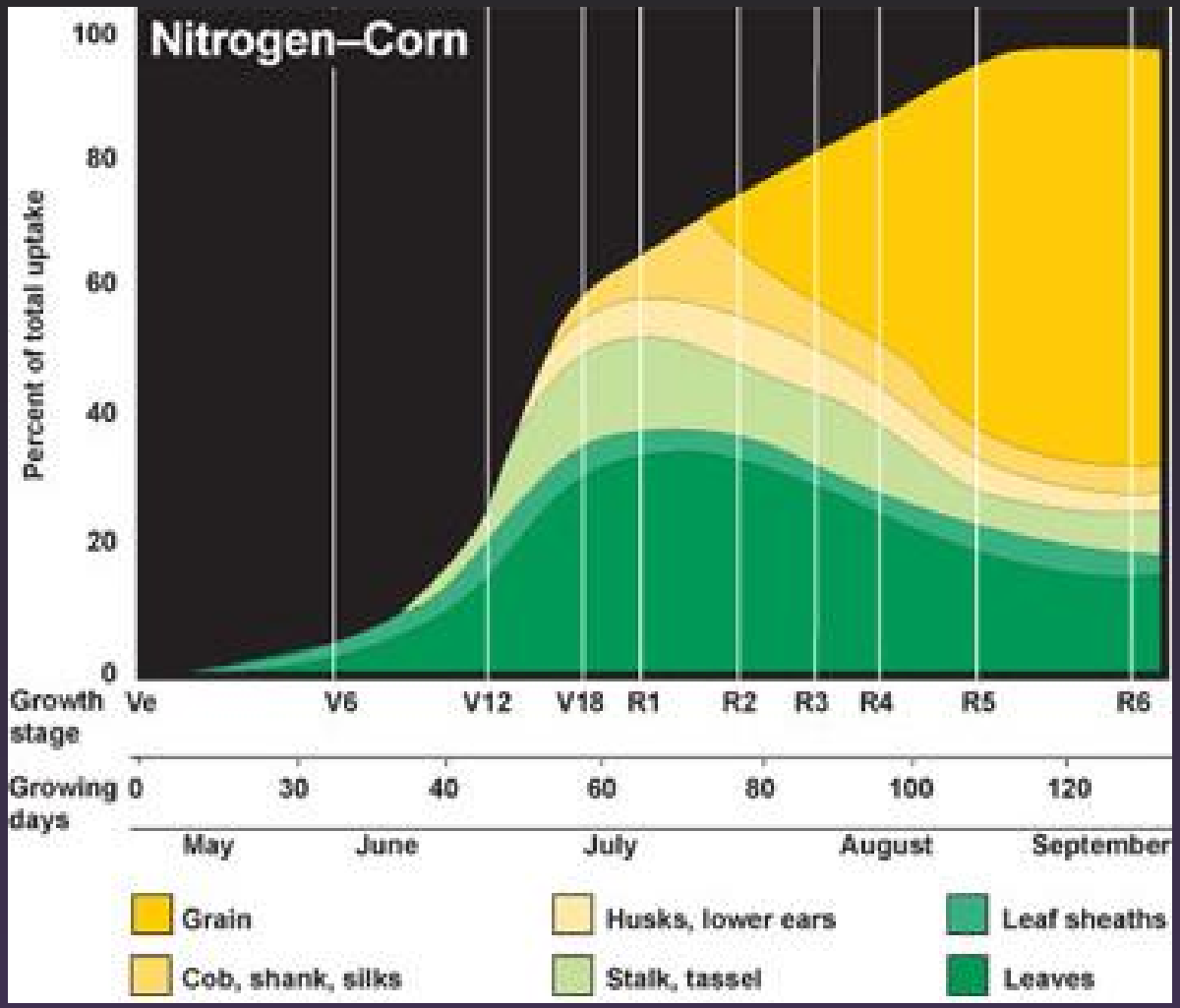
Hybrid was Terral 25BR23

180 units of nitrogen applied

Trial was replicated four times

Credit: David Y. Lanclos, Ph.D.

Nitrogen uptake: urea at tassel?



