



Increasing Root Mass and Yield in Corn Through the Use of Fertilizer Additives



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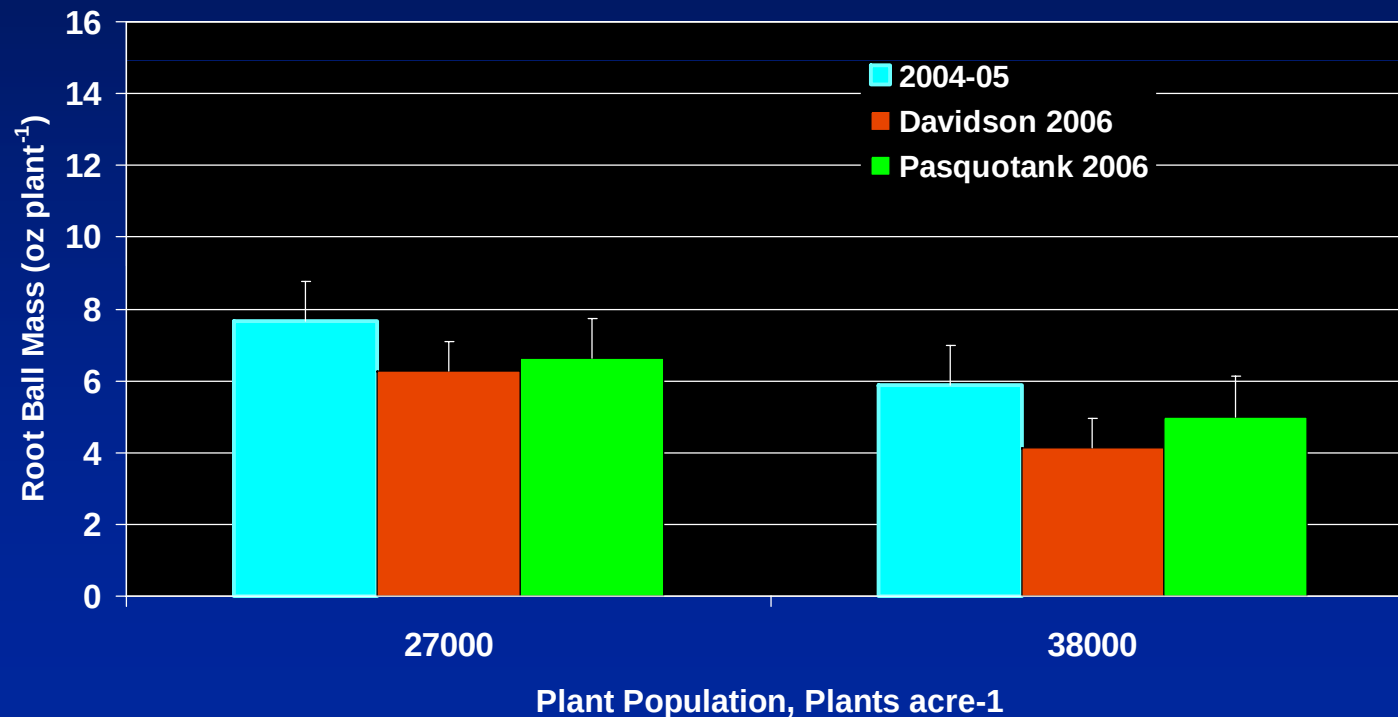
Effect of Row Spacing on Plant Height – 12" spacing



