Starter Phosphorus On Very High "P" Index Soils In NC: Is It Needed?

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Seth Nagy/Lynn Howard – Caldwell

Mark Powell – Camden

C. Mike Williams – Chowan

Al Wood - Pasquotank

Mike Carroll – Craven

- Josh Gady - Duplin
- Keith Wood - Cherokee
- Art Bradley – Edgecombe
- Louie Johnson – Greene
  Mark Keene – Lenoir
- Josh Beam – Lincoln
- Bryant Spivey – Onslow
- Ben Knox – Union
- Kevin Johnson – Wayne
- Norman Harrell - Wilson
- Producers who helped!

The Problem

Excess Soil Test Phosphorus

A Solution

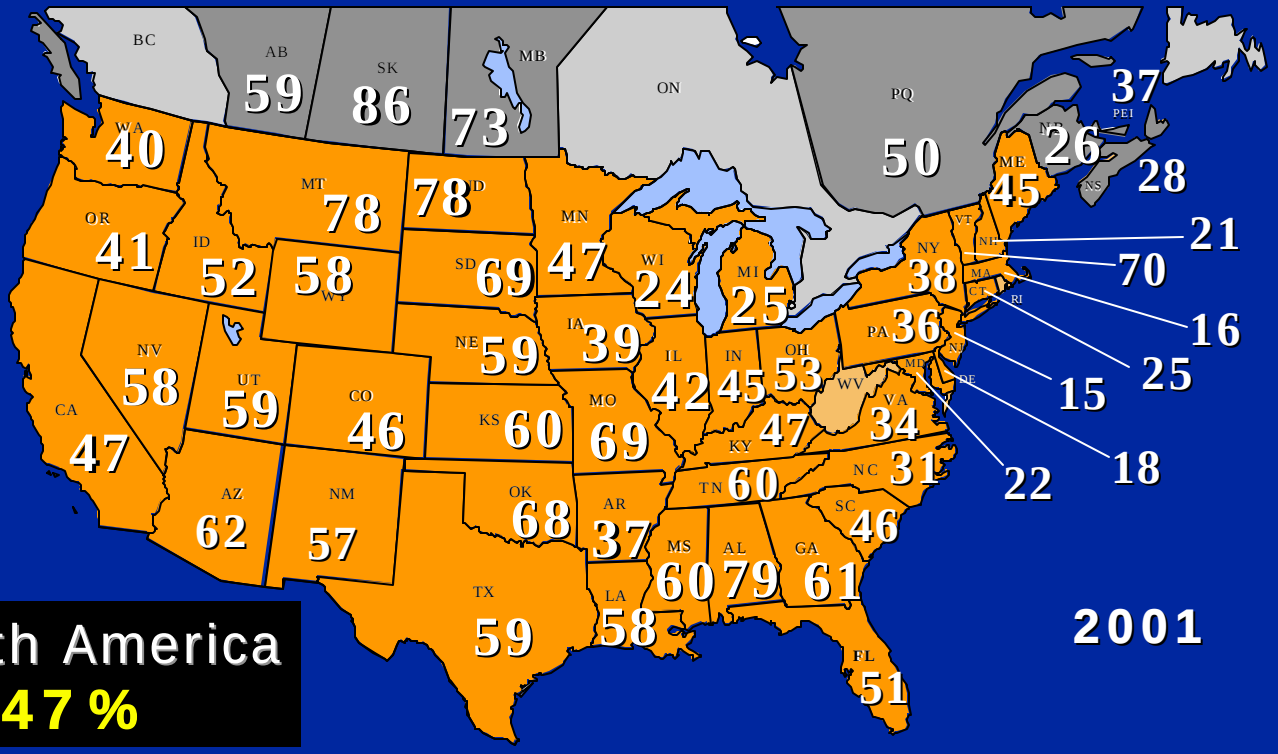
Stop Starter P Applications

Why?

Save Money and Reduce P Loss

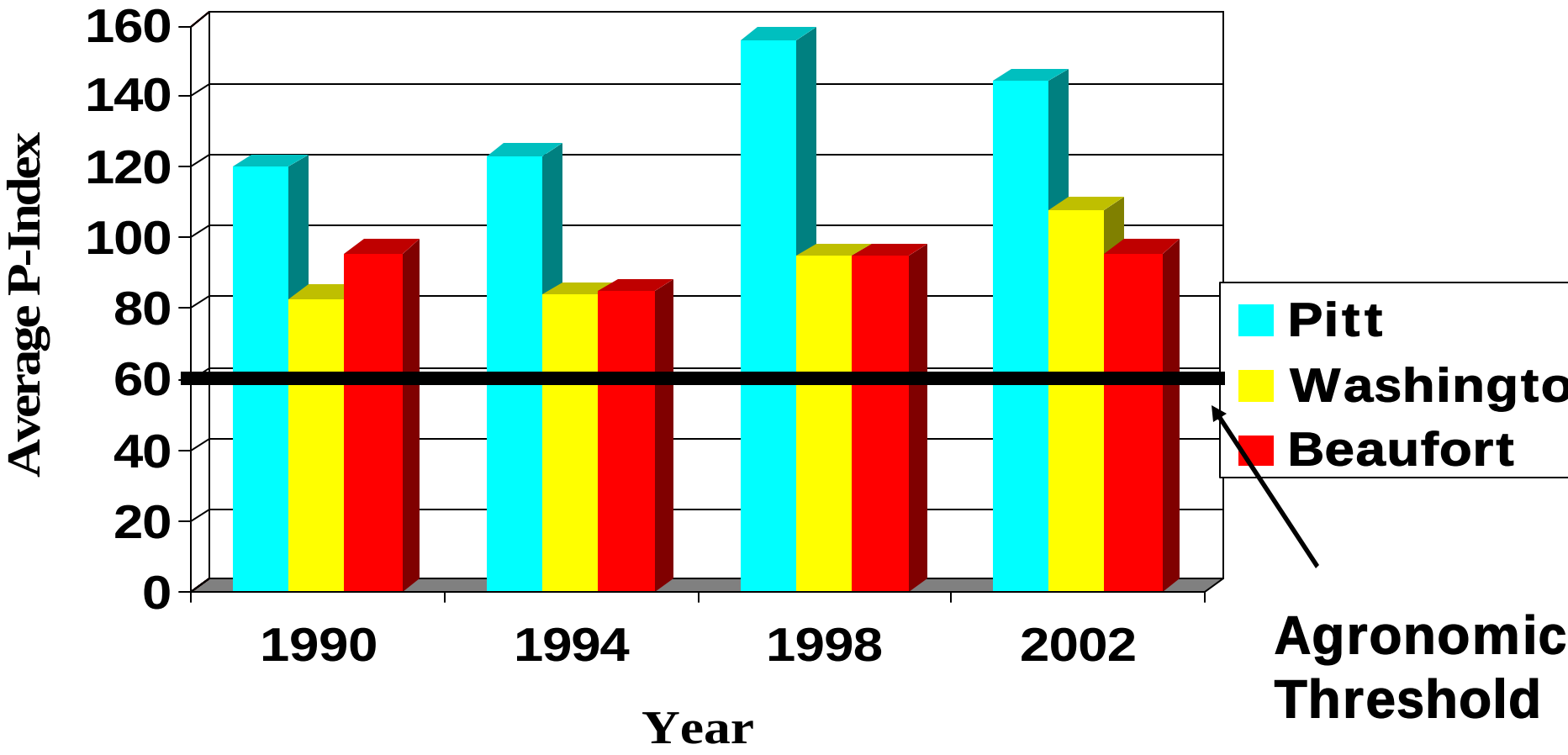
National Soil Test Phosphorus Levels

Percent of Soils Testing Medium or Lower in P

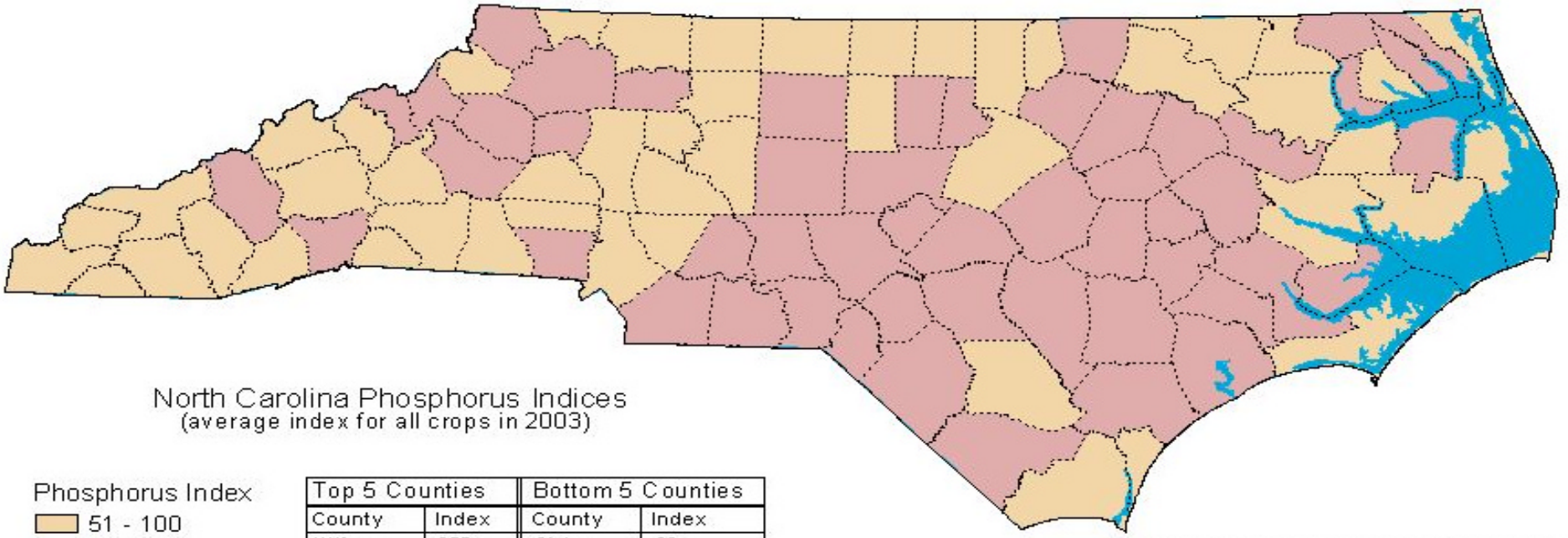


PPI/PPIC/FAR Technical Bulletin 2001-1

Average Soil Test Phosphorus in Two Counties



Average Soil Test Phosphorus



North Carolina Phosphorus Indices
(average index for all crops in 2003)

Phosphorus Index
- 51 - 100
- > 100

Top 5 Counties		Bottom 5 Counties	
County	Index	County	Index
Wilkes	255	Stokes	60
Duplin	195	Yancey	66
Richmond	186	Hyde	67
Union	183	Caswell	69
Lenoir	182	Catawba	70

Multiplication factors for converting soil test index values to a quantitative equivalent

