NC STATE UNIVERSITY

The Road Ahead

Challenges and Opportunities in 2024

Dr. Ron Heiniger
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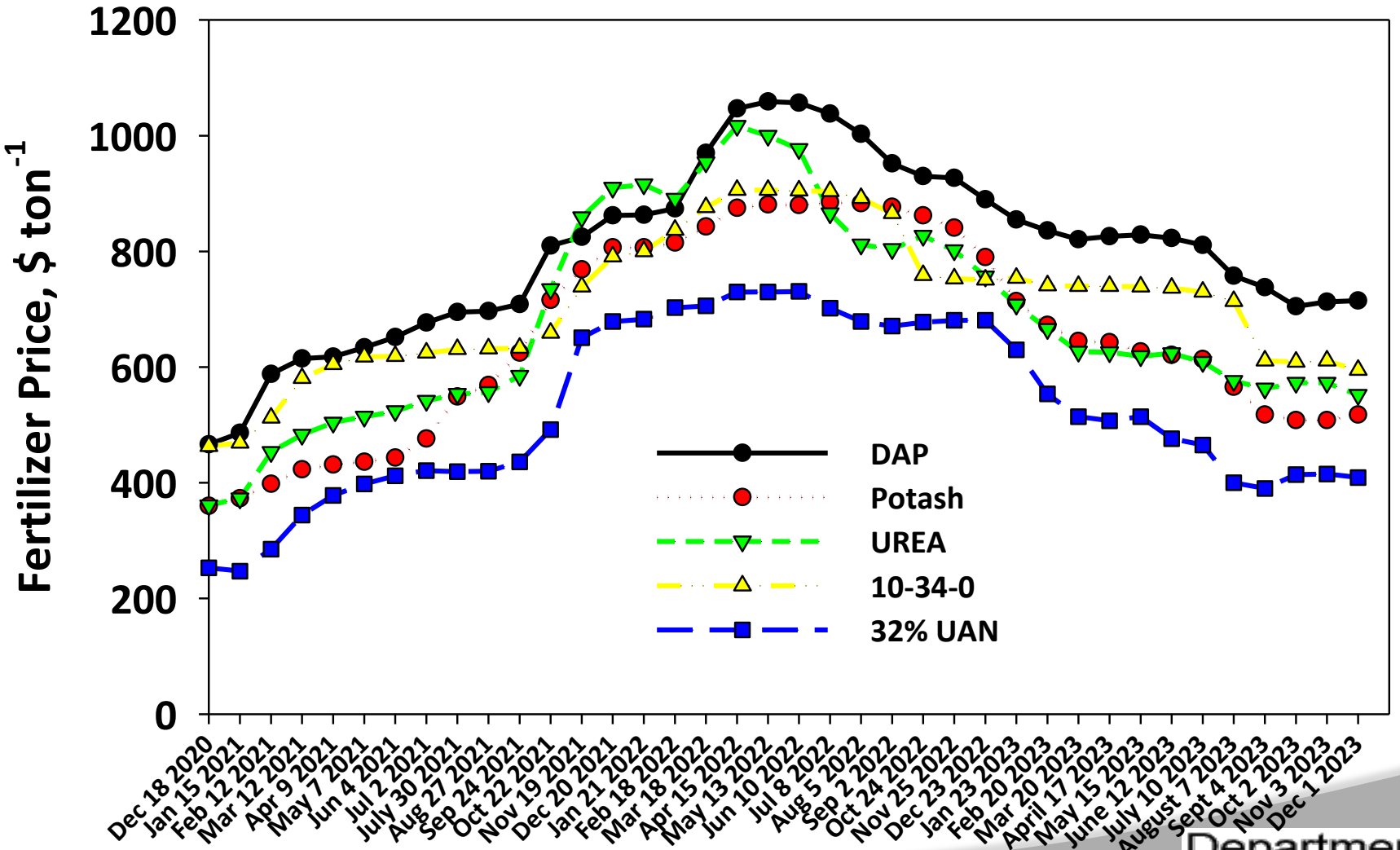
Department of Crop Science
College of Agriculture and Life Sciences

Fertilizer Prices are down but remain High!!



- DAP up 55%
- Potash up 34%
- Urea up 35%
- 10-27-0 up 19%
- 32% UAN up 36%

- 140 bushel Corn – 50 bushel Soybean – 65 bushel Wheat

CROP COMPARISON SUMMARY NO INCREASED INPUT COST FROM 2020	Corn	Soybean	Wheat	Sorghum
Gross Revenue	$774.00	$604.00	$322.40	$467.83
Total Variable Costs	$578.64	$372.01	$370.06	$349.18
Total Fixed Costs	$49.75	$54.67	$42.11	$61.85
Total Cost	$628.39	$426.68	$412.17	$411.03
NET RETURNS TO FARMER AND RISK:	$145.61	$177.32	-$89.77	$56.80
Projected Input Costs Using Increased Input Costs compared to 2020				
SEED or TRANSPLANTS	$87.65	$48.40	$45.00	$15.00
NITROGEN 30%	$59.02	--	$44.43	$31.61
DAP (18-46-0)	$52.31	--	--	--
PHOSPHATE (0-46-0)	$18.09	$27.14	$23.75	$27.47
POTASH (0-0-60)	$16.88	$27.76	$9.85	$8.44
LIME (PRORATED)	$26.99	$26.99	$26.99	$26.99
HERBICIDES	$39.26	$37.91	$13.69	$23.32
INSECTICIDES	--	--	$4.48	$6.20
Total Featured Input Costs	$300.21	$168.19	$168.18	$139.02
Additional Input Costs	$61.98	$35.80	$34.20	$33.58
% Increase in Featured Input Costs	126.0%	127.0%	125.5%	131.8%
Projected NET RETURNS TO FARMER AND RISK	$83.63	$141.52	-$123.97	$23.22

- $5.16 Corn
- $12.08 Soybean
- $4.96 Wheat
- $4.92 Sorghum

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Three Bright Hopes for Success in 2024!

1. Adaptive Genetics that Respond to the Environment

1.Choose Your Corn Hybrids Wisely!