Root Development

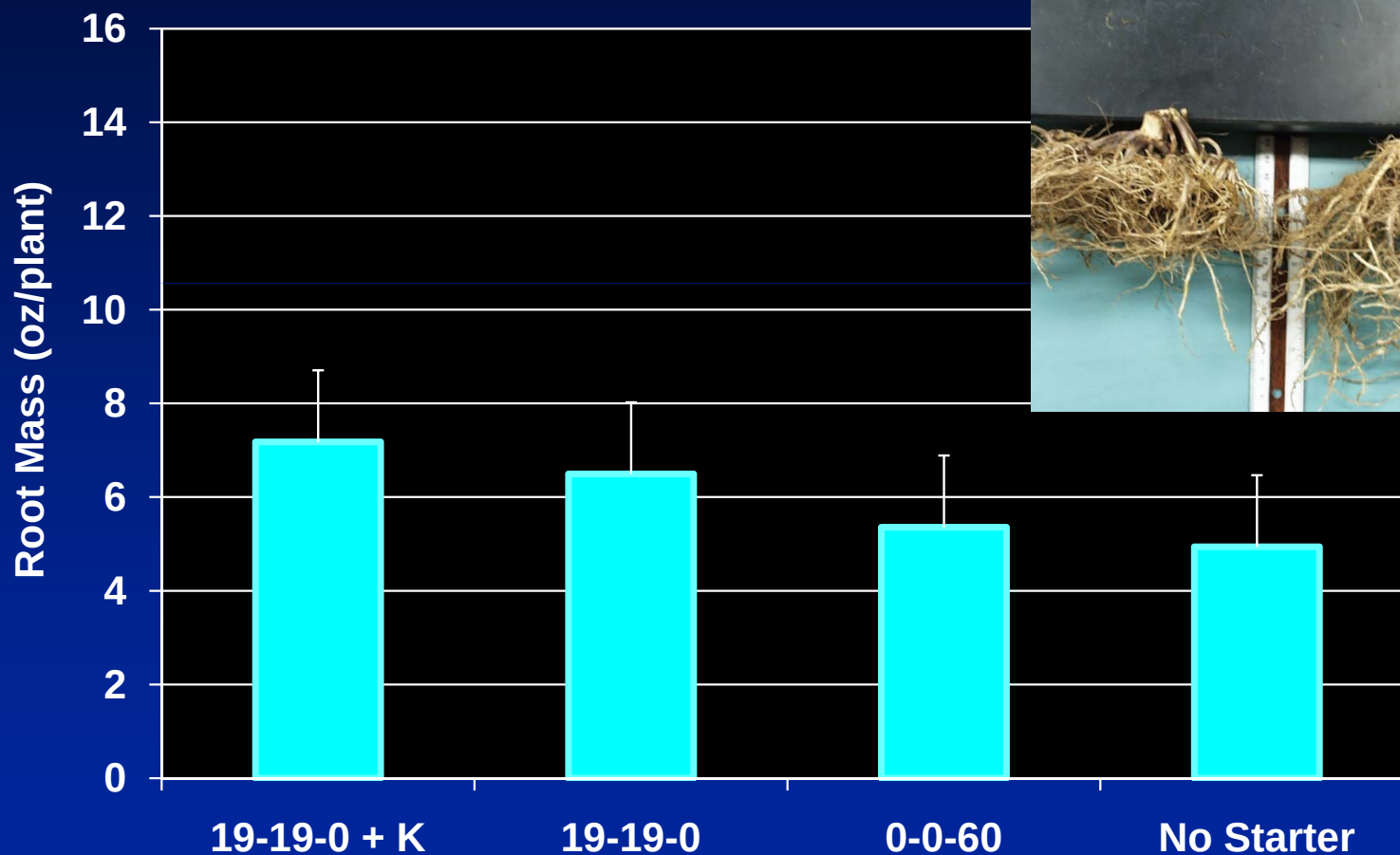
⇒ Increasing population requires higher concentrations of nutrients in the root zone for the development of root mass