kg/ha = 2.4 x Phosphrous Index
lbs/acre = 2.138 x Phosphrous Index

N

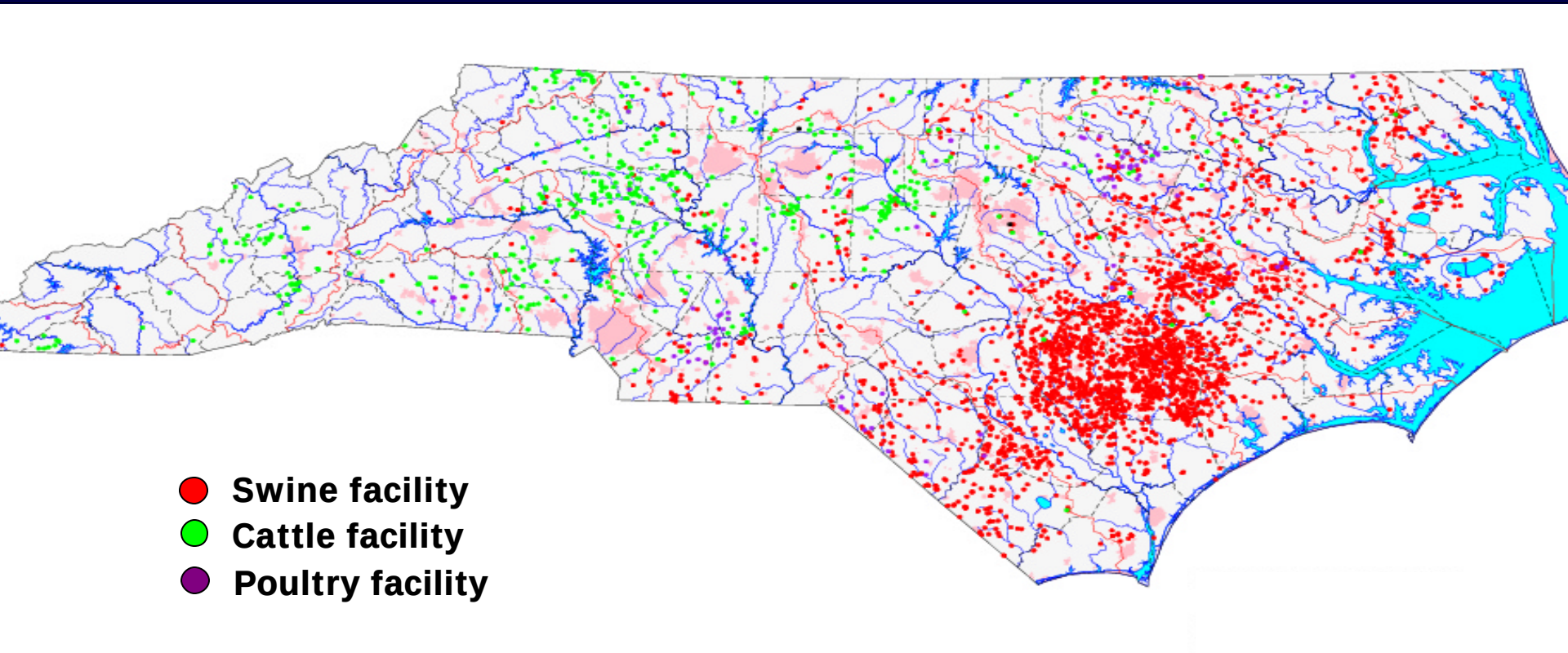
1:3,500,000

0 80 160 240 Miles

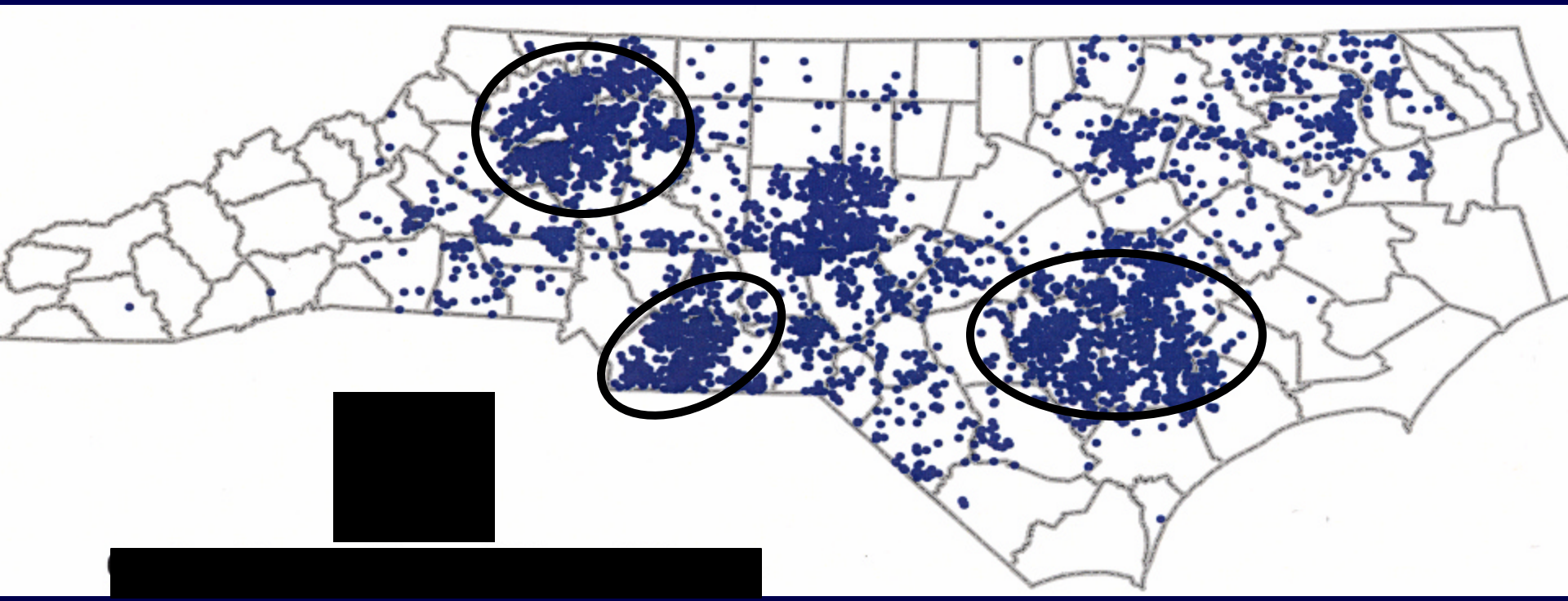
North Carolina Stateplane Coordinate System, zone 4901, NAD83, meters

North Carolina State University
Department of Soil Science
R. Austin, D. Osmond - 10/08/0

Livestock Distribution Minus Dry Litter Poultry



Poultry Distribution



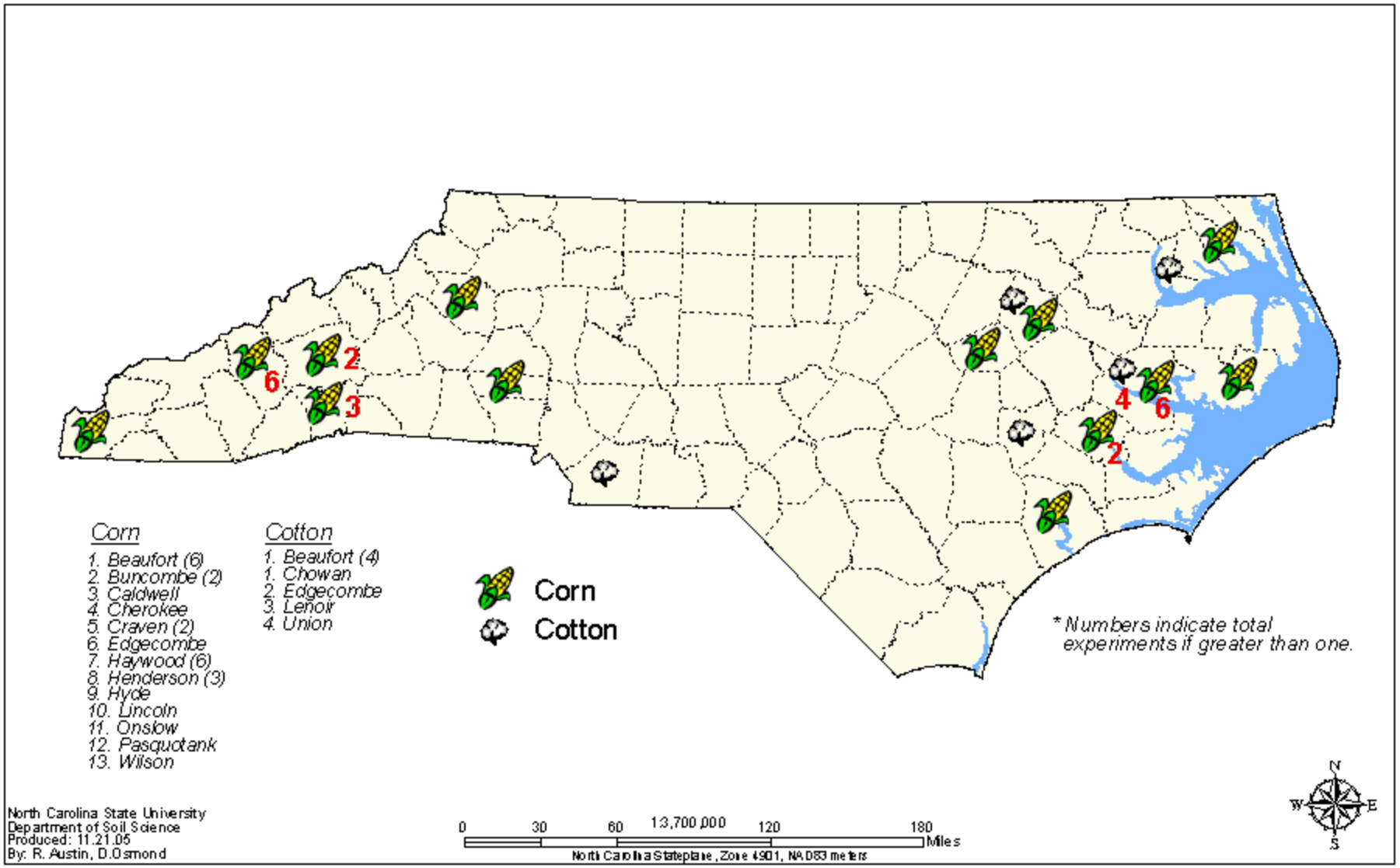
Question?

When Soil Test Levels Are Very High
(>100 P-Index)

Do Producers Still Need Starter Phosphorus Fertilizer?

Methodology

P Starter Trial Locations



Experimental Design: Corn and Cotton

Soil Test P > 100

4 Replications

Starter N
+
Layby N

Starter Rates:
- 20-30 lbs N
- 20-30 lbs P_2O_5

Starter N + P
+
Layby N

Remaining N Rate –
Use Realistic Yield Expectations to Determine Total N R

Corn: DKC 69-71 RR/YG; Cotton: DP 451 B/RR

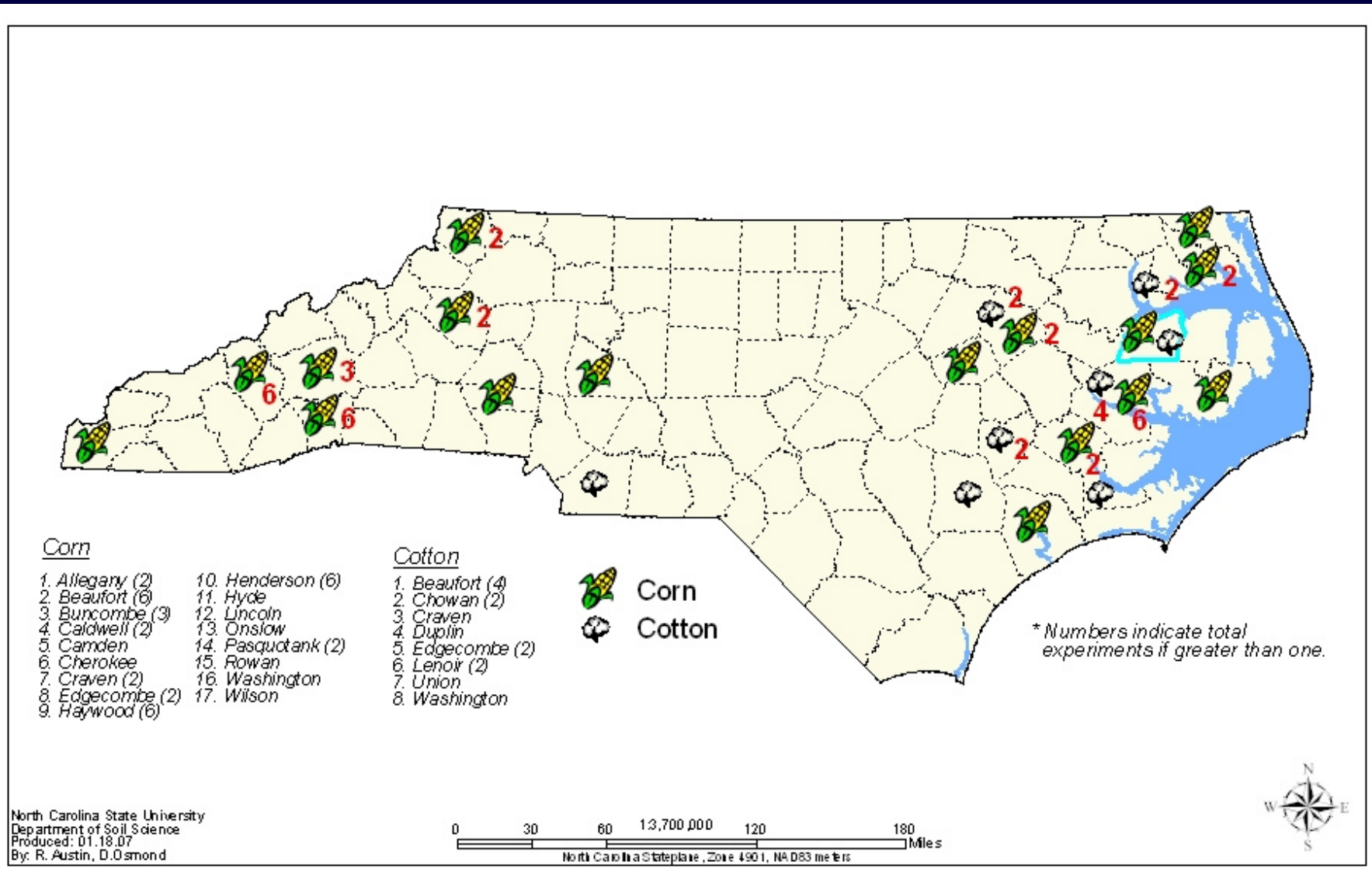
Data Collected: Soil, Fertilizer & Agronom

- Soils Information
  - Soil mapping unit
  - Realistic yield expectation
  - Soil test P – before
  - Soil test P – after
- Fertilizer Information
  - Total N rate
  - Application date(s)
  - Fertilizer source(s)
  - Application type
- Agronomic Information
  - Seed treatment
  - Herbicide (name & quantity)
  - Insecticide program (name & quantity)
  - Variety
  - Row spacing

ata Collected: Plant Growth Characteristic

Corn	Cotton
Plant Height (3 wks ger)	Plant Height (3 wks ger)
Plant Tissue (10-12”)	Plant Tissue (8 leaf stage – most dev. Leaf)
Days to Silking	Date of Early Bloom
	Nodes Above White Flower
Final Plant Population	Final Plant Population
Yield	Yield