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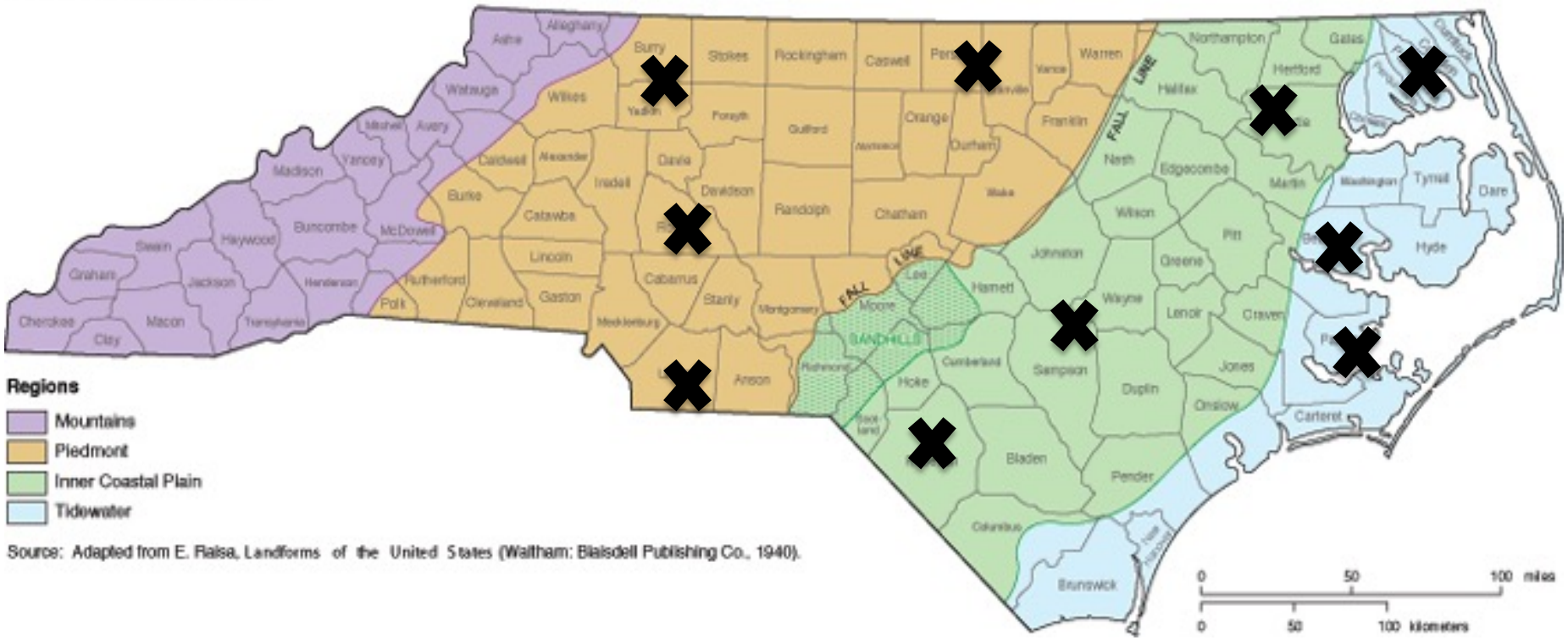
2023 Corn Site Distribution (10 locations)



Piedmont (210 bu/a)

Person:
199.7 bu/a (M)
NR (L)

Rowan:
NR (M)
158.7 bu/a (L)

Surry:
242.7 bu/a (M)
NR (L)

Union:
214.8 bu/a (M)
233.9 bu/a (L)

Coastal Plain (180.4 bu/a)

Bertie:
152.0 bu/a (M)
156.1 bu/a (L)

Robeson:
213.6 bu/a (M)
188.8 bu/a (L)

Sampson:
195.0 bu/a (M)
176.9 bu/a (L)

Tidewater (214.4 bu/a)

Pasquotank:
219.0 bu/a (M)
232.5 bu/a (L)

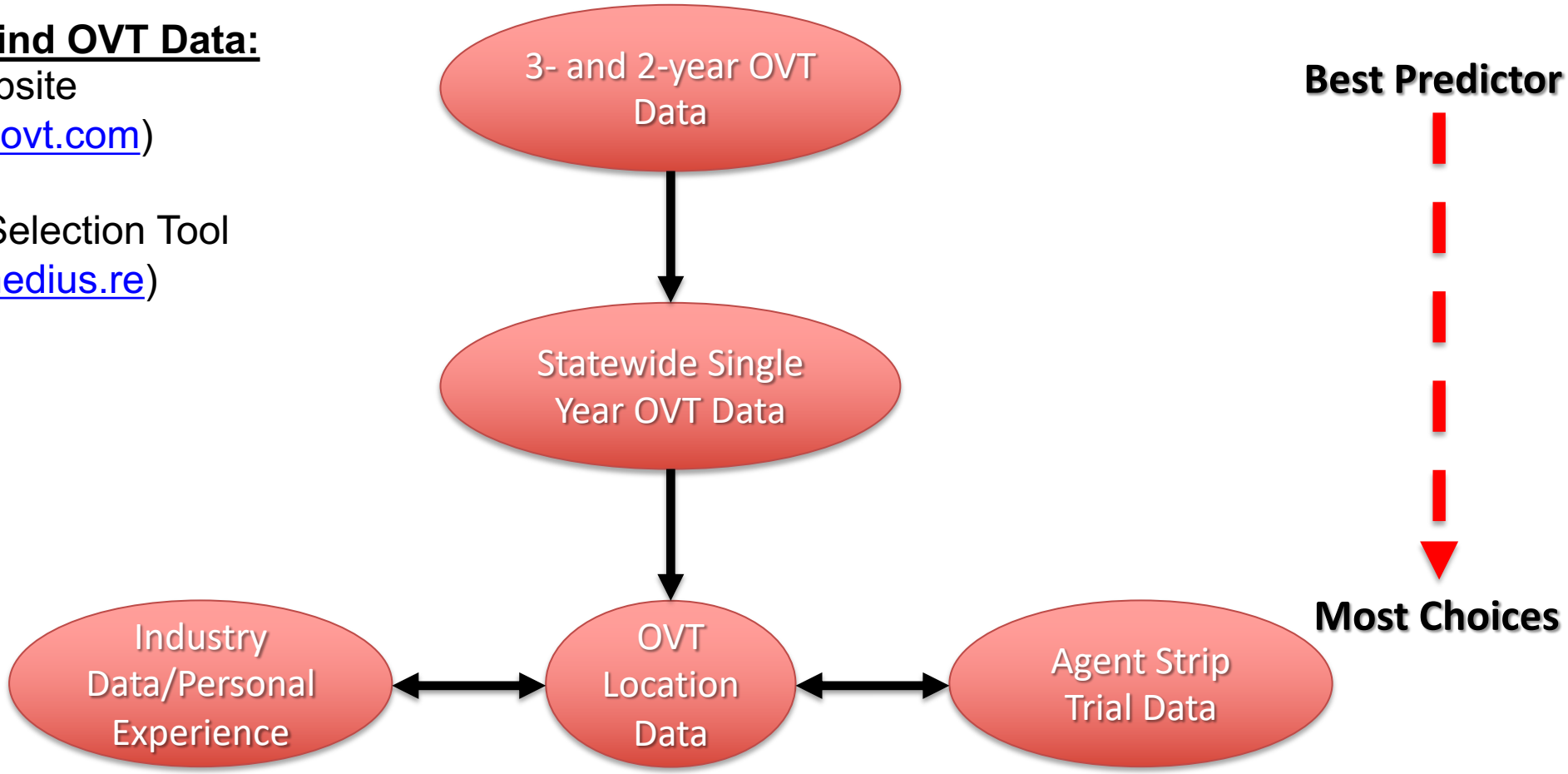
Pamlico:
240.0 bu/a (M)
240.2 bu/a (L)

Beaufort:
196.3 bu/a (M)
158.7 bu/a (L)

Variety Selection Model (Yield)

Where to Find OVT Data:

1. OVT website (www.ncovt.com)
2. Variety Selection Tool (ncovt.medius.re)



NOTE: DO NOT plant more than 1/4 to 1/3 of your acreage in a single hybrid

Multiple Year Selections (2 year) - Piedmont

Company/Brand	Hybrid	Trait	Relative Maturity	% of Trial Mean	Test Weight (lb/bu)	Top Yield Group %
DEKALB - Bayer Crop Science	**DKC 68-35**	VT2P	118	18.90%	59.3	100%
DEKALB - Bayer Crop Science	**DKC 67-44**	VT2P	117	9.80%	58.4	60%
INTEGRA	**6720**	VT2P	117	9.60%	59.4	60%
Seed Consultants	**SC1112AM**	AM	112	8.40%	58.3	67%
Growmark Inc	**FS 6306T RIB**	TRECEPTA	113	7.00%	58.3	67%
Dyna-Gro	**D54VC34**	VT2P	114	6.90%	57.5	83%
DEKALB - Bayer Crop Science	**DKC 69-99**	TRECEPTA	119	5.70%	59.3	40%
DEKALB - Bayer Crop Science	**DKC 65-99**	TRECEPTA	115	5.20%	57.7	50%
Axis	**63M73**	TRECEPTA	113	5.20%	58.4	67%
Dyna-Gro	**D53TC23**	TRECEPTA	113	5.10%	58.1	67%
Revere Seed	**Revere 0918 SSX**	SSX	109	4.50%	57.4	67%
Pioneer	**P1197YHR**	YGCB/HX1/RR2/LL	111	3.70%	58.6	67%
Revere Seed	**Revere 1307 TC**	TRECEPTA	113	3.70%	58.3	50%
Dyna-Gro	**D57TC29**	TRECEPTA	117	3.40%	56.3	40%
Revere Seed	**Revere 1627 TC**	TRECEPTA	116	3.00%	58.8	40%
Seedway	**SW 1600VT**	VT2P	116	2.60%	58.9	40%
INTEGRA	**6342**	TRECEPTA	113	2.60%	58.1	50%
INTEGRA	**6493**	VT2P	114	2.50%	57.8	67%
Growmark Inc	**FS 6818V RIB**	VT2P	118	2.00%	59.2	0%
Growmark Inc	**FS 6017V RIB**	VT2P	110	1.90%	57.4	33%

Single Year Medium (2024) - Piedmont

Above Average Piedmont - Medium Hybrids (2023)							
Company/Brand	Hybrid	Trait	Relative Maturity	Yield (bu/a)	Test Weight (lb/bu)	% of Trial Mean	Top Yield Group %
Seed Consultants	**SC1112AM**	AM	112	240.2	57.5	9.9%	67%
Dyna-Gro	**D54VC34**	VT2P	114	236.9	57.8	8.2%	67%
Pioneer	**P1197YHR**	YGCB/HX1/RR2/LL	111	231.2	58.2	5.8%	67%
Augusta Seed	**A1365**	PCE	115	230.1	58.8	5.5%	67%
Progeny Ag Products	**PGY 2314TRE**	TRECEPTA	114	228.8	57.5	4.4%	33%
Pioneer	**P1222YHR**	YHR	112	227.5	58.9	4.2%	67%
INTEGRA	**6493**	VT2P	114	227.1	57.9	3.9%	67%
Axis	**63M73**	TRECEPTA	113	227.1	57.9	3.5%	33%
Growmark Inc	**FS 6306T RIB**	TRECEPTA	113	226.3	57.8	3.5%	33%
Growmark Inc	**FS 6017V RIB**	VT2P	110	226.1	56.9	3.2%	33%
Gateway	**1913TRE**	TRECEPTA	113	226.0	57.5	3.7%	33%
DEKALB - Bayer Crop Science	**DKC 113-83**	TRE	113	225.9	58.3	3.0%	67%
INTEGRA	**6342**	TRECEPTA	113	225.5	57.6	2.7%	33%
DEKALB - Bayer Crop Science	**DKC 65-99**	TRECEPTA	115	225.2	57.5	2.9%	33%
Seed Consultants	**SC1134AM**	AM	113	225.1	57.5	2.9%	33%
FS System	**FS 6137 PC**	PowerCore	111	224.9	56.8	2.6%	33%
DEKALB - Bayer Crop Science	**DKC 63-56**	RR2	113	224.1	57.7	2.7%	33%
FS System	**FS 6133VDG RIB**	VT2P	111	223.6	56.7	2.3%	67%
DEKALB - Bayer Crop Science	**DKC 64-22**	VT2P	114	223.3	59.9	1.8%	33%
Revere Seed	**Revere 1307 TC**	TRECEPTA	113	222.4	57.8	1.6%	33%
Dyna-Gro	**D53TC23**	TRECEPTA	113	221.2	57.6	1.0%	33%
Growmark Inc	**FS 6217T RIB**	TRECEPTA	112	221.0	56.7	0.9%	33%
Revere Seed	**Revere 0918 SSX**	SSX	109	220.4	57.5	0.4%	33%
DEKALB - Bayer Crop Science	**DKC 62-70**	VT2P	112	219.7	59.5	0.0%	33%
Revere Seed	**Revere 1577 VT2P**	VT2P	115	219.6	58.8	0.1%	33%
Axis	**65W75**	TRECEPTA	115	219.4	57.8	0.1%	33%

The yields for these hybrids are greater than or equal to 1 standard deviation from the average. Hybrids are sorted by yield from high to low. Top Yield Group % is the percentage of time the hybrid was in the top yield group across all locations tested in this category. For more details on these hybrids, visit ncovt.medius.re

Single Year Late (2024) - Piedmont

Above Average Piedmont - Late Hybrids (2023)

Company/Brand	Hybrid	Trait	Relative Maturity	Yield (bu/a)	Test Weight (lb/bu)	% of Trial Mean	Top Yield Group %
DEKALB - Bayer Crop Science	**DKC 68-35**	VT2P	118	229.3	59.3	19.5%	100%
DEKALB - Bayer Crop Science	**DKC 66-06**	TRECEPTA	116	216.2	58.4	10.8%	50%
INTEGRA	**CX301119VT2P**	VT2P	119	213.4	57.5	9.8%	50%
FS System	**FS 6627T RIB**	TRECEPTA	116	211.6	59.1	8.8%	50%
Dyna-Gro	**D56TC44**	TRECEPTA	116	209.0	59.2	6.7%	50%
INTEGRA	**6624TRE**	TRECEPTA	116	206.0	59.3	5.0%	50%
DEKALB - Bayer Crop Science	**DKC 67-44**	VT2P	117	205.5	59.1	5.6%	0%
DEKALB - Bayer Crop Science	**DKC 69-99**	TRECEPTA	119	204.6	59.7	3.4%	50%
AgraTech	**87VT2P**	VT2P	117	203.8	57.7	3.1%	50%
Seedway	**SX 19B23VT**	VT2P	118	203.5	57.6	3.3%	50%
Dyna-Gro	**D58TC94**	TRECEPTA	118	203.4	60.1	3.6%	50%
INTEGRA	**6641**	SS	116	202.3	58.8	3.6%	0%
Dyna-Gro	**D57TC29**	TRECEPTA	117	201.0	57.3	2.2%	50%
Pioneer	**P1622VYHR**	VYHR	116	199.3	59.3	2.9%	0%
Revere Seed	**Revere 1627 TC**	TRECEPTA	116	198.9	57.8	0.3%	50%
Growmark Inc	**FS 6818V RIB**	VT2P	118	198.3	59.3	2.2%	0%
DEKALB - Bayer Crop Science	**DKC 117-78**	VT2P	117	196.9	59.3	0.6%	0%
INTEGRA	**6720**	VT2P	117	196.6	59.5	0.7%	0%