Effect of Plant Population on Root Mass



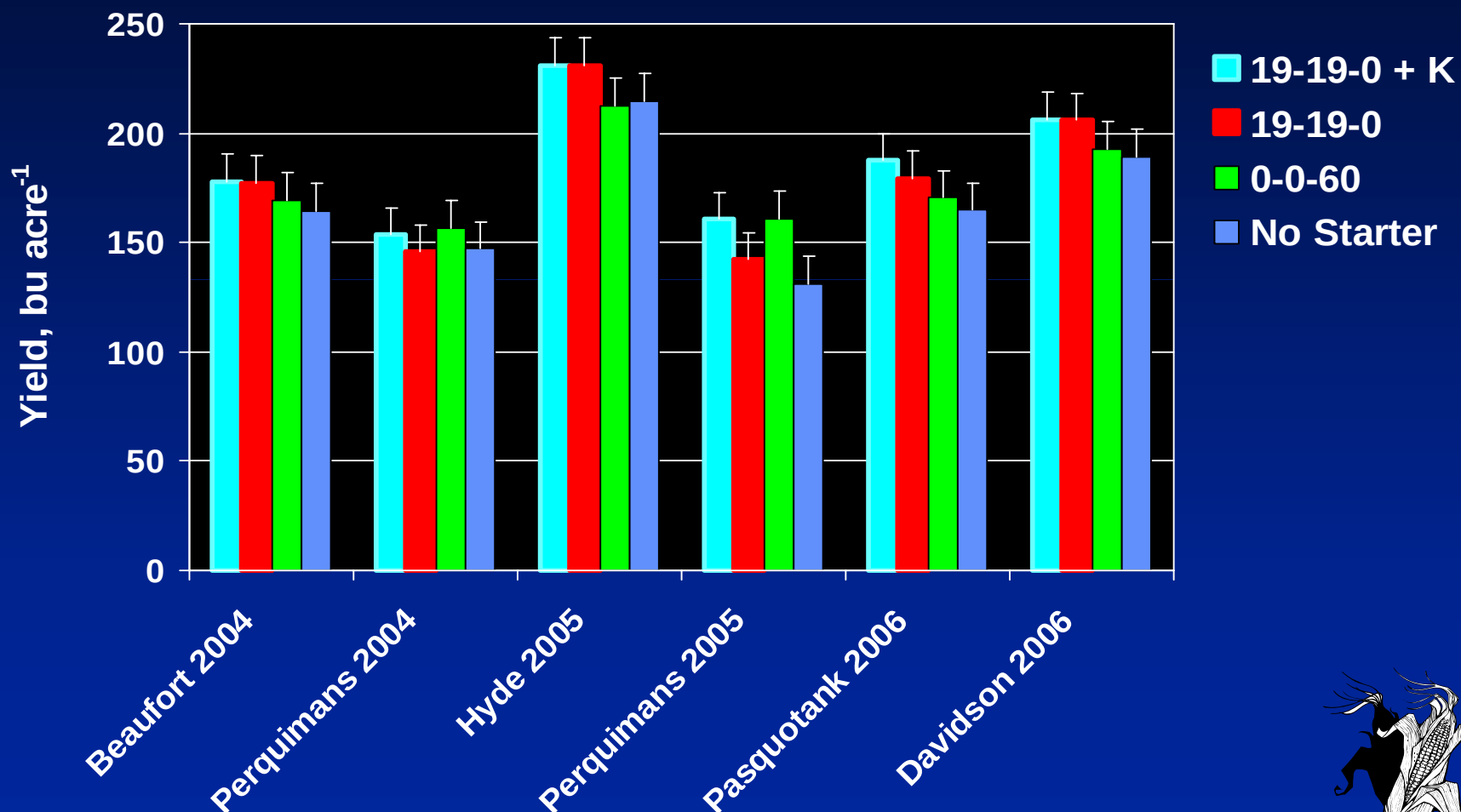
Differences in Root Ball Mass

Fertility Treatments across Plant Populations:
2004-06



Differences in Corn Yield

Fertility Treatments across Six NC Sites



2007 Studies

☑ Sites: Perquimens 2007	Roanoke sandy loam	Terral TV21BR40
Pamlico 2007	Wasda Muck	DeKalb DKC69-71
Currituck 2007	Pasquotank silt loam	Pioneer 31G98
Alamance 2007	Dragston sandy loam	Pioneer 31G98
Davidson 2007	Kirksey clay loam	Pioneer 31G98

☑ Design: Split plot in four Blocks

Main Plots: Starter Blends – 10-27-0; 10-27-0 + Avail; 17-17-0; 12-12-4

Subplots: Application Rate – 5, 10, 20, 40 gals of solution per acre

☑ Measurements:

rooting depth, root mass, plant height, stalk diameter, grain yield

☑ Analysis: Proc Mixed



2008 Studies

☑ Sites: Pasquotank 08 Bladen silt loam Pioneer 33M53/57
Beaufort 08 Cape Fear silt loam Pioneer 33M53/57

☑ Design: Split plot in four Blocks
Main Plots: Hybrids – Bt and nonBt isoline
Subplots: Starter Blends –
10-27-0; 10-27-0 + Avail; 17-17-0; 12-12-4; 30-0-0; 0-0-27, check

☑ Measurements:
rooting depth, root mass, plant height, stalk diameter, grain yield