Results

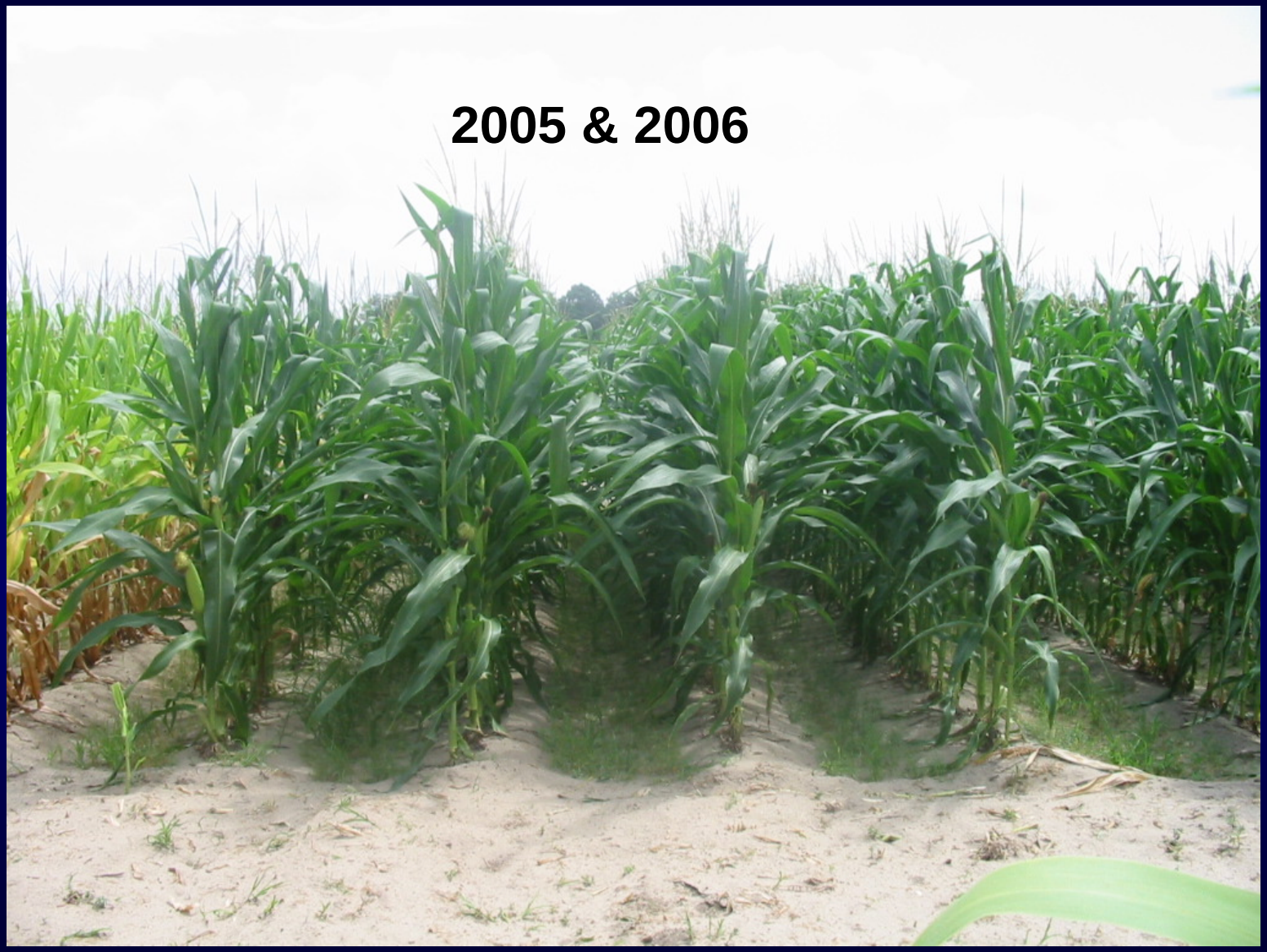

Corn
1. Allegany (2)
2. Beaufort (6)
3. Buncombe (3)
4. Caldwell (2)
5. Camden
6. Cherokee
7. Craven (2)
8. Edgecombe (2)
9. Haywood (6)
10. Henderson (6)
11. Hyde
12. Lincoln
13. Onslow
14. Pasquotank (2)
15. Rowan
16. Washington
17. Wilson
Cotton
1. Beaufort (4)
2. Chowan (2)
3. Craven
4. Duplin
5. Edgecombe (2)
6. Lenoir (2)
7. Union
8. Washington
Corn
Cotton
* Numbers indicate total experiments if greater than one.
North Carolina State University
Department of Soil Science
Produced: 01.18.07
By: R. Austin, D.Osmond
0 30 60 13,700,000 120 180
Miles
North Carolina Stateplane, Zone 4901, NAD83 meters
N
W
E
S

Corn Varieties

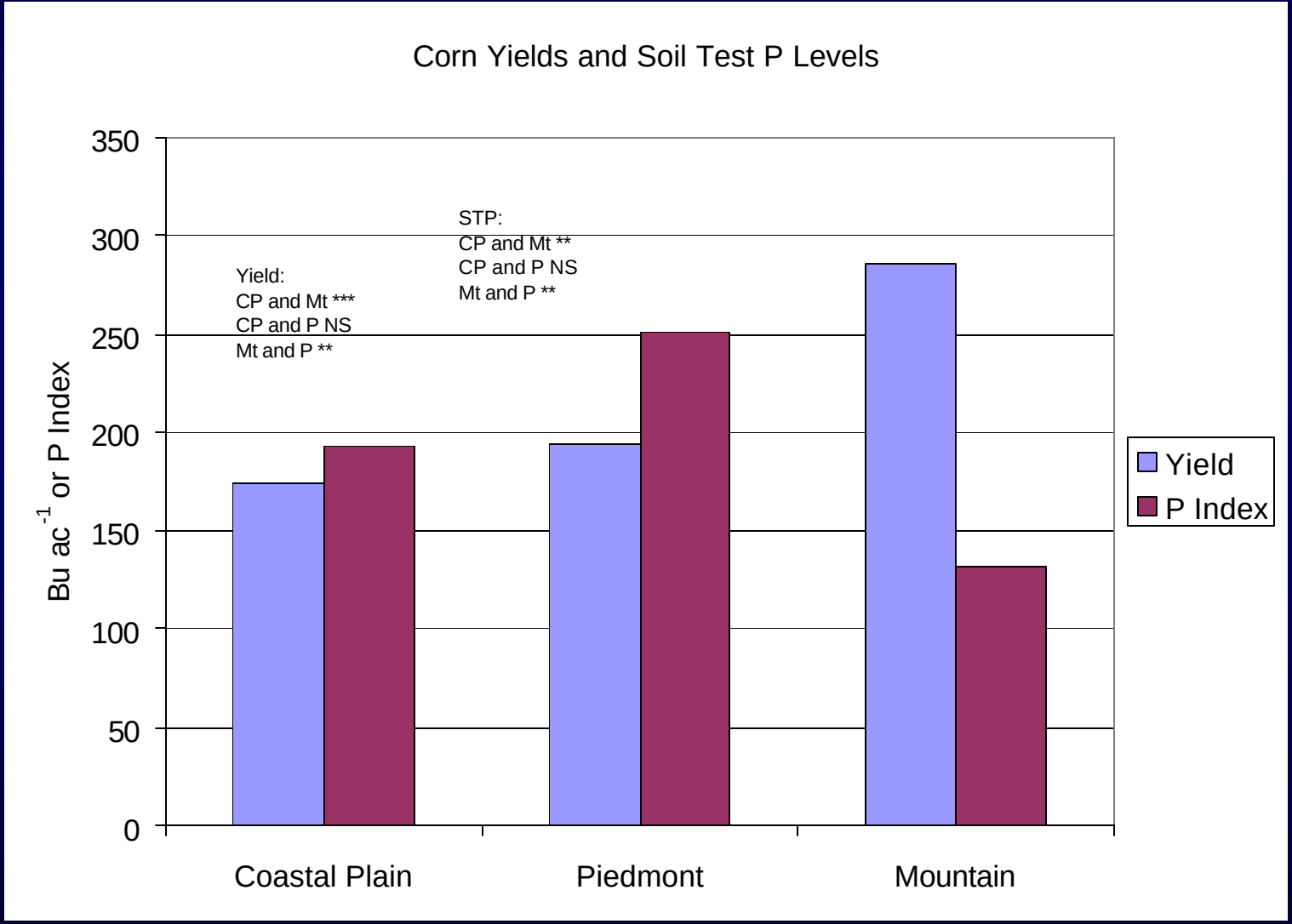
County	Variety Used
Beaufort	DeKalb 63-81(5) Pioneer 34B94 (2)
Caldwell	Pioneer 31G98
Cherokee	Pioneer 33V15
Craven	Pioneer 31G68 Pioneer 34897
Edgecombe	Pioneer 31G98
Henderson	DeKalb 697 (11)
Lincoln	Pioneer 31G98
Onslow	DeKalb 69-71
Pasquotank	Pioneer 34B98
Wilson	Pioneer 31G98

Cotton Varieties

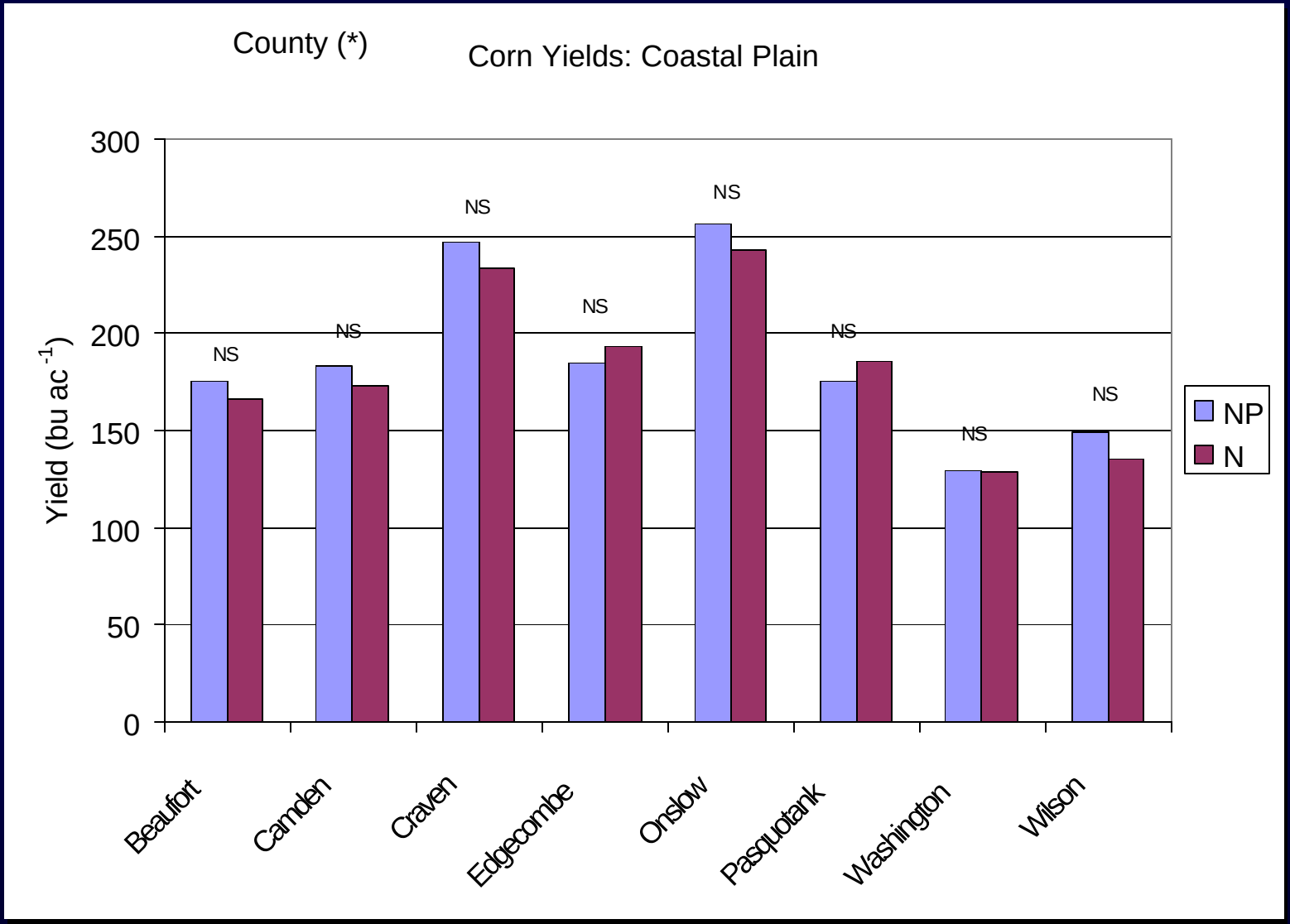
County	Variety Used
Beaufort	DP451BR (1) DP449BR (1)
Chowan	451 B/RR
Edgecombe	DP432 RR
Lenoir	DP444
Union	DP449 BG/RR