The yields for these hybrids are greater than or equal to 1 standard deviation from the average. Hybrids are sorted by yield from high to low. Top Yield Group % is the percentage of time the hybrid was in the top yield group across all locations tested in this category. For more details on these hybrids, visit ncovt.medius.re

2023 Corn Yield Contest

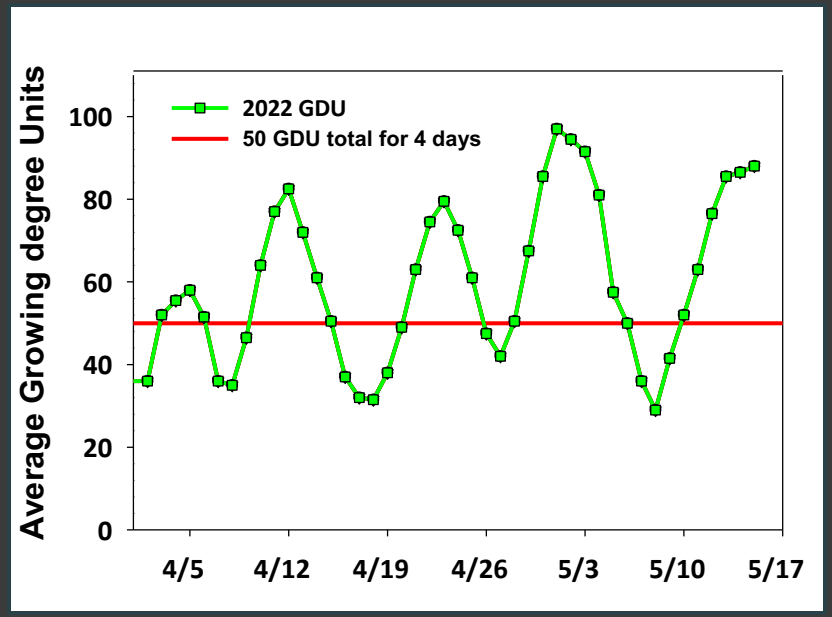
Top Hybrids Piedmont

Grower	Location	Hybrids	Maturity	Yield
			Days	Bu/acre
Helms Farms	Union	DeKalb DKC 68-35	118	335.7
Friendship Farms	Davidson	Pioneer 1718 YHR	117	327.5
B.J. Roberts	Guilford	Pioneer 1718 AML	117	317.8
Lewis Bros.	Guilford	DynaGro 55VC80	115	314.3
Johnson Farm Operations	Surry	Pioneer 1718 YHR	117	301.5
Terry Lee Busick	Guilford	DeKalb DKC 68-35	118	294.8
PD Three Farming	Catawba	Pioneer 1718 YHR	117	291.7

Three Bright Hopes for Success in 2024!

1. Adaptive Genetics that Respond to the Environment

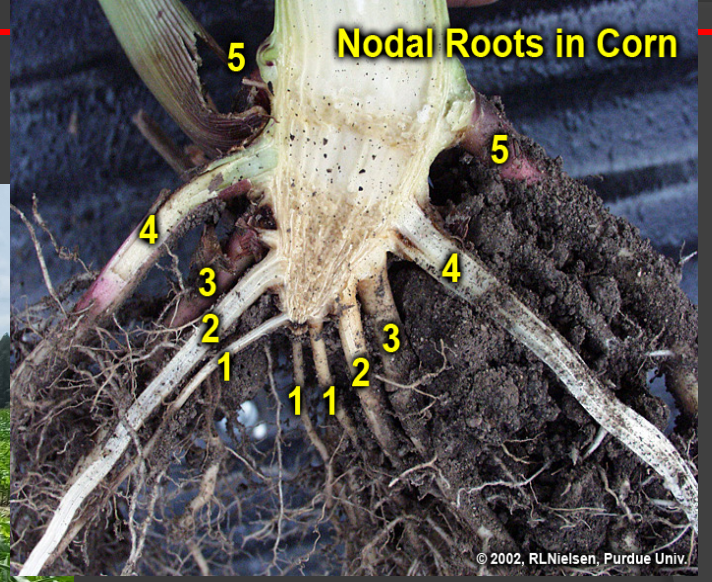
2. Getting Off to the Right Start



Picking the Right Planting Date -

- Aim to Plant so That 40 to 50 GDD are accumulated over the next four to five days
- No more than 2” of rainfall for the first 7 days following planting