☑ Analysis: Proc Mixed



2008 Studies

☑ Sites: Forsythe 08	Cecil silt loam	DeKalb DKC61-69
Guilford 08	Dragston sandy loam	DeKalb DKC61-69
Davidson 08	Kirksey clay loam	Syngenta NK68-B8

☑ Design: Split plot in four Blocks

Main Plots: Starter treatments – 12-12-4, 12-12-4 with Avail, check

Subplots: UAN, UAN + Nutrisphere , check
two rates - 152 or 184 lbs of N acre⁻¹

☑ Measurements:
grain yield

☑ Analysis: Proc Mixed - separations made using contrast statements



Improving Early Growth and Stress Tolerance



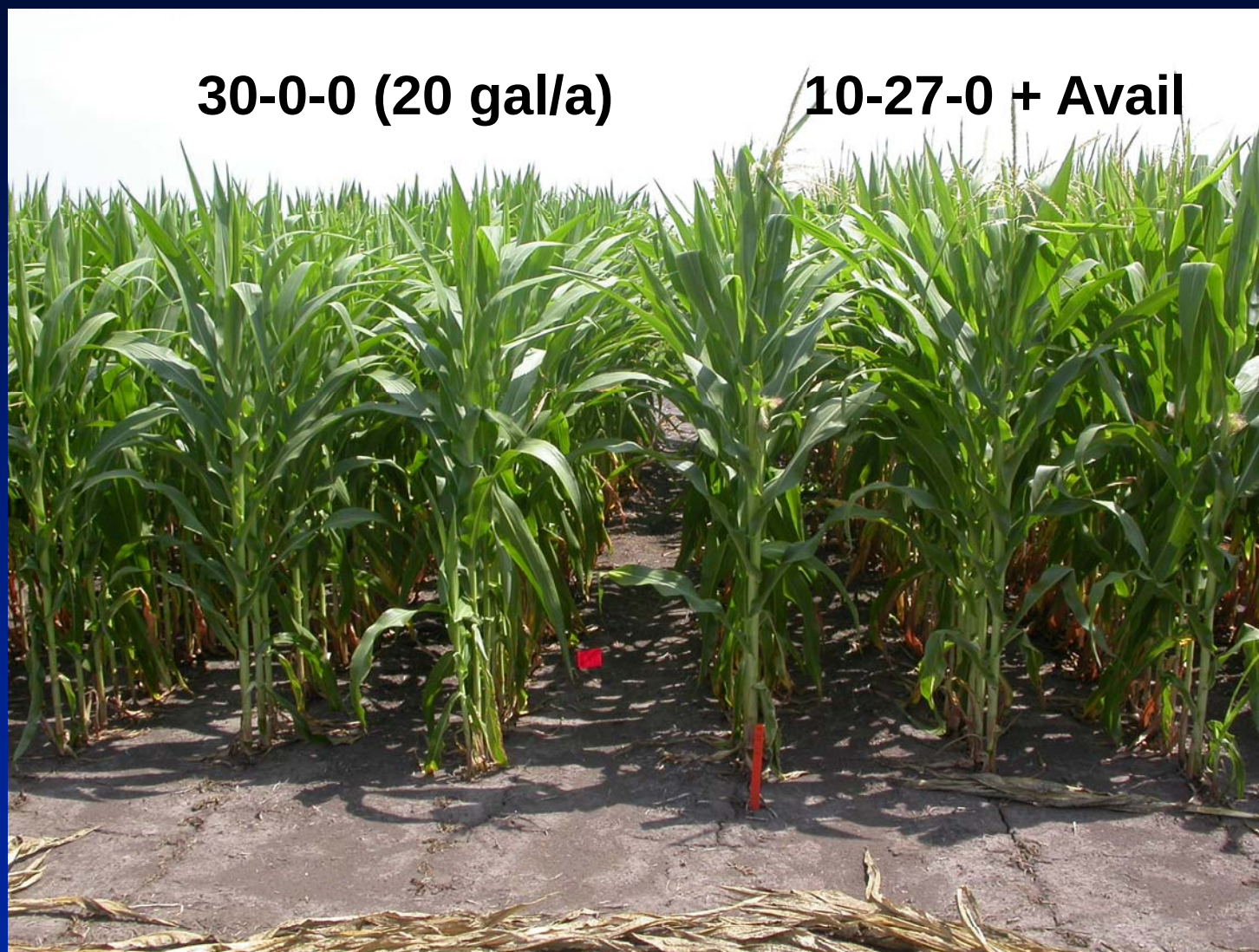
12 – 12 – 4 @ 20 gal/acre



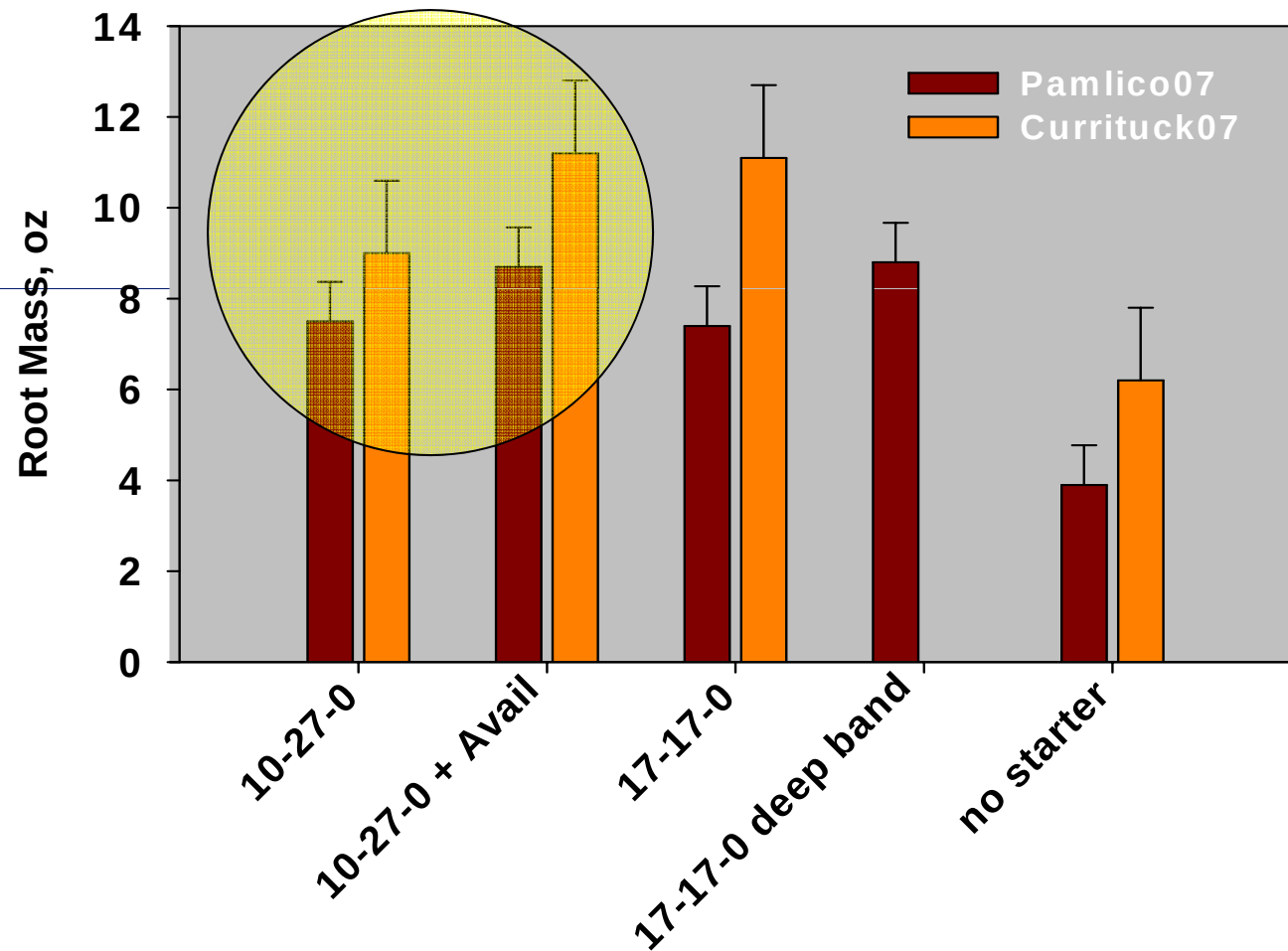
**12 – 12 – 4 @ 20 gal/acre
Plus Avail**



What's The Difference?