2005 & 2006

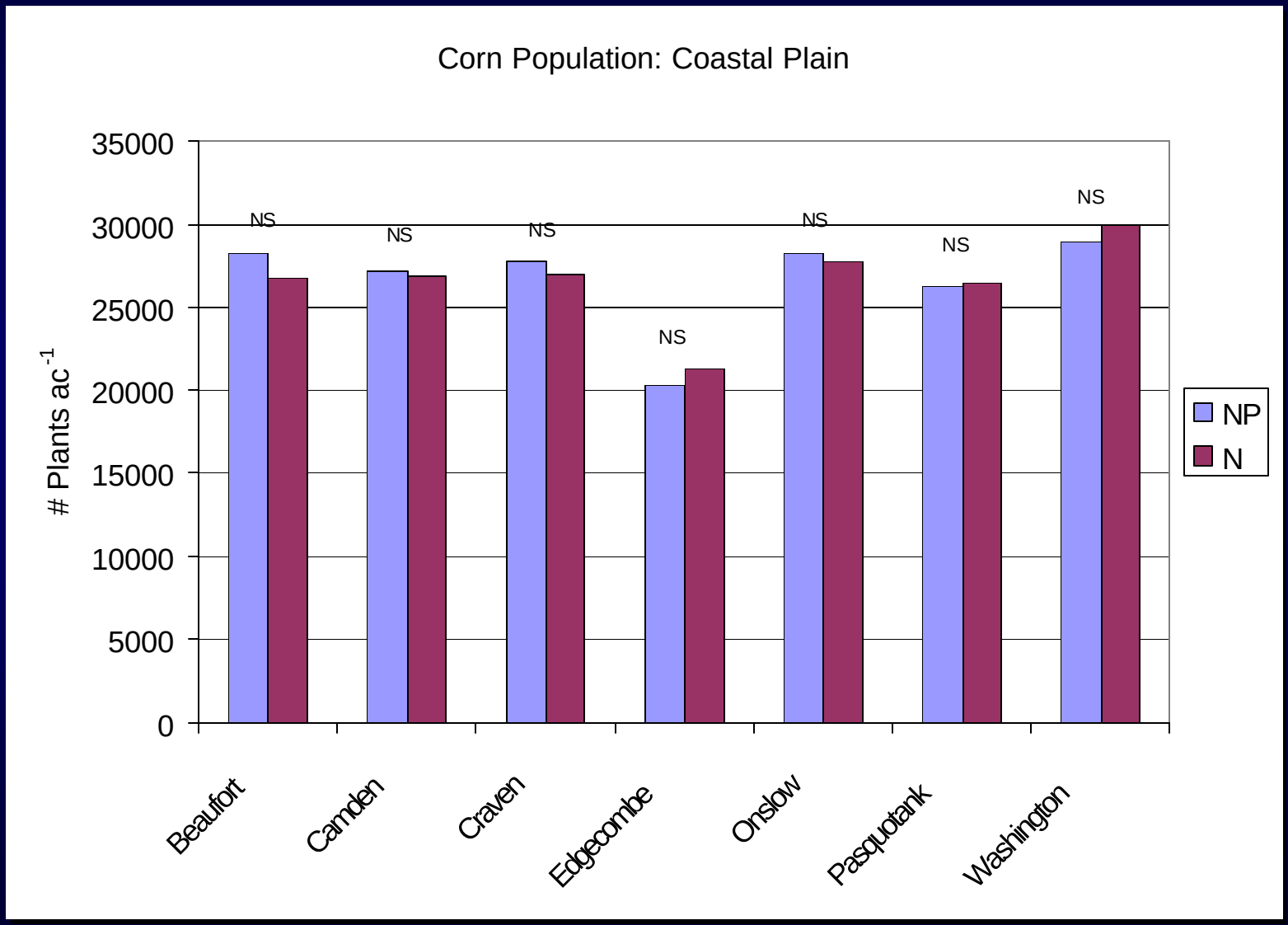
Corn Yields and Soil Test P Levels



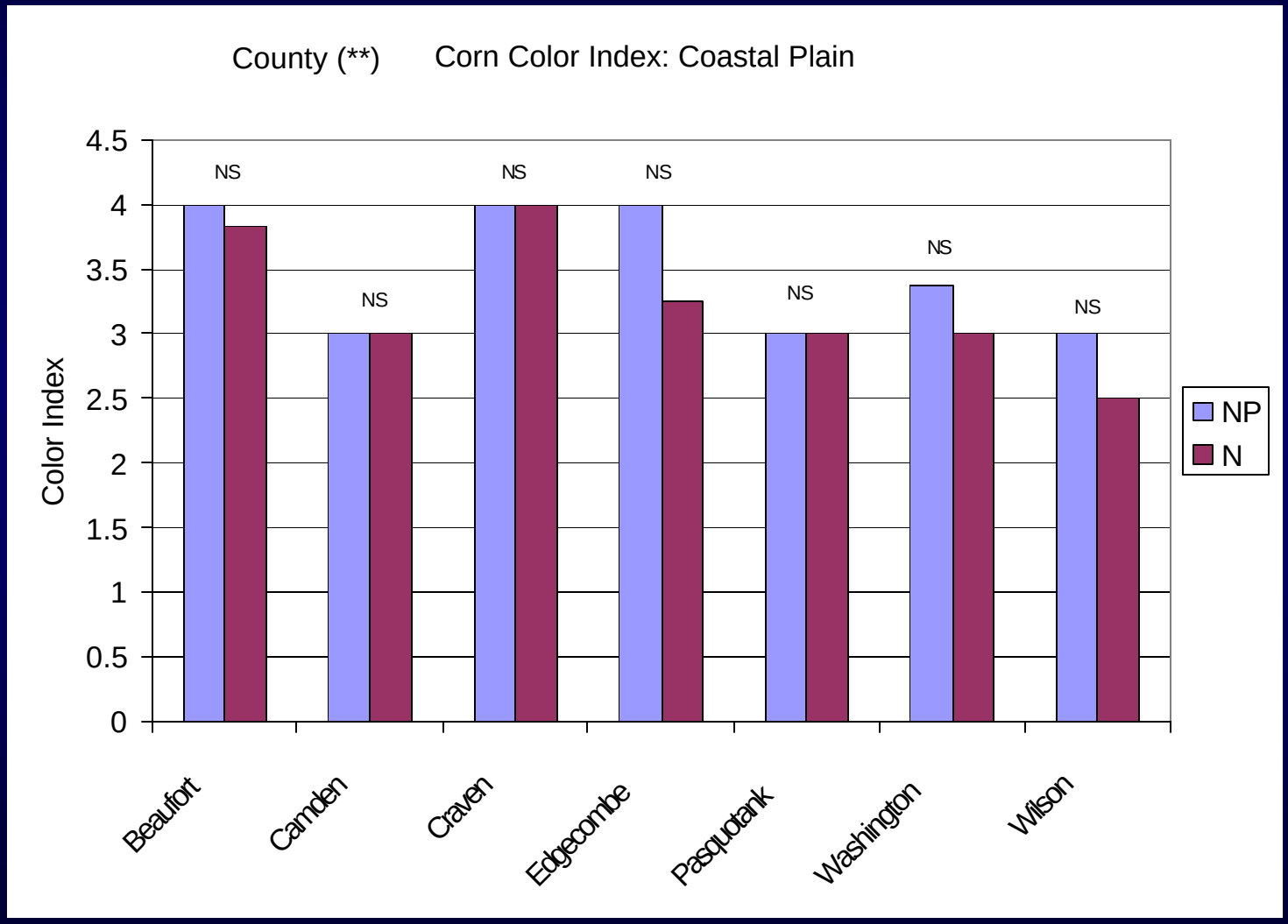
Corn Yields: Coastal Plain



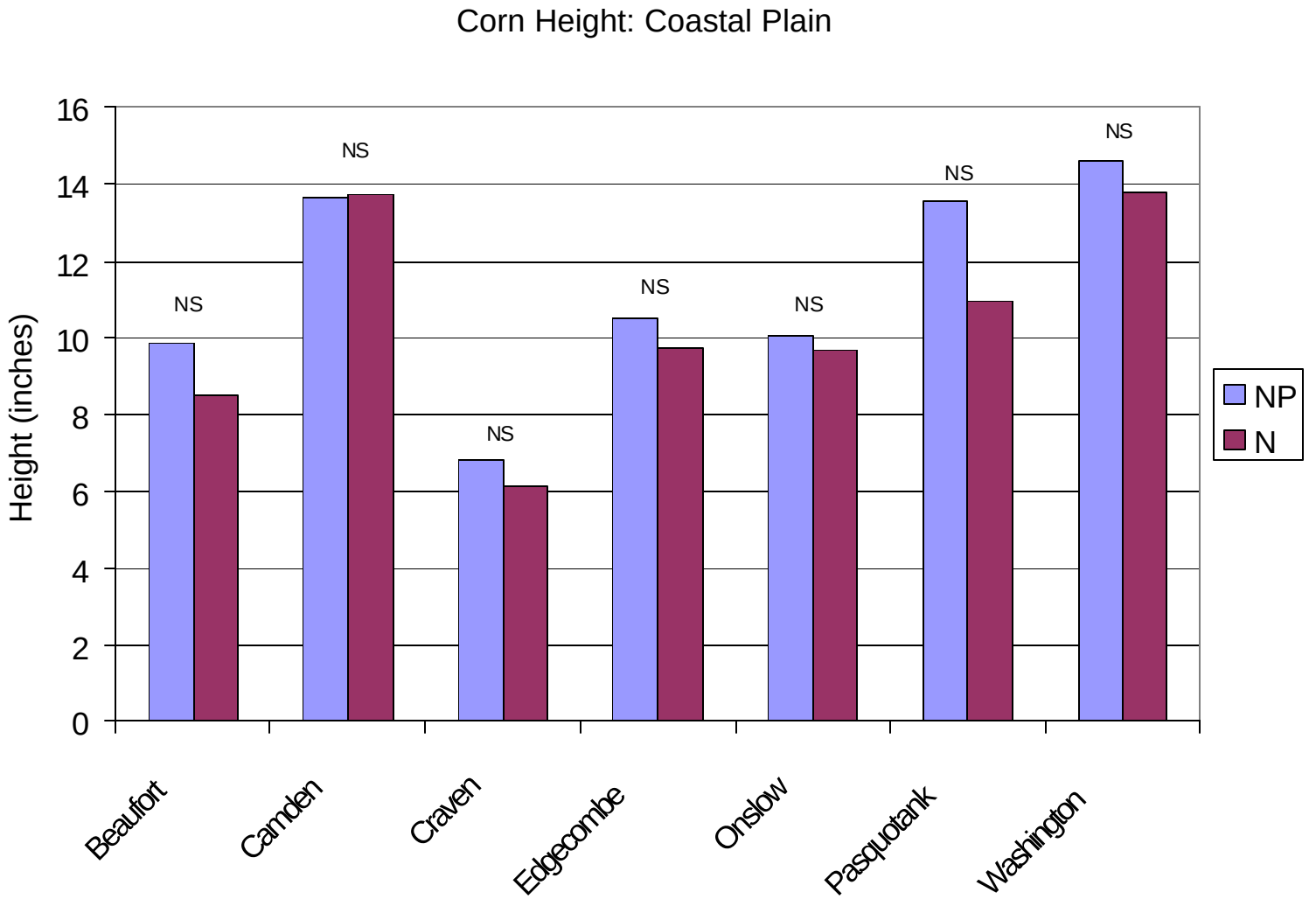
Corn Population: Coastal Plain



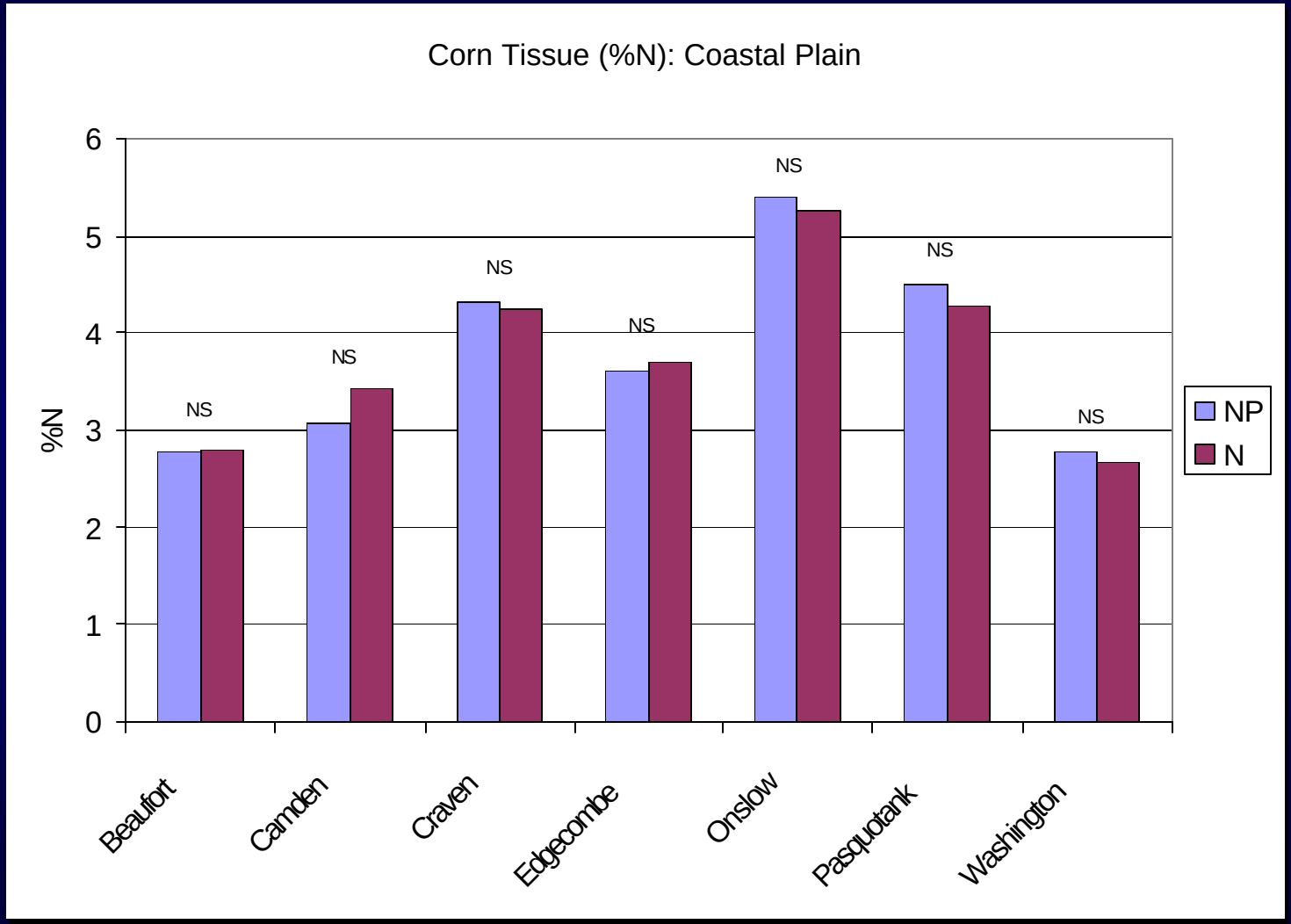
Corn Color Index: Coastal Plain



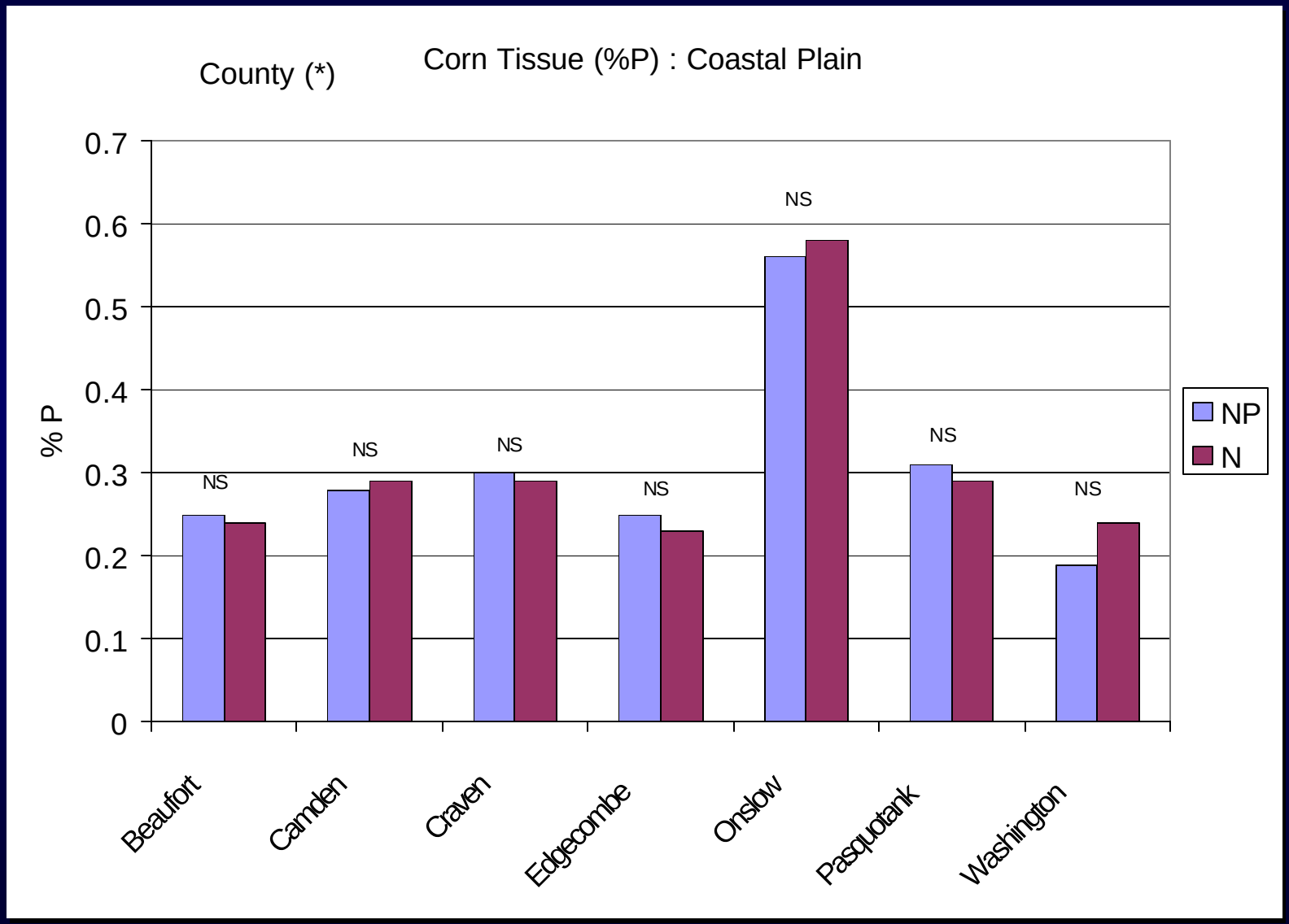
Corn Height: Coastal Plain