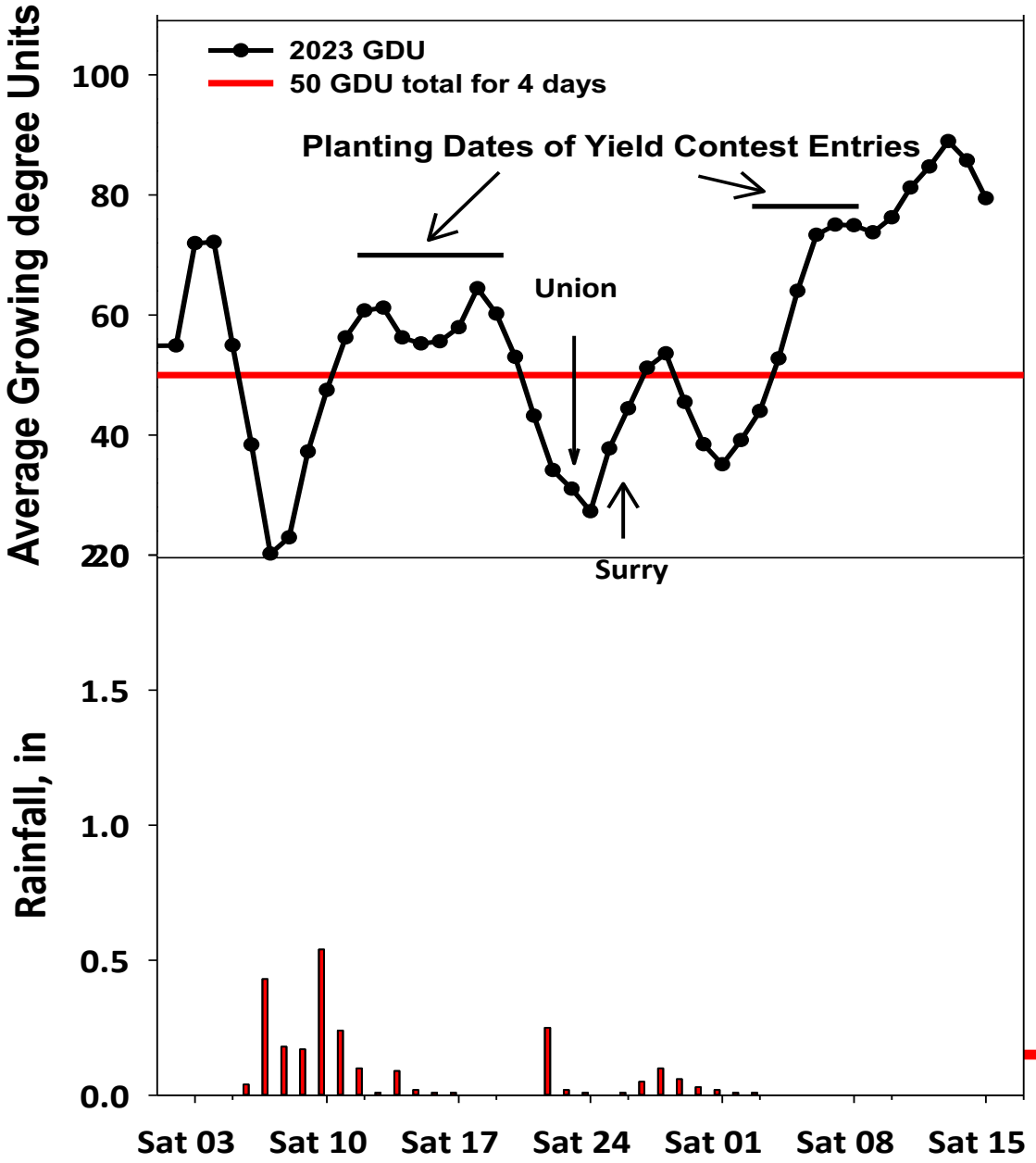
Develop nodal Roots early



Should I Spend Money on Starter Fertilizer in 2023?

- Ask Yourself four Questions
  1. Am I able to plant into a very good to idea soil environment?
  2. Is my phosphorus (P) index above 40?
  3. Do I have sufficient micronutrients available – Zn, B, Mn, etc.?
  4. Do I have at least 1/3 of my N requirement applied at planting?

- Starter performs best under difficult environments



Planting Opportunities in Your Area in 2023

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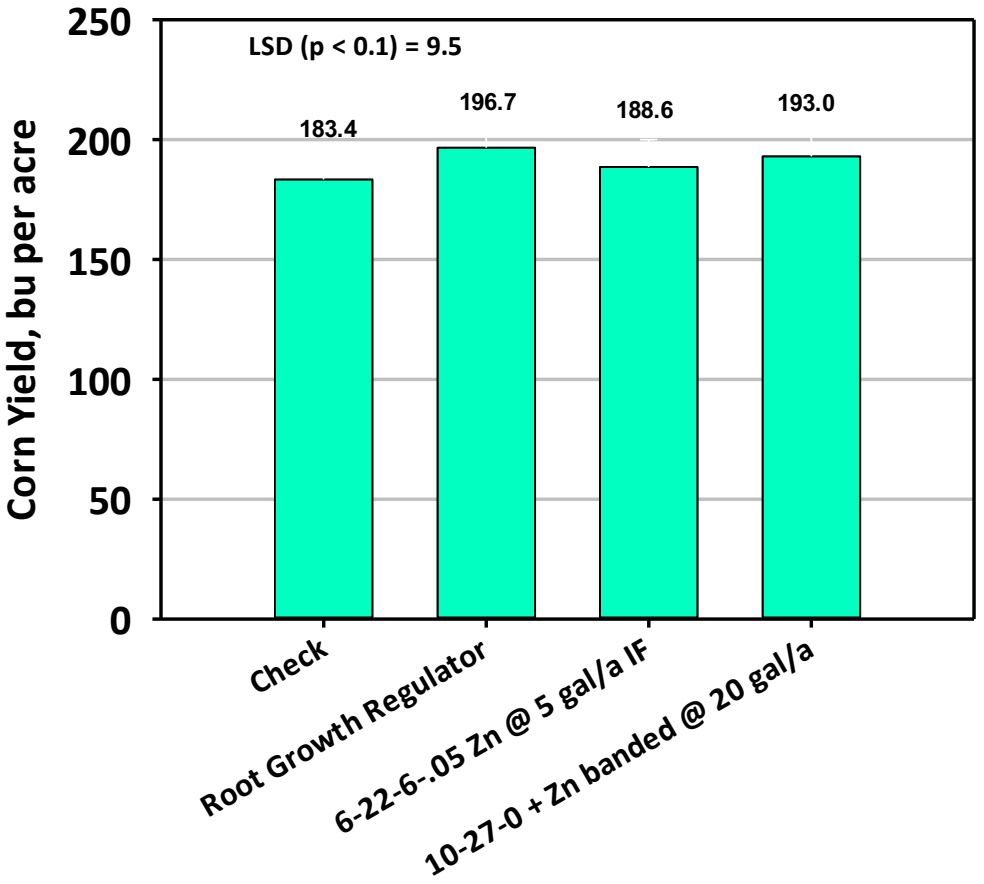
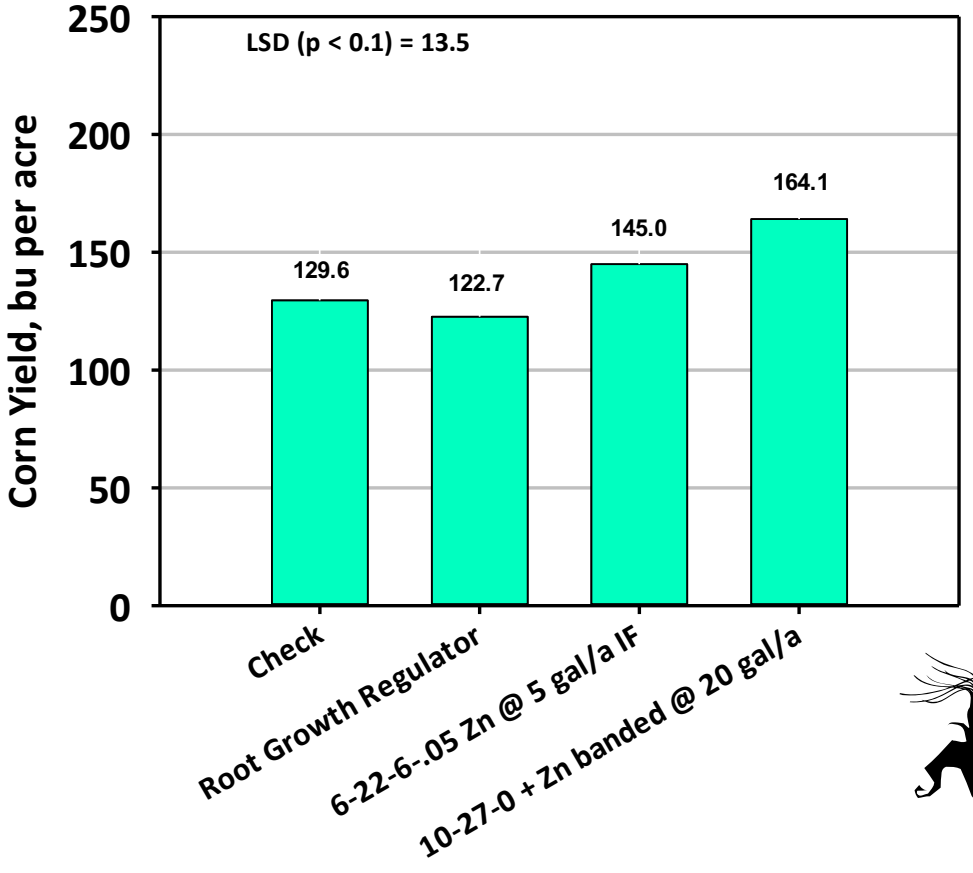
Starter Treatments on Early Corn Growth – 2023