Differences in Root Mass



Comparison of Root and Stalk Properties with (Yes) and without (No) Avail added to the starter

Location - Year	Root Properties						Stalk Properties	
	Depth (in)		Width (in)		Mass (oz)		Ear Internode Diameter (in)	
	No	Yes	No	Yes	No	Yes	No	Yes
Pamilico -07	5.3	6.0	5.8	6.1	7.5	8.7	0.95	1.0
Currituck – 07	3.6	3.7	5.0	5.0	9.0	11.2	0.93	0.95
Beaufort – 08	2.6	2.6	4.0	4.3	2.4	2.7	0.74	0.78
Pasq. - 08	3.7	3.8	5.8	5.6	4.7	3.8	0.79	0.83

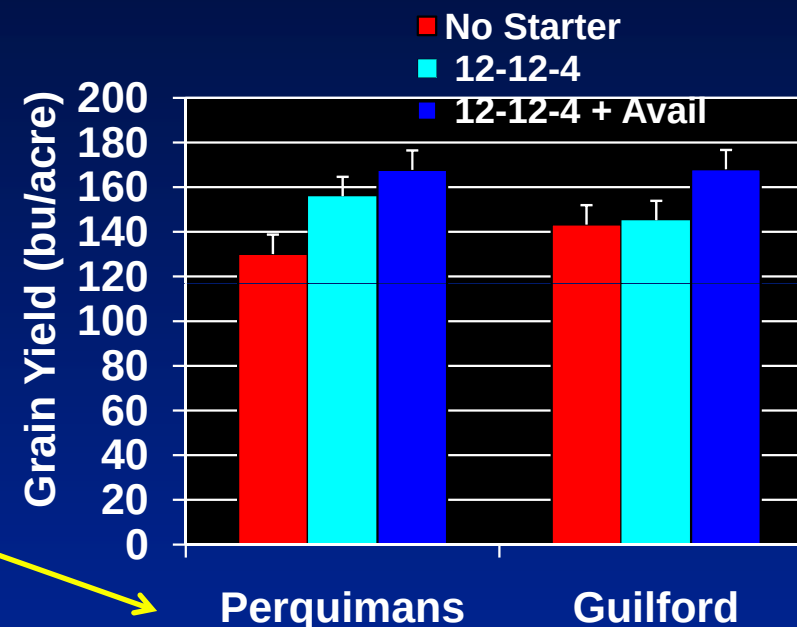


10 gal/acre of 10-27-0 with Avail