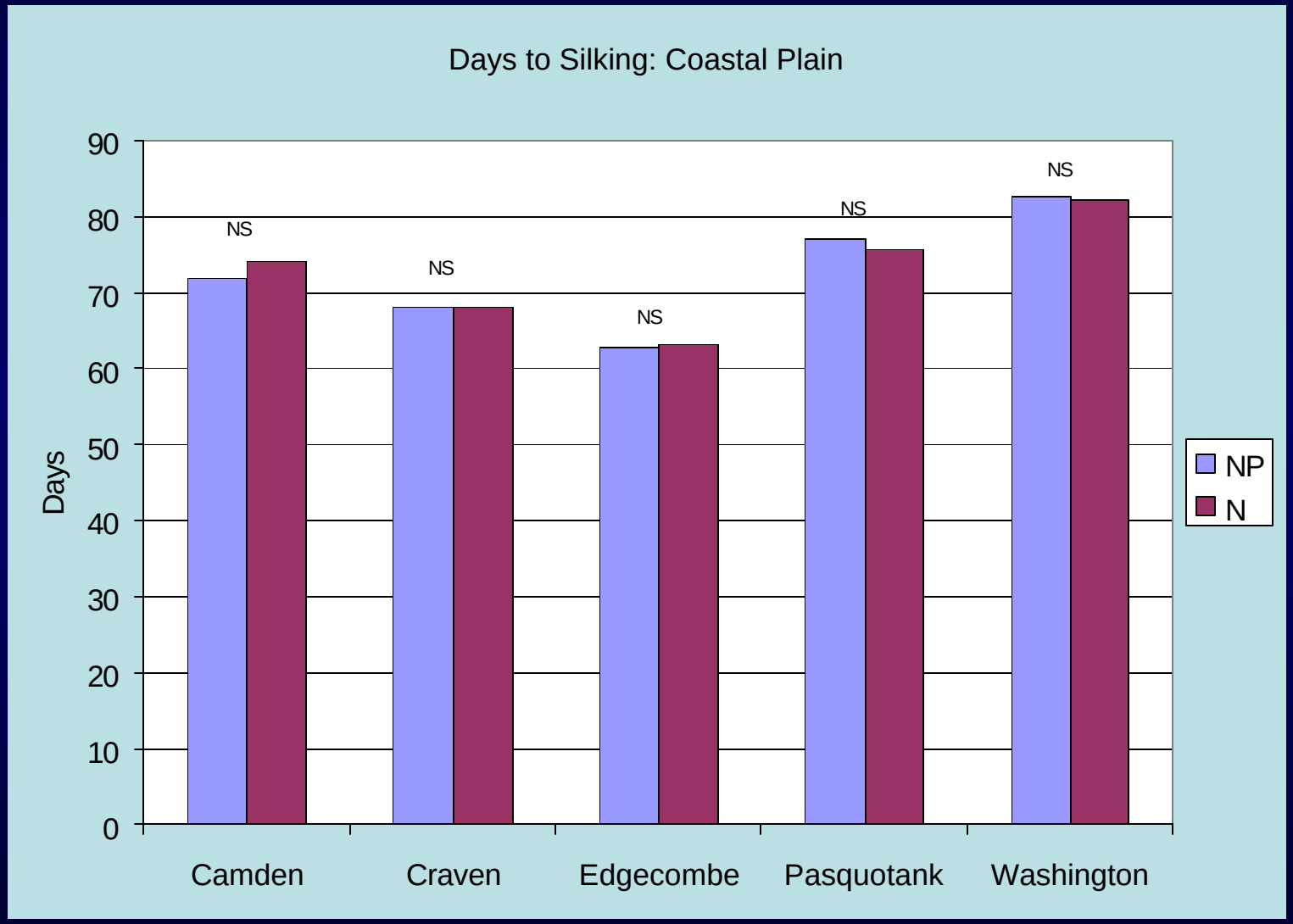
Corn Tissue - % N: Coastal Plain



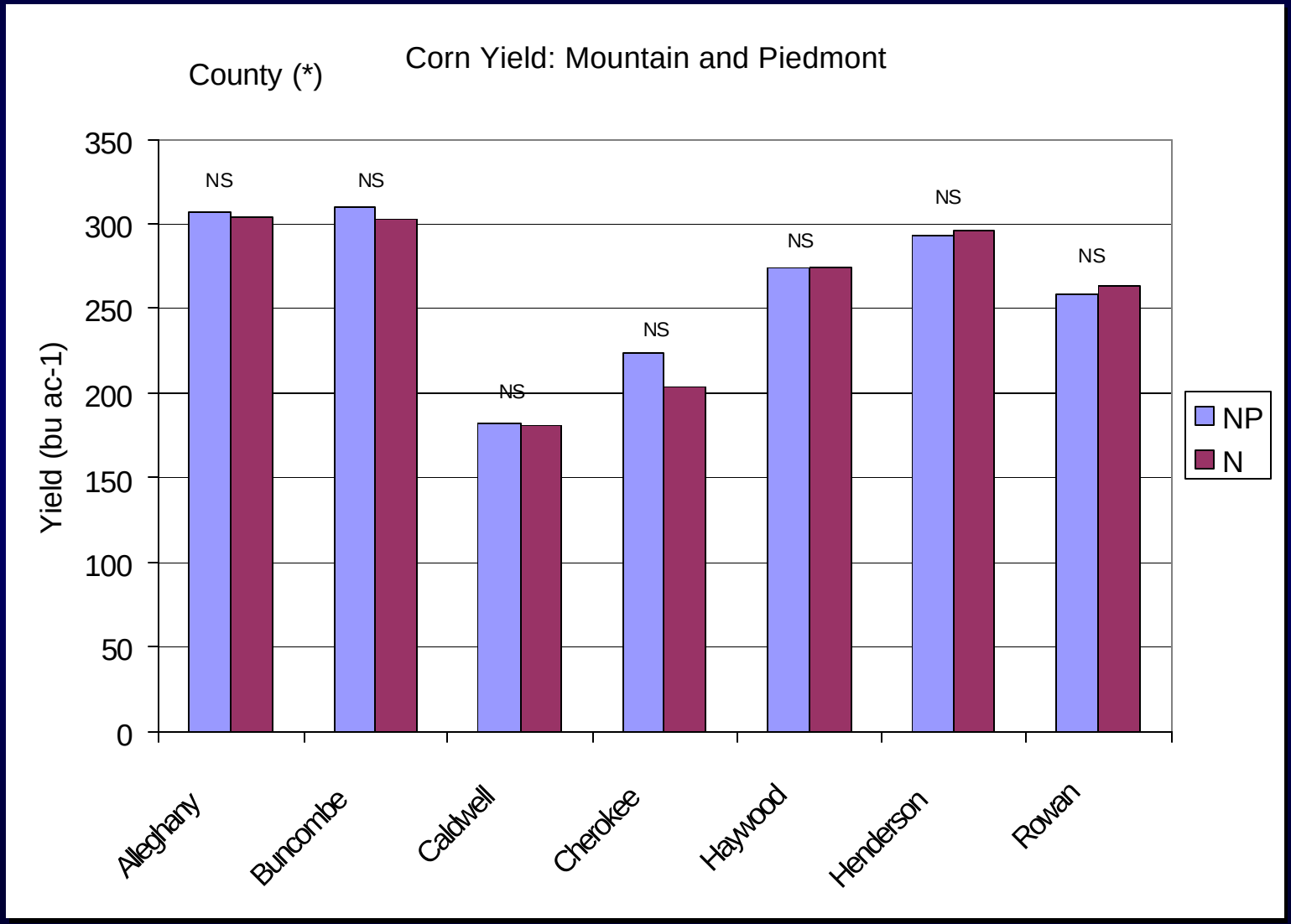
Corn Tissue - %P: Coastal Plain



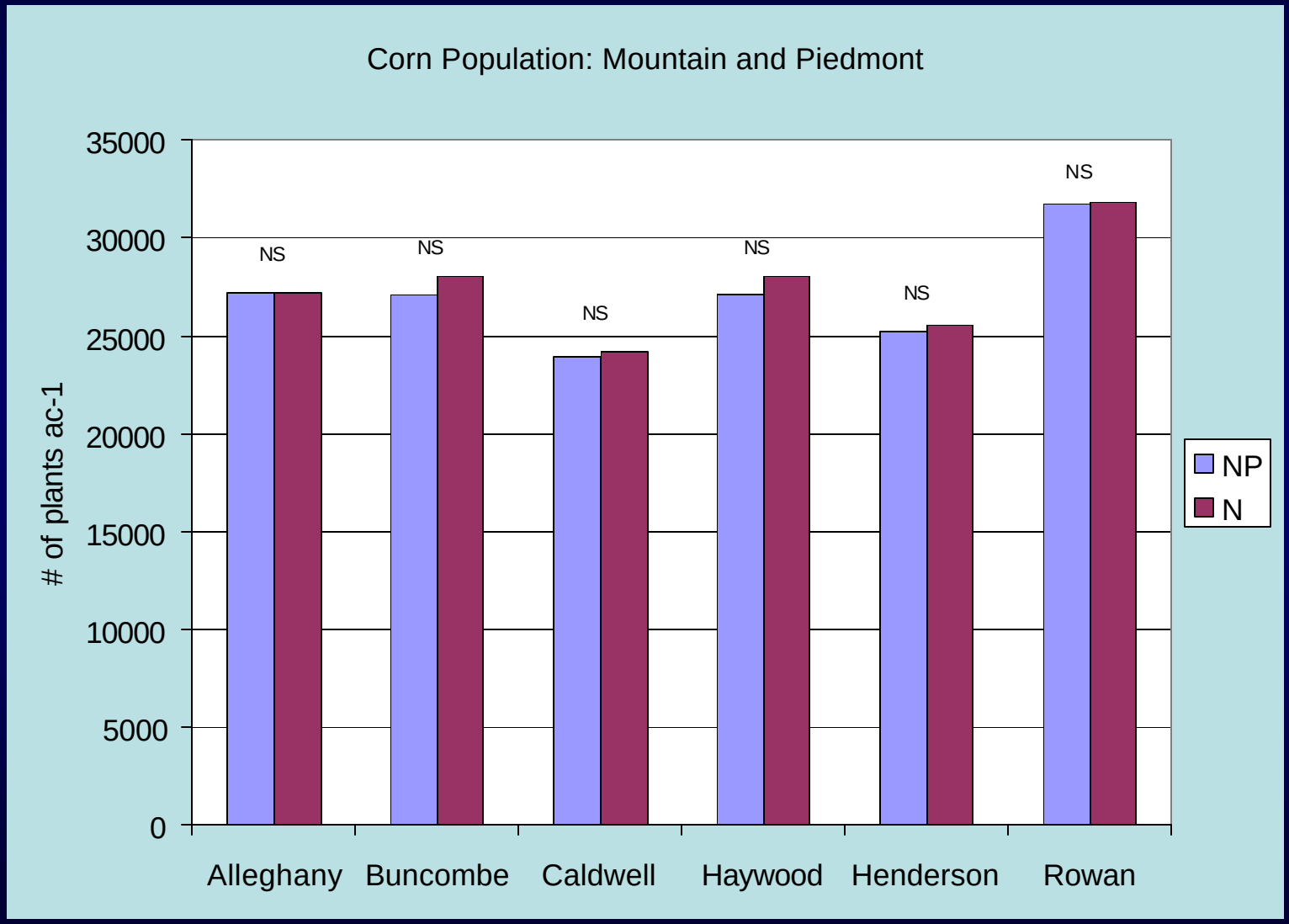
Days to Silking: Coastal Plain



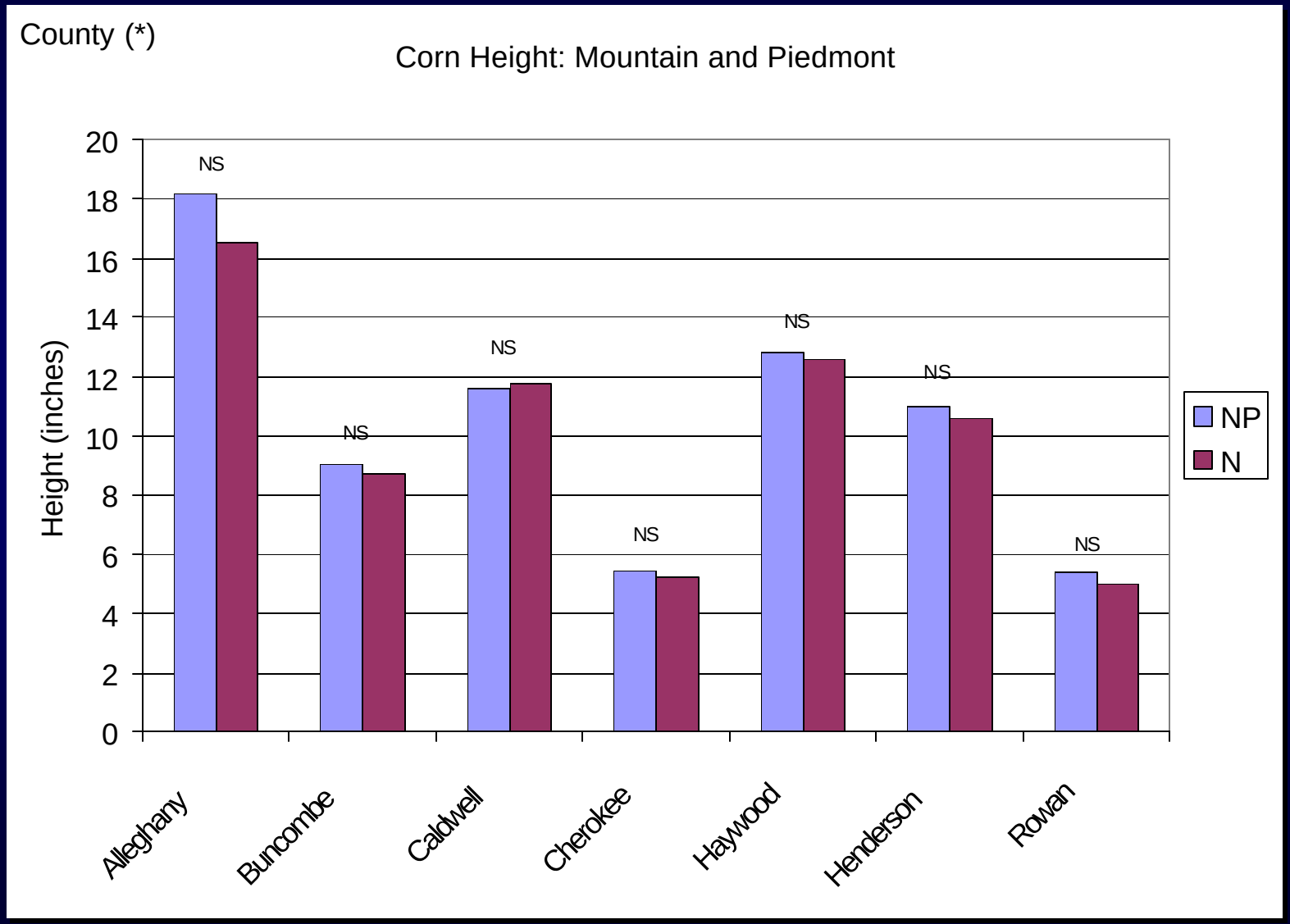
Corn Yield: Mountain and Piedmont



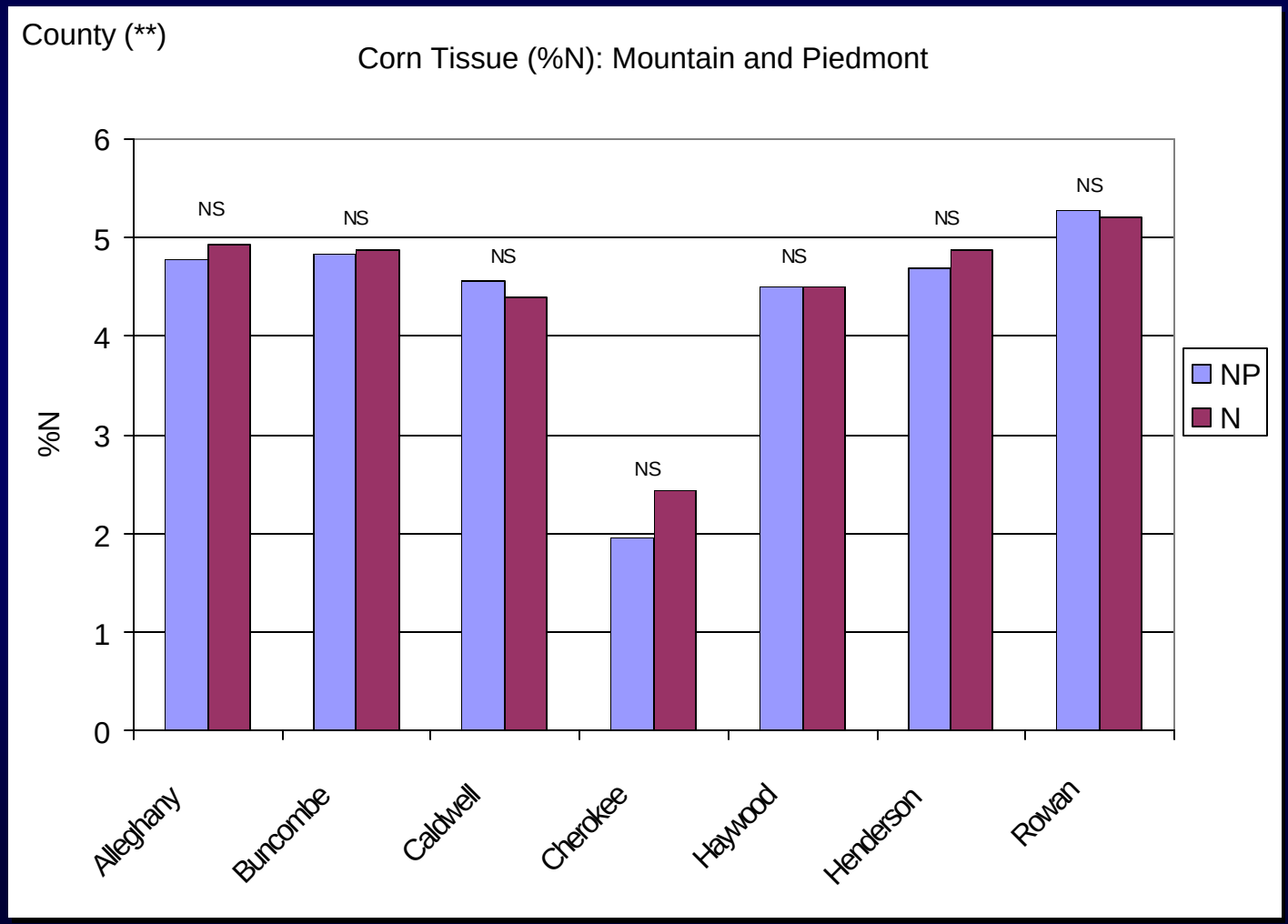