Union Co
Baden Channery silt loam



Surry Co
Colvert and Suches loam



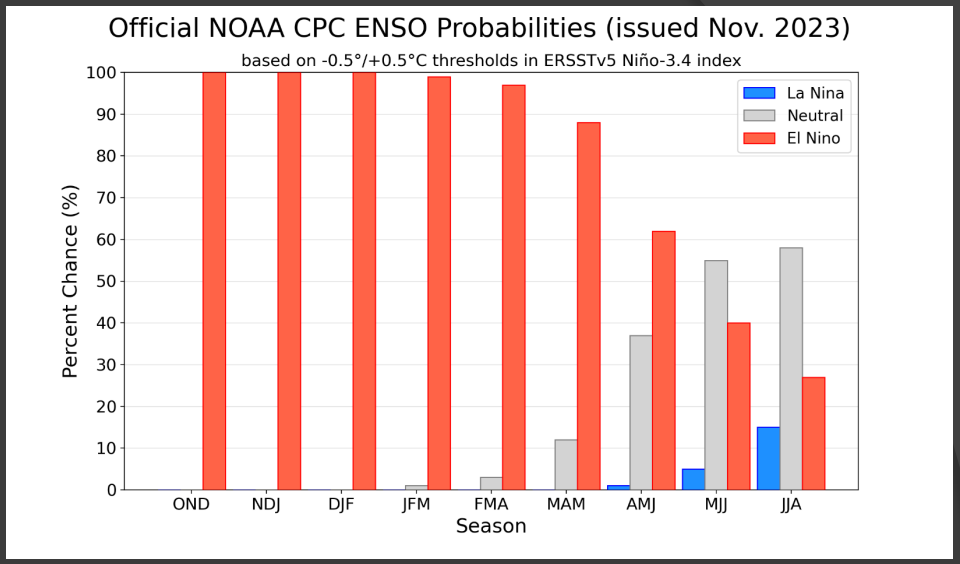
Union County Test ROI

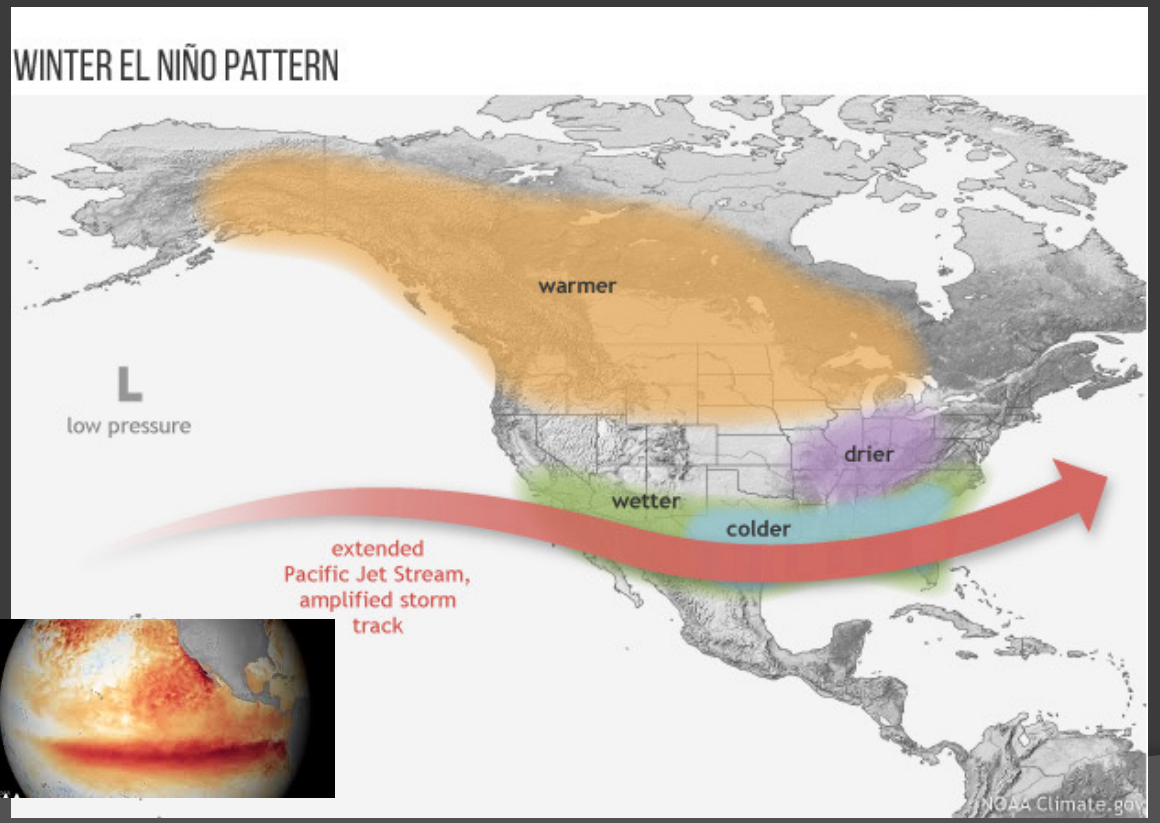
Treatment	Yield +/- over check	Gross Return @ $5.00/bu	Cost of Treatment	ROI over check	Yield Craven Site
	Bu/a	$	$	$	Bu/a
10-27-0 + Rotech @ 20 gpa	+ 9.6	$48.00	$69.57	- $21.57	193.0
Radiate @ 4 oz/acre	+ 13.3	$66.50	$14.00	$52.50	196.7
6-22-6 @ 5 gal/a	+ 5.2	$26.00	$22.00	$4.00	188.6
Untreated Check	0	0	0	0	183.4