Phosphorus (P)

- P is absorbed by plants as a phosphate (a charged particle)
- P does not move very far (a few mm)
- P gets bound up in soil – esp. at low and high pH

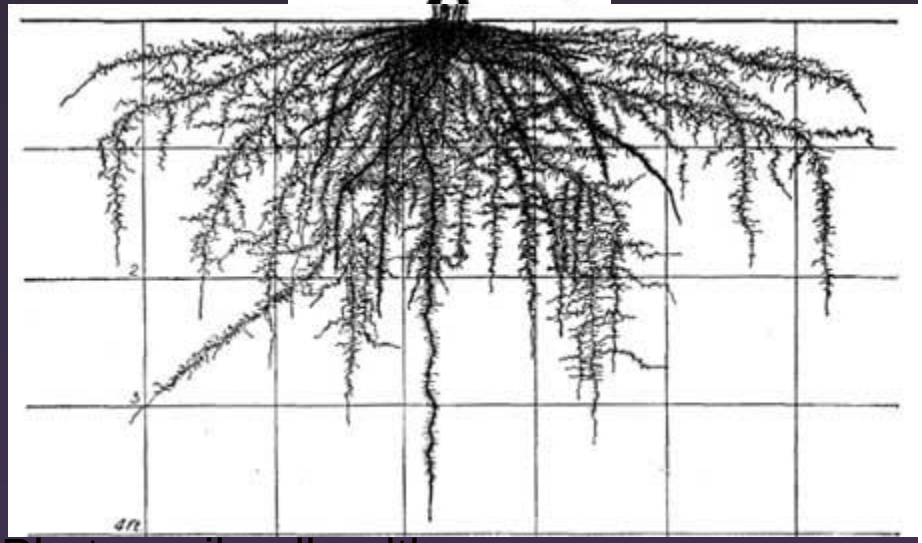


Photo: soilandhealth.org

Phosphorus Levels – probability of response

Soil Test P (lbs/acre)	Category
0-18	Very Low
19-36	Low
37-72	Medium
73-144	High
>144	Very High

Source: MSU, 2011

Zinc Research in Corn
(Red River alluvial soils)

- Locations:
  - Bossier
  - Cheneyville
- Site requirements:
  - High soil test P, high pH
- Zn source: $ZnSO_4$ and ZnEDTA
- Zn rate: 0, 2.5, 5 and 10 lbs/A
- Sampling
  - V3 leaf stage
  - V8 leaf stage, soil samples
  - VT
  - Harvest (grain and soil samples)

Cooperators: Dr. Brenda Tubana & Dr. J Kruse

Zinc Research in Corn
(Red River alluvial soils)

Cheneyville

Source	Rate, lbs/A	Soil Test Zn, ppm	V3 leaf stage		V8 leaf stage		Grain Yield, bu/A
			Zn, ppm	P/Zn	Zn, ppm	P/Zn	
$ZnSO_4$	0	1.21	22	147	18	116	115
	2.5	1.72	21	152	20	116	142
	5	2.43	21	141	20	115	159
	10	4.00	26	124	18	124	139
ZnEDTA	0	1.28	18	167	19	121	129
	2.5	1.99	20	153	19	113	155
	5	2.39	21	145	18	115	143
	10	2.11	23	129	20	110	139

Soil test P = 50 ppm; pH = 7.5

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Zn Highlights

- A Zn application rate of 5 lbs/A was required for soil testing <1.5 ppm Zn.
  - An average of 35 bu/A increase in grain yield was obtained
  - Lower application rate was required if applied as ZnEDTA
- A marginal increase in grain yield was observed when 2.5 lbs Zn/A (regardless of source) was applied to corn grown on soil with Zn < 3 ppm.

Effective water holding capacity

Table B.1: Available water holding capacity of different textured soils

Soil Texture	Available Water (in./ft.)
Very coarse texture (very coarse sand)	0.39 to 0.74
Coarse texture (coarse sands, fine sands, loamy sands)	0.74 to 1.25
Moderately coarse texture (sandy loams)	1.25 to 1.74
Medium texture (very fine sandy loams, loams, silt loams)	**1.5 to 2.3**
Moderately fine texture (clay loams, silty clay loams, sandy clay loams)	**1.74 to 2.5**
Fine texture (sandy clays, silty clays, clays)	**1.6 to 2.5**

From Keller and Bliesner (1990).

Table B.2: Effective root depths of selected crops (80% of total)

Crop	Root Depth (ft)
Corn (grain and silage)	0.6 to 1.2
Corn (sweet)	0.4 to 0.6
Cotton	0.6 to 1.8

Based on a deep, uniform, well-drained soil profile (Keller and Bliesner (1990).

Credit: Thomas et al., UGA

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Questions

Acknowledgements

Parish ANR Agents
Brandi Woolam