orn Population: Mountain and Piedmo



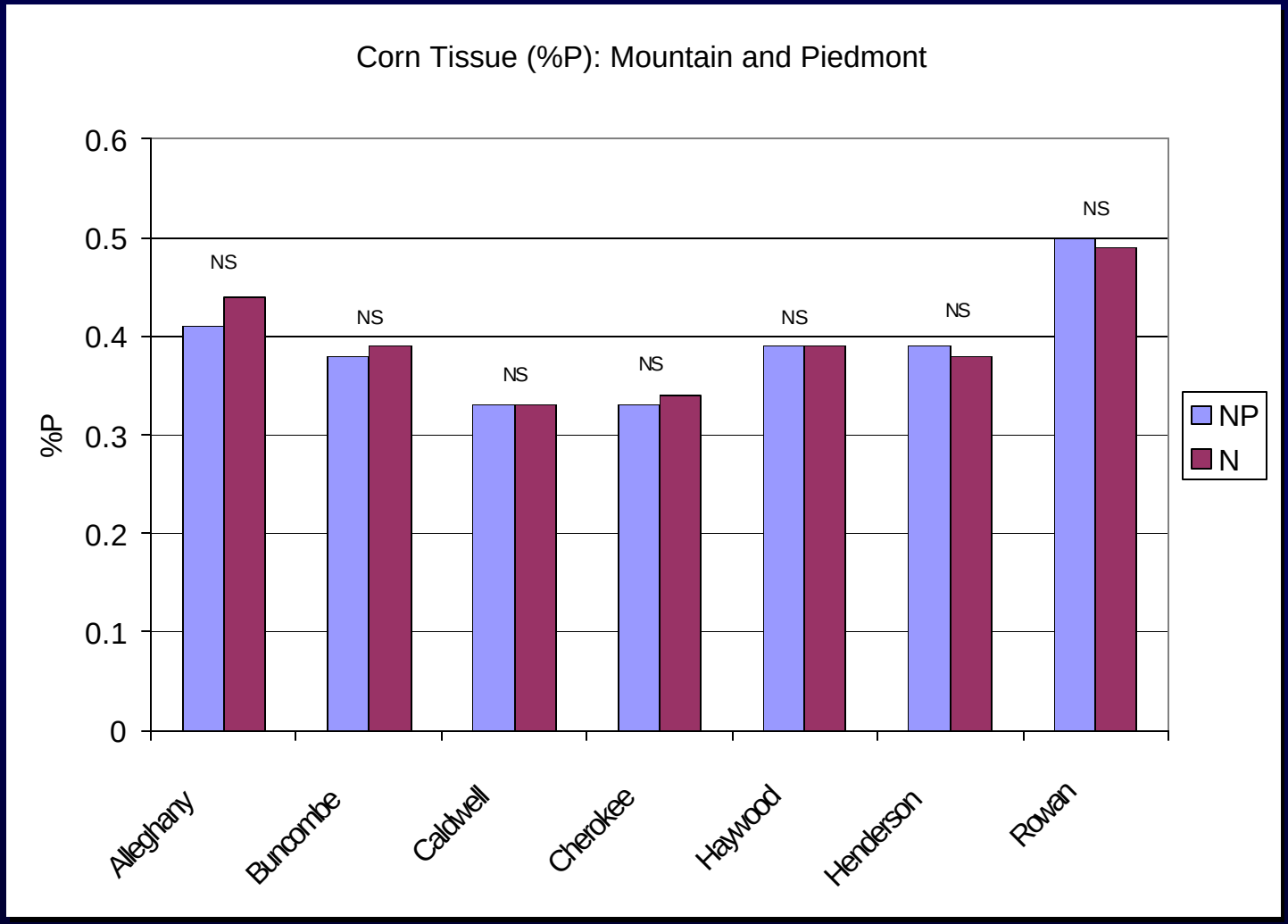
Corn Height: Mountain and Piedmont



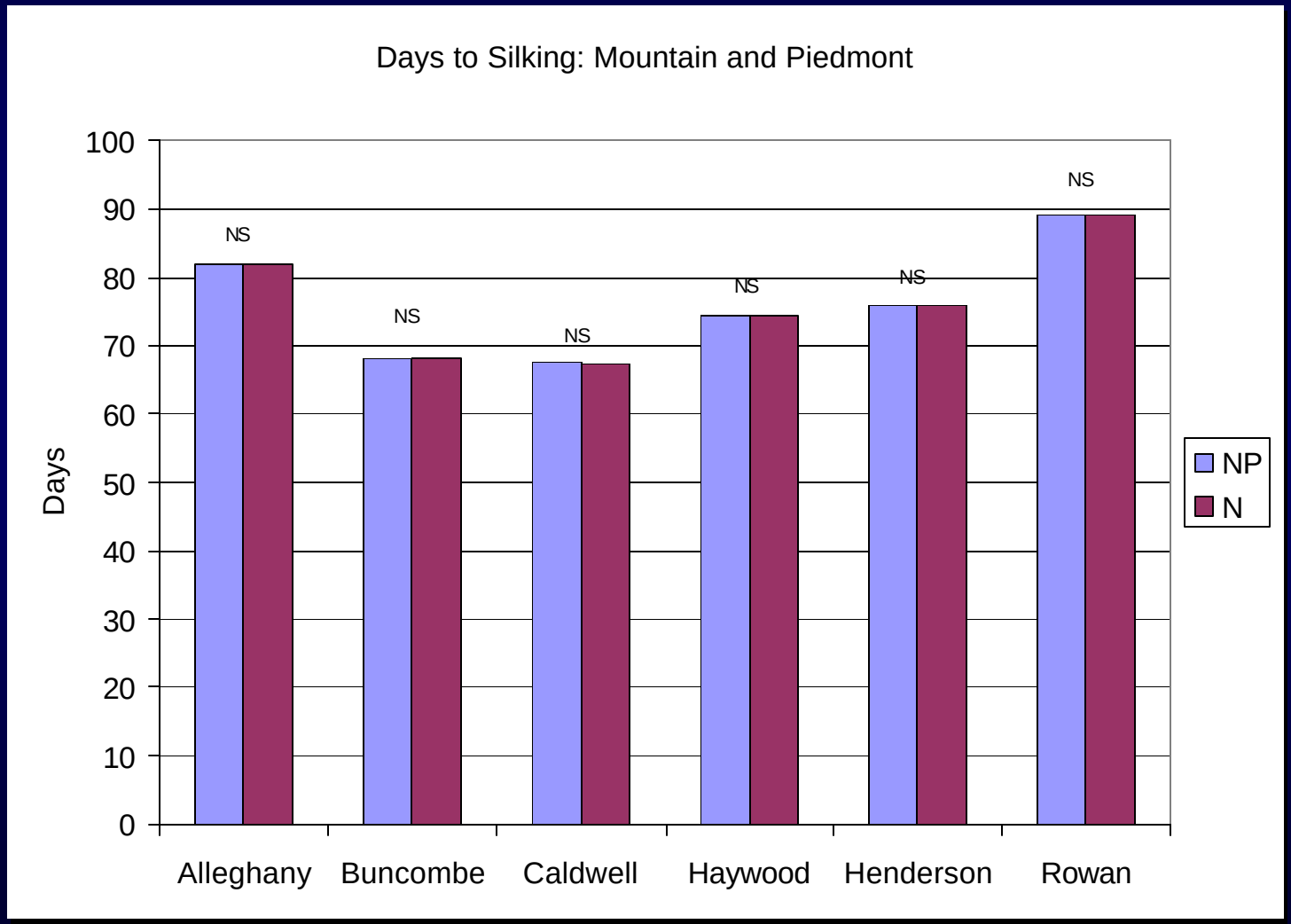
Corn Tissue %N: Mountain and Piedmont

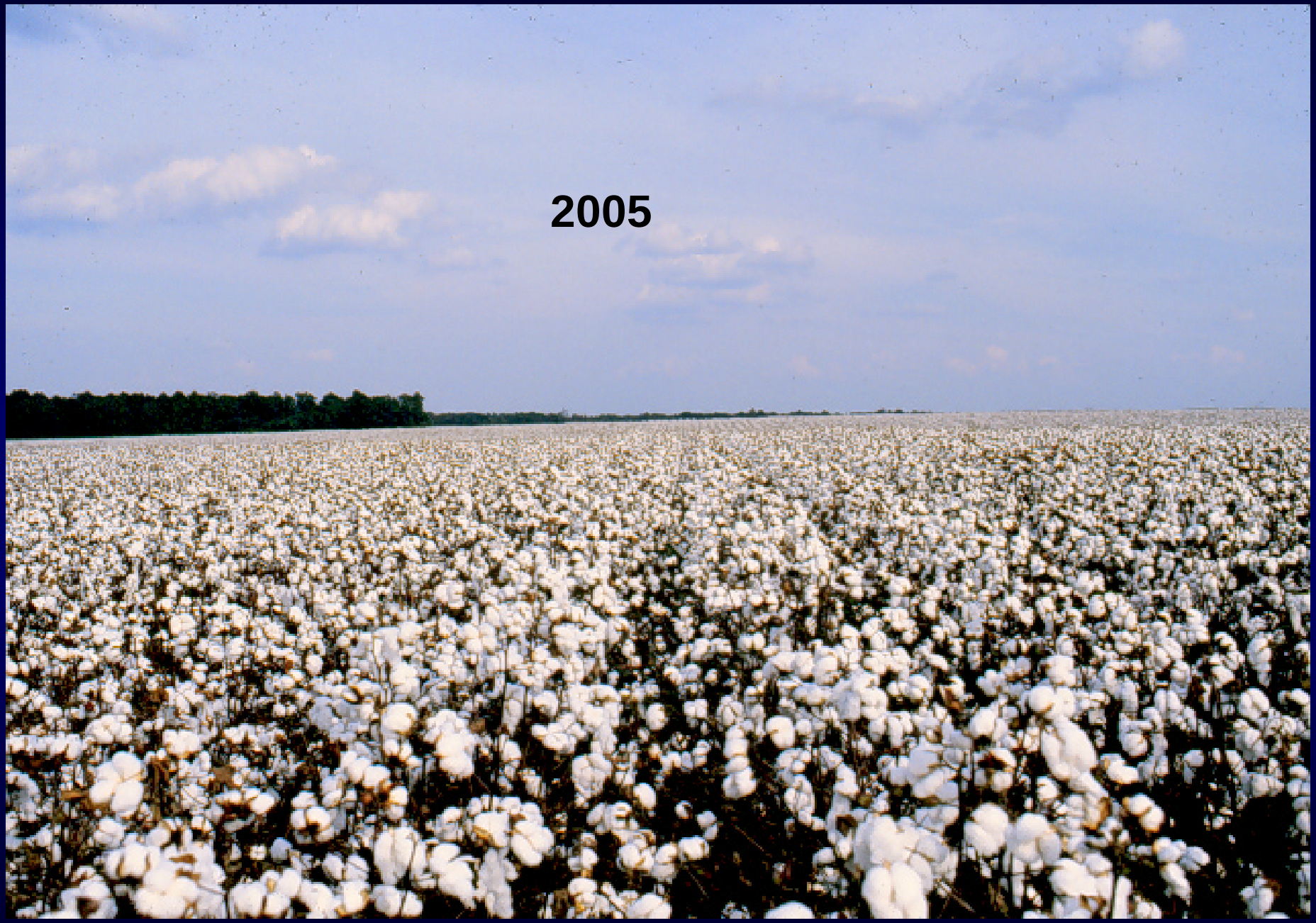


Corn Tissue %P: Mountain and Piedmont

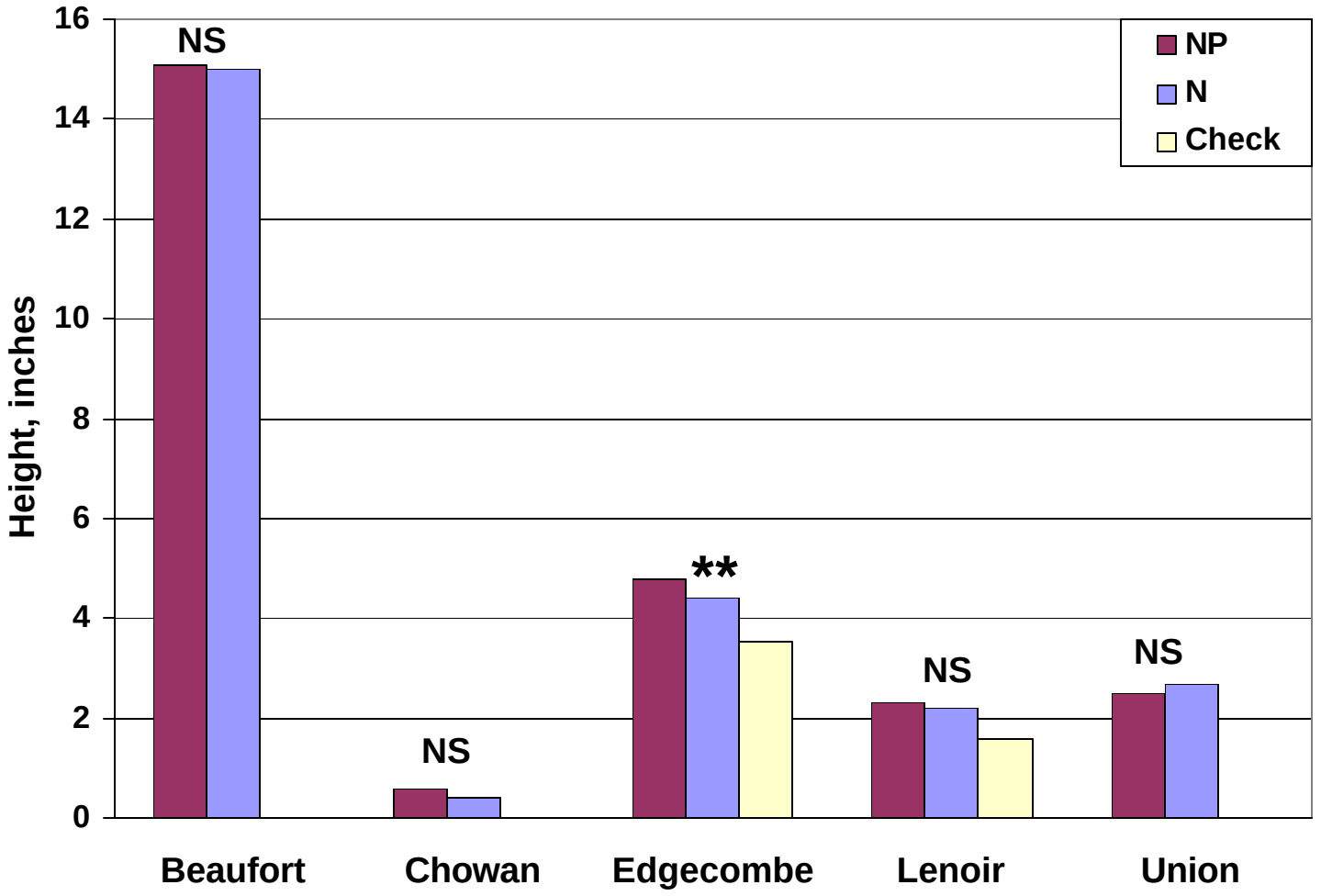


Corn Color Index: Mountain and Piedmont

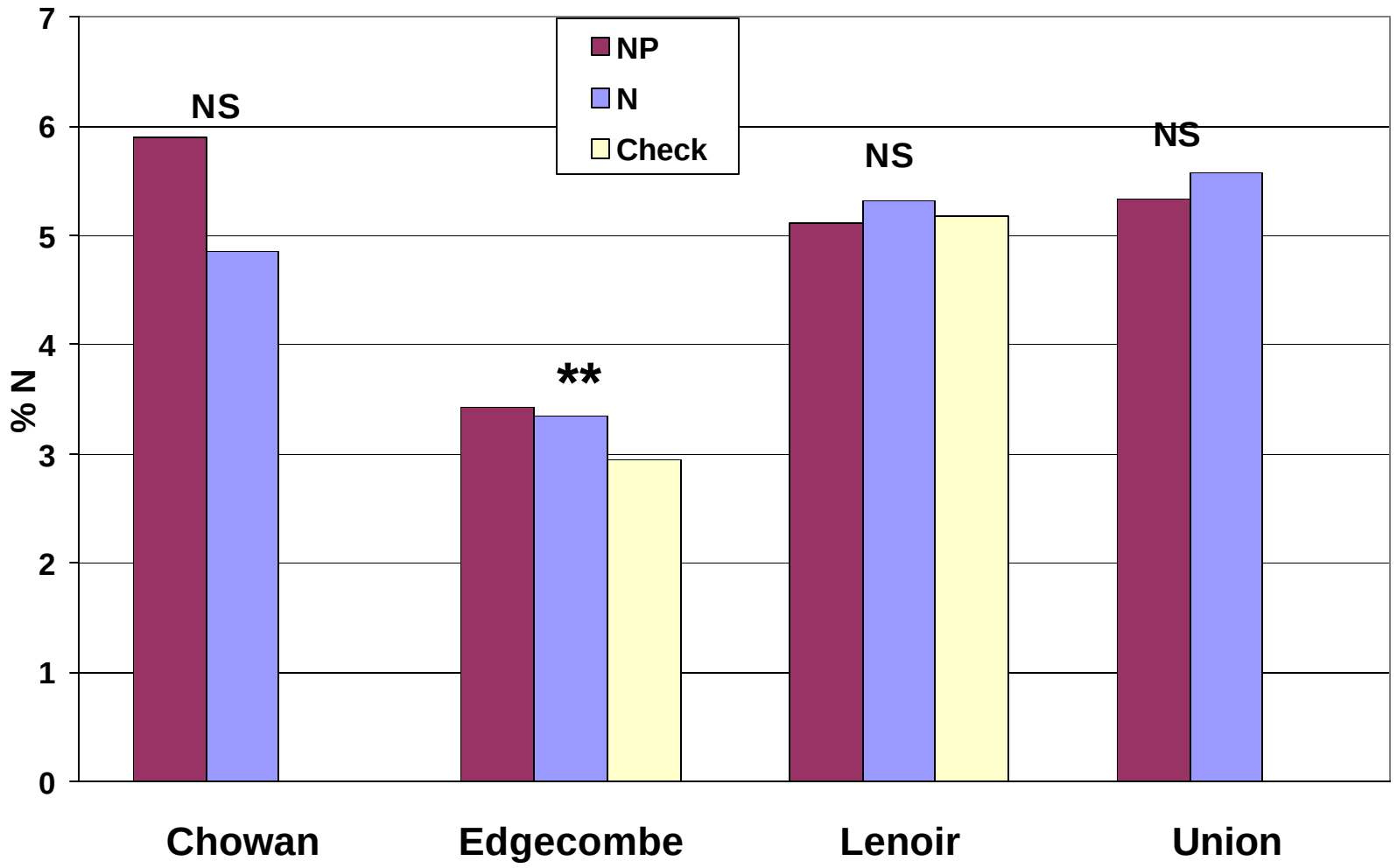