No Starter

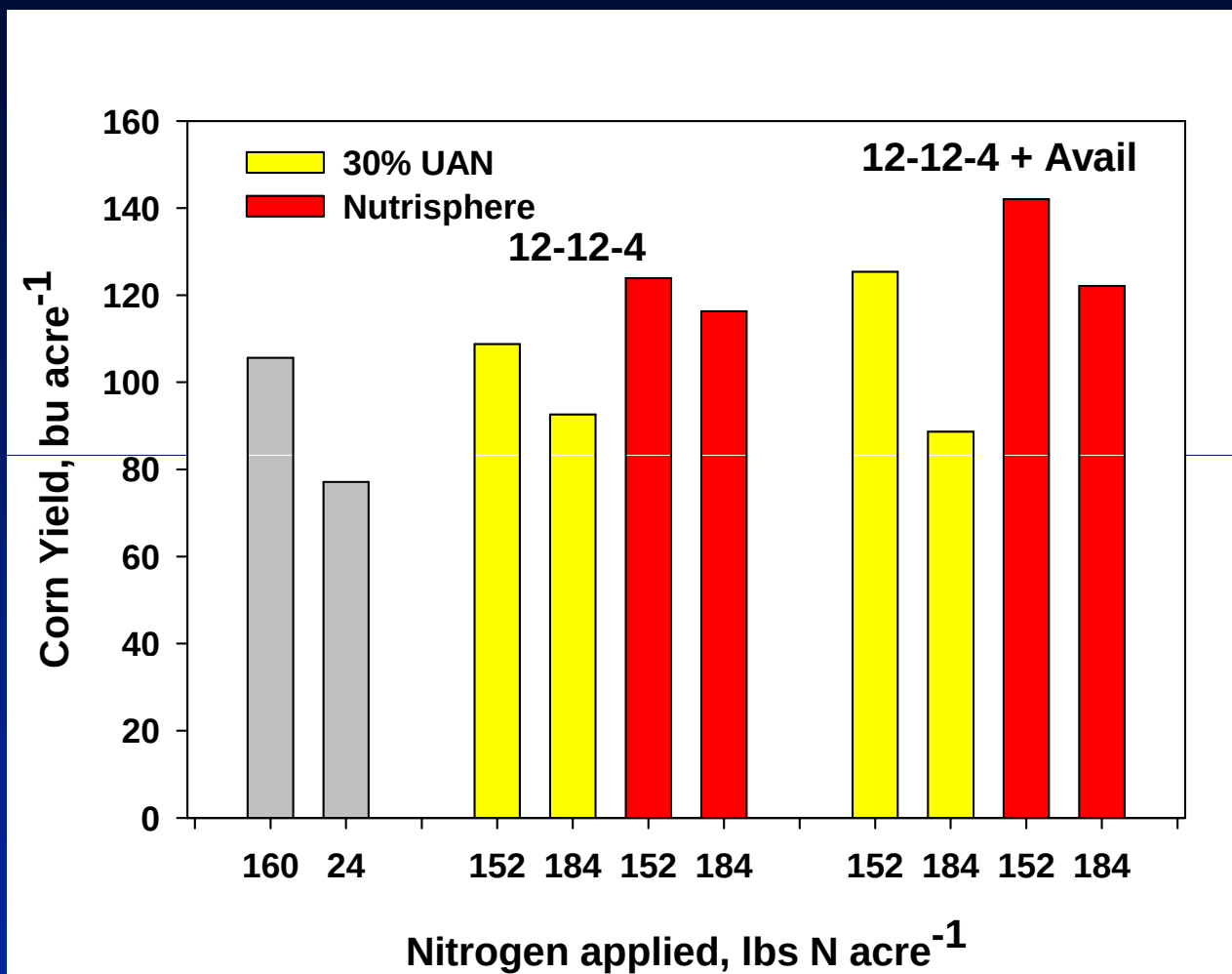
Yield Response to Avail

Location - Year	P Level	Corn Yield (bu acre ⁻¹)		
		No Starter	Starter only	Starter with Avail
Pamilico -07	Med	185.1	191.0	200.7
Currituck – 07	Med	190.8	198.6	199.4
Beaufort – 08	High	128.0	122.7	127.5
Pasq. - 08	High	165.3	153.7	160.0
Perq. – 07	Low	131.3	155.0	167.8
Guilford – 07	High	143.3	142.2	160.9
Davidson – 07	v. High	123.7	151.0	133.5
Davidson - 08	v. High	161.3	164.6	164.0
Forsythe – 08	Med	105.6	110.4	120.3
Guilford - 08	High	106.6	107.0	121.8