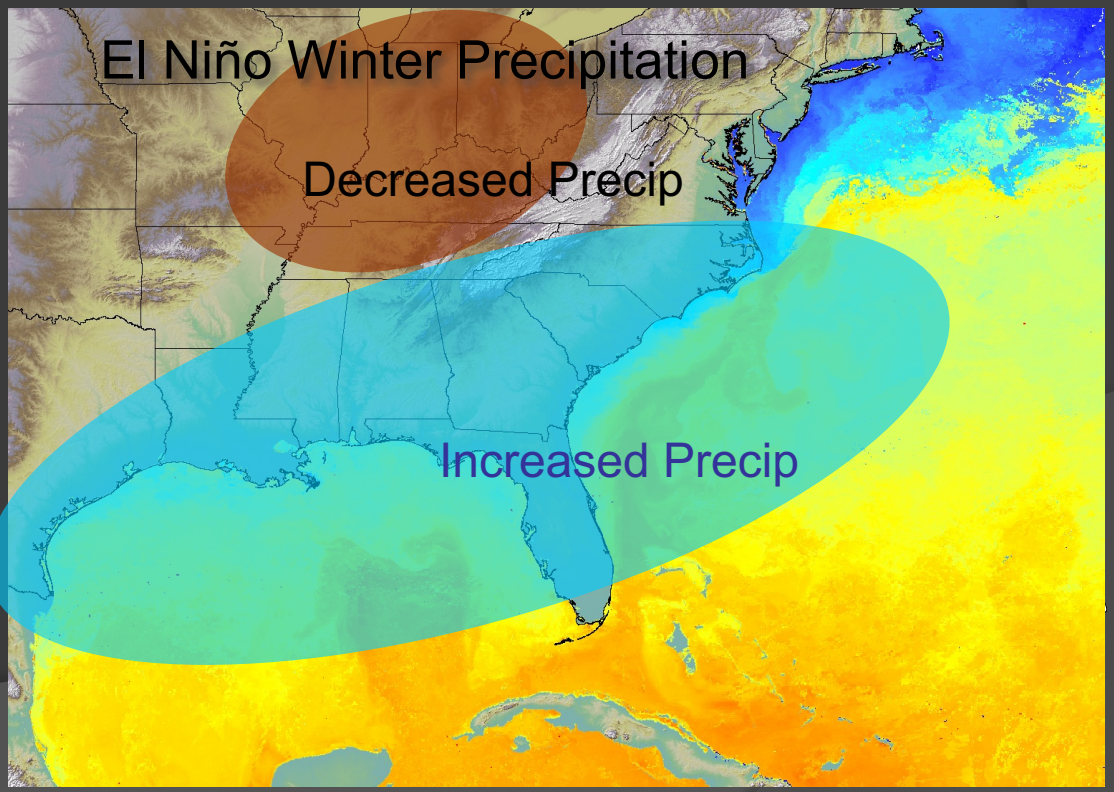
Surry County Test ROI

Treatment	Yield +/- over check	Gross Return @ $5.00/bu	Cost of Treatment	ROI over check	Yield Craven Site
	Bu/a	$	$	$	Bu/a
10-27-0 + Rotech @ 20 gpa	+ 34.5	$172.50	$69.57	**$102.93**	**164.1**
Radiate @ 4 oz/acre	- 6.9	$0	$14.00	**- $14.00**	**122.7**
6-22-6 @ 5 gal/a	+ 15.4	$77.00	$22.00	**$55.00**	**145.0**
Untreated Check	0	0	0	**0**	**129.6**

How would farming change if one could predict when rainfall would occur and what temperature to expect?