2005

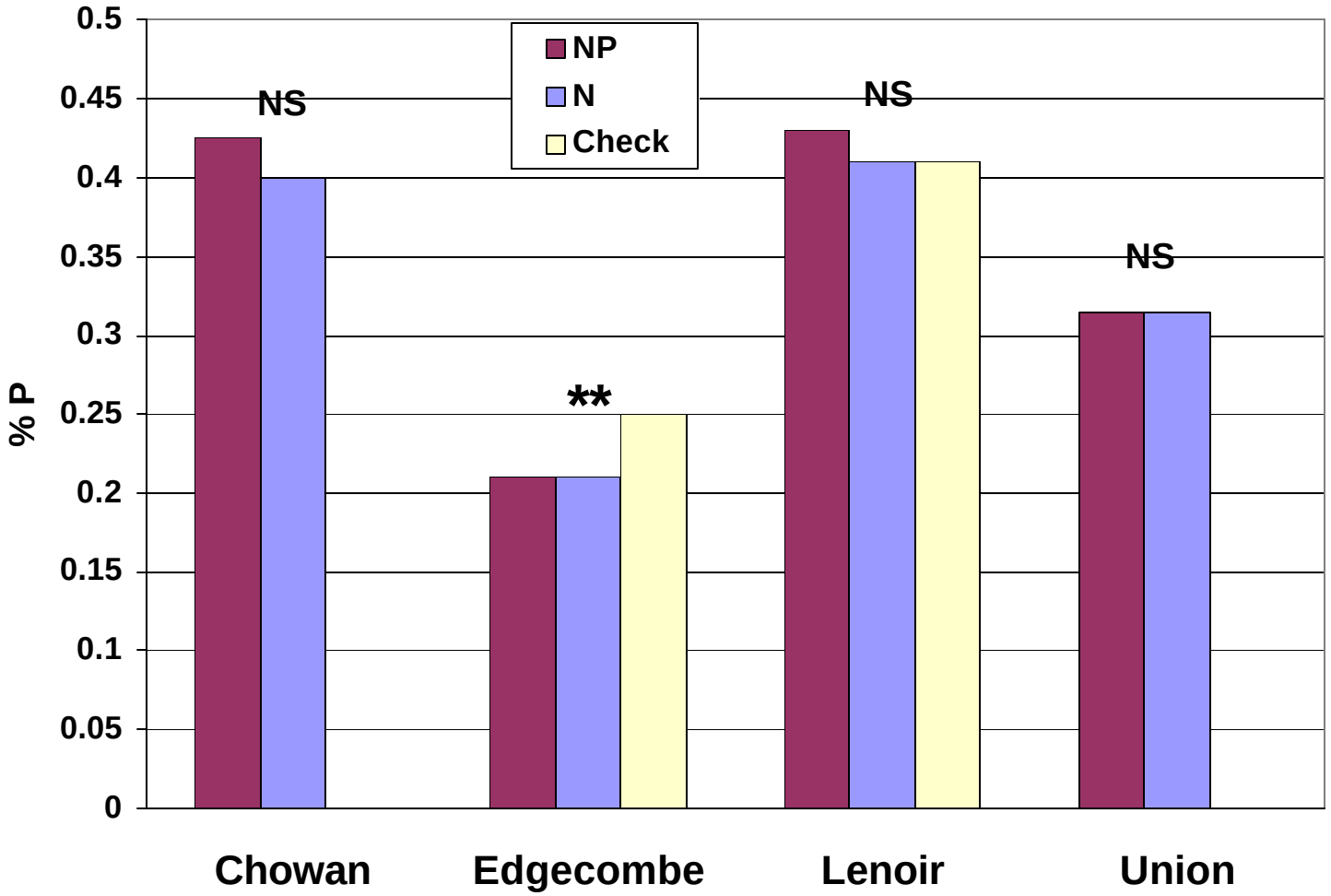
Cotton Height



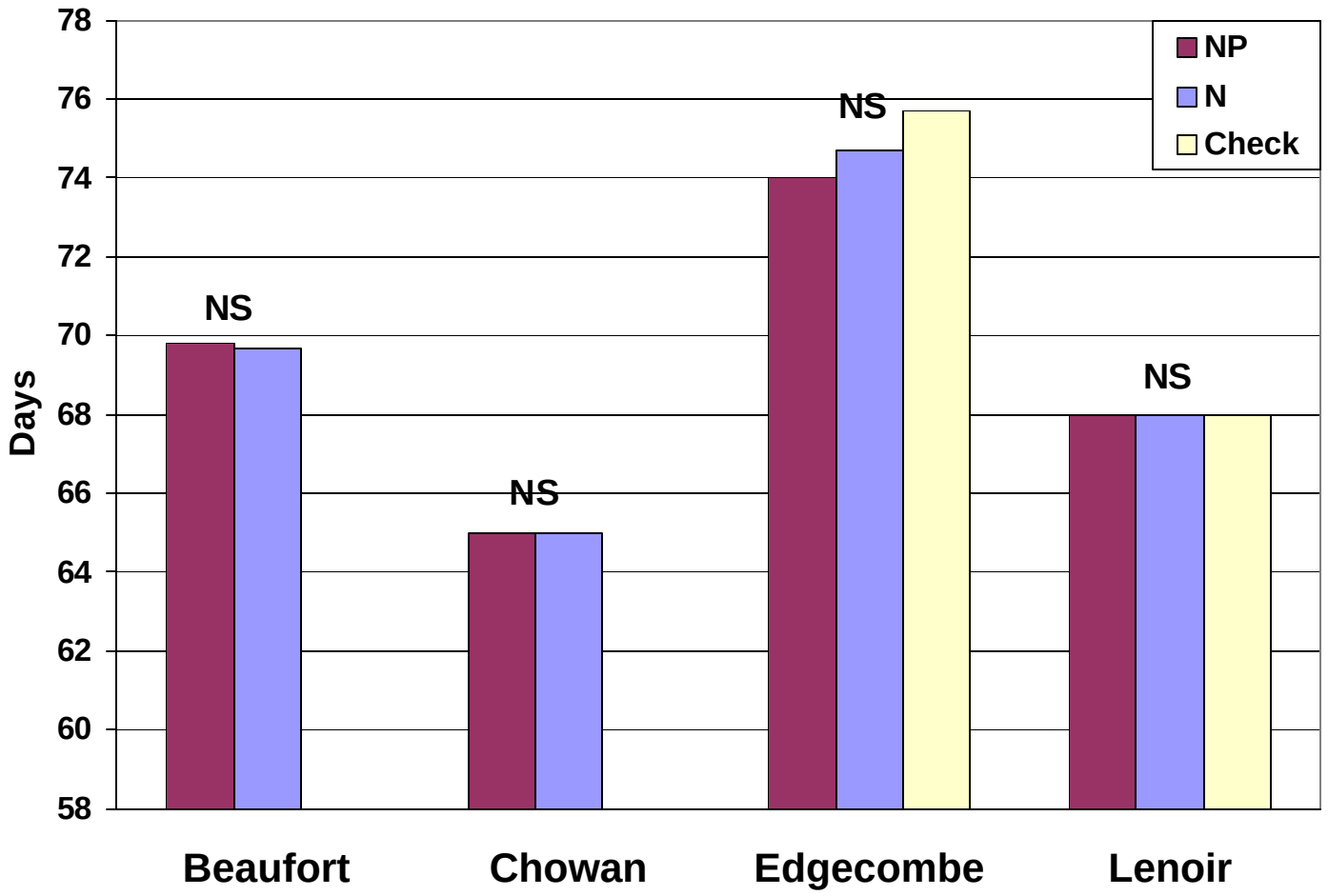
Cotton Petiole Tissue: %N



Cotton Petiole Tissue: %P



Days to Early Bloom



Conclusion

Is Starter P Necessary on Very High STP Soils?

- Data from 2005 & 2006 should have shown differences due to the cool, wet spring
- Across all locations, no difference
- Need to change NCCES recommendations for starter P
- Need to change NRCS recommendation for starter P

Percentage of Sites in Phosphorus Index Rating Categories Segregated by Level of STP

	PLAT risk category			
STP (mg kg^{-1})	**Low**	**Medium**	**High**	**Very High**
0 – 53	99%	< 1%	< 1%	--
53 – 100	93%	5%	2%	--
100 - 200	73%	19%	7%	1%
>200	40%	29%	21%	10%