Average Yield Increase = 6 bu acre⁻¹

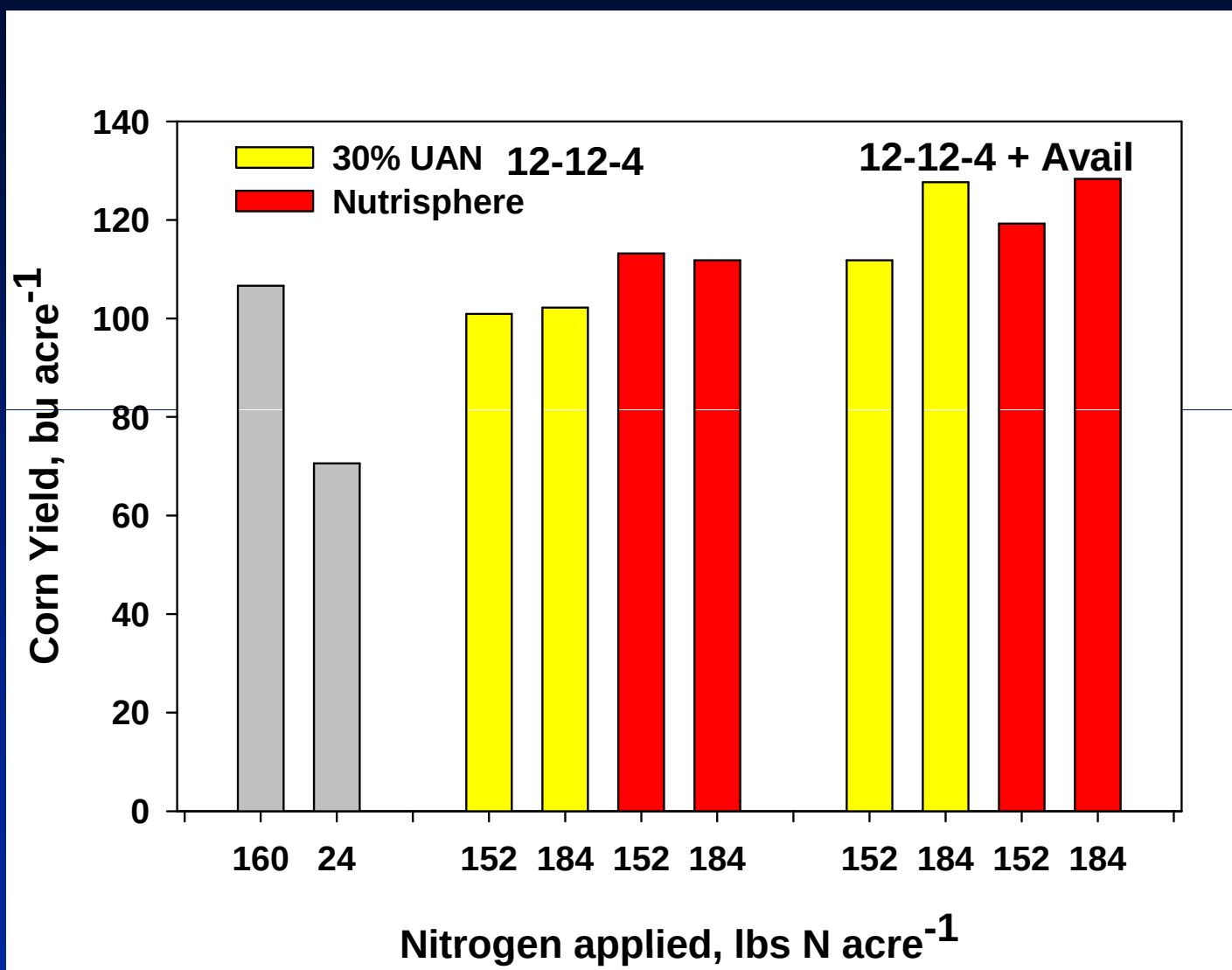
Forsythe County – 2008 (pH = 6.1)



$p = 0.3814$ - 12-12-4 vs 12-12-4 + Avail

$p = 0.0394$ – UAN vs Nutrisphere

$p = 0.0398$ – UAN + 12-12-4 vs Nutrisphere + Avail



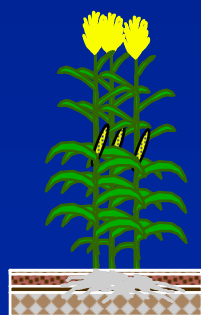
$p = 0.0192$ - 12.12.4 vs 12.12.4 + Avail

$P = 0.0023$ - UAN with 12.12.4 vs Nutrisphere + Avail

Department of Crop Science
College of Agriculture and Life Sciences

Where is Avail® Working ?

- High population corn systems when used with nutrisphere
- Banded applications that enhance the activity of the polymer
- Cool soils with excess moisture
- Soils where pH is above or below optimum levels
 - ✓ corn following cotton or tobacco on sandy soils
 - ✓ corn on new ground
- Situations where soil P concentrations are low in the upper profile
 - ✓ Wasda soils with shallow organic horizons



Effects of Nutrisphere on Yield and Optimum N Rate

Location - Year	Corn Yield (bu acre ⁻¹)			
	30% UAN		UAN + Nutrisphere	
	Maximum Yield	Economic Optimum N rate	Maximum Yield	Economic Optimum N Rate
Pamlico -07	209.7	187	219.1	135
Currituck – 07	176.5	147	191.1	109
Pamlico – 08	165.9	230	169.8	180
Bertie - 08	64.6	0	87.8	0
Davidson – 07	151.0	n/a	136.0	n/a
Davidson - 08	179.1	n/a	163.2	n/a
Forsythe – 08	125.4	n/a	142.1	n/a
Guilford - 08	127.7	n/a	128.3	n/a



Root Mass - 2008