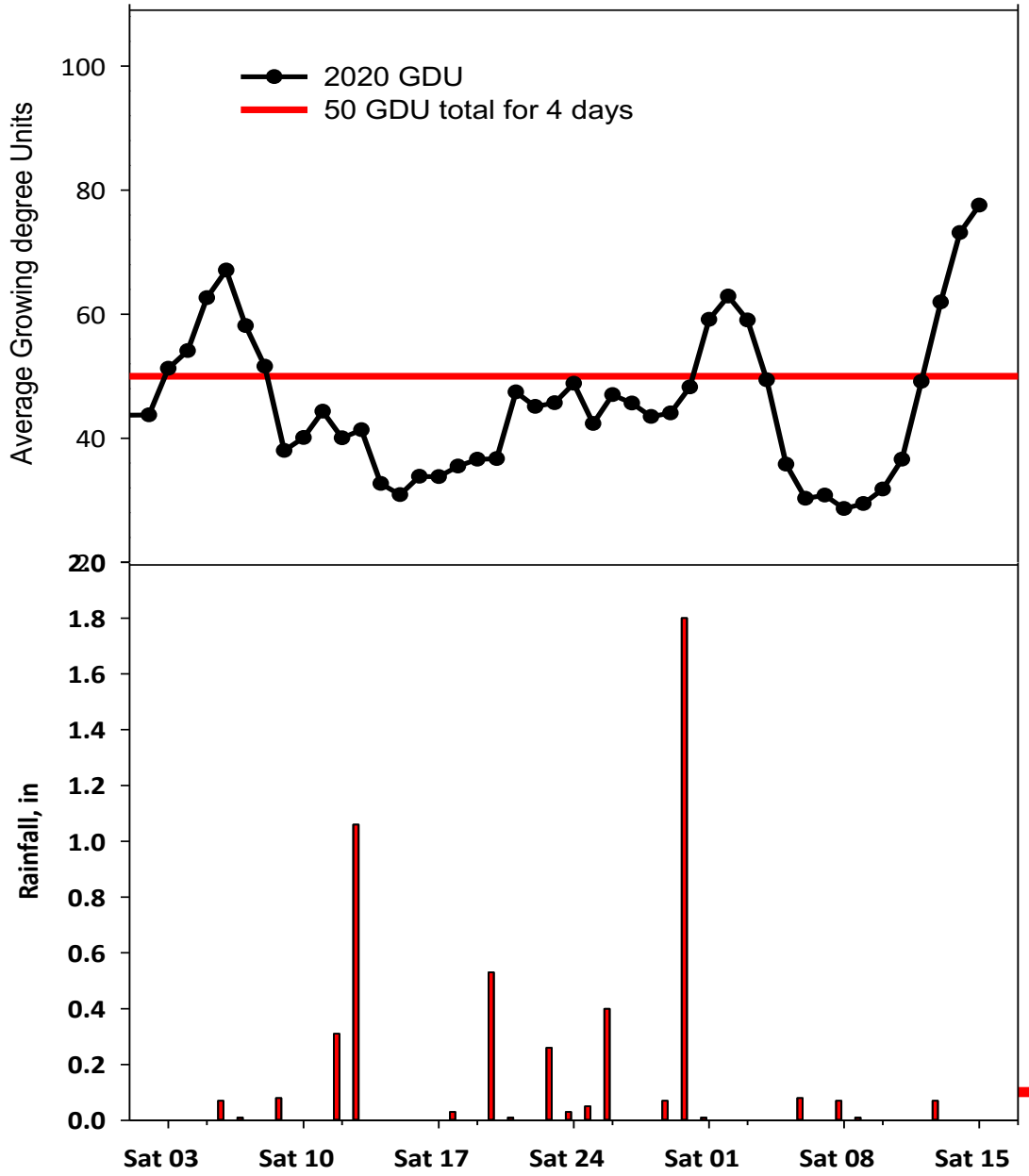






What to Expect: Jan 2024 – September 2024

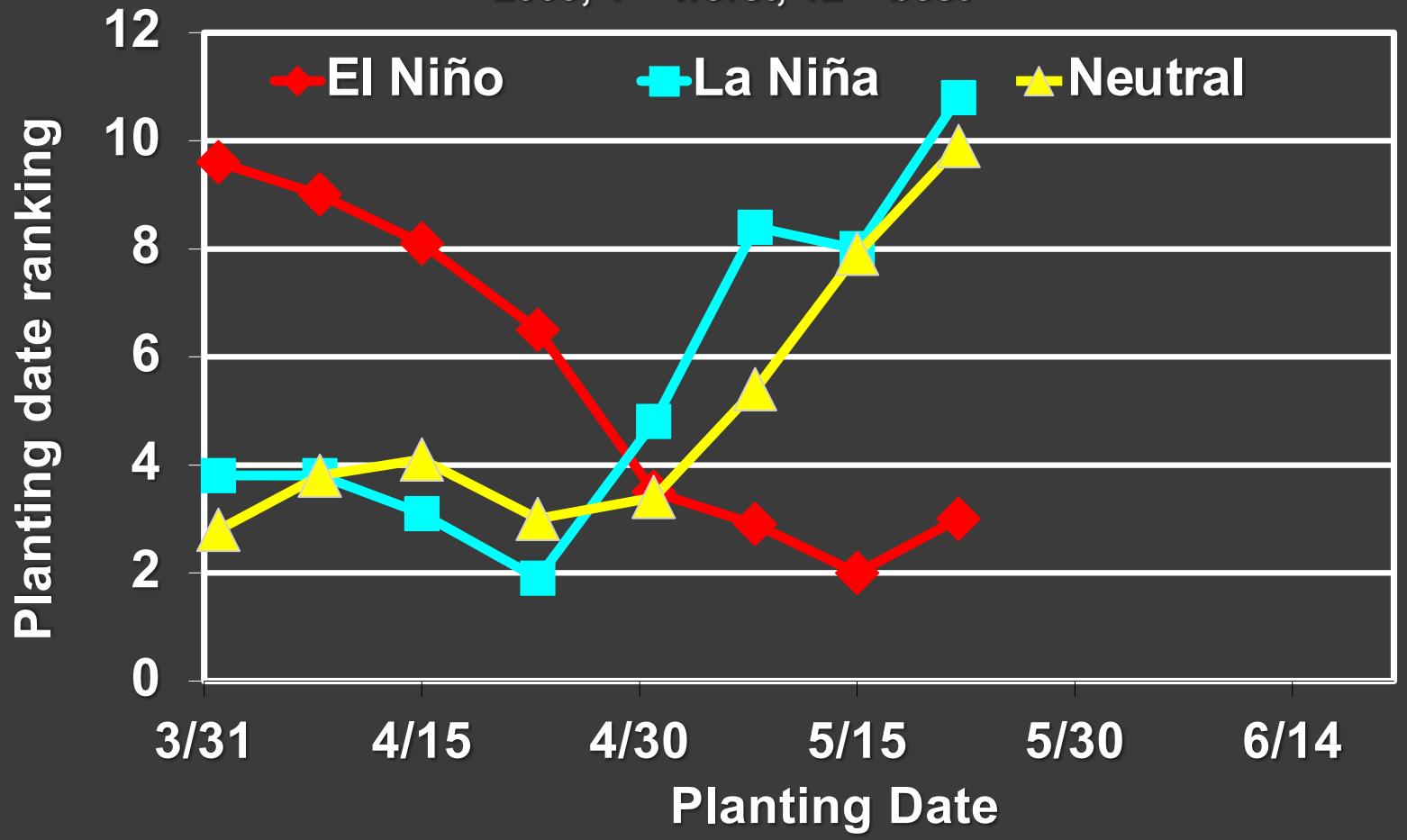
- Late January through Mid April – Cold. Well below average temperatures with frequent cold events. Intense precipitation events. Expect one or more heavy snowfall events.
- April through May – Cooler than normal with high likelihood of frequent intense rainfall events.
- Average Temperatures and average rainfall from late May through late June
- Very Hot July early August with very little chance of measurable precipitation
- Early tropical storm activity and high likelihood of hurricane making landfall in North Carolina from mid August through September

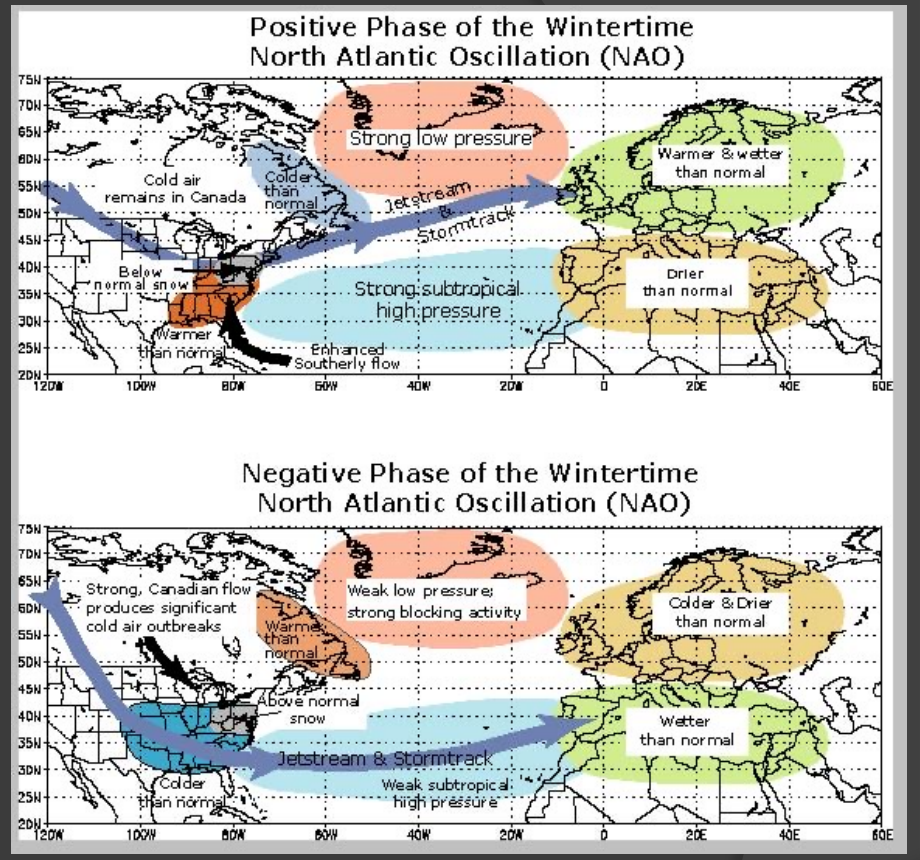


Planting Opportunities in the Piedmont in El Nino Years

- ✓ **Good planting opportunities will be rare**
- ✓ **Best chances early April or Mid May**
- ✓ **Starter fertilizer or other starter treatments should be employed**
- ✓ **Be ready and get-r-done when the weather is right**

Planting dates ranked based on drought stress during pollination & grain-filling, mid-maturity corn hybrid, 1950-2009, 1 = worst, 12 = best





NC S

Climate Dashboard for NC Corn Growers

This tool provides corn growers in North Carolina with climate-based information and predictions about seasonal corn development. To use this tool, select your location and planting date (past or anticipated) and click "Update Chart". Scroll down to see forecasts. This tool was sponsored by the Corn Growers Association of North Carolina. Learn more about this tool, the datasets and calculations used, and a tutorial on our **About Page**.

1. Select Your Location

Search with Address [ ] **Search**

Or

Use My Location

Or

Click on the map below

Selected Latitude (°N): 35.724

Selected Longitude (°E): -78.683

2. Select Your Planting Date

Planting Date:

01/22/2024

Science
Sciences

Planting Guidance Chart for 35.724°N -78.683 °E
Based on Today's Date

Corn germination is based on an accumulation of at least 40-50 GDDs over the next 4-5 days (of the current date, not the planting date). This table shows the predicted accumulation of GDDs over the next 5 days, starting with each date.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mar 21	Mar 22	**Mar 23** **35**	Mar 24 20	Mar 25 11	Mar 26 14	Mar 27 21
Mar 28 29	Mar 29 30	Mar 30 37	Mar 31 36	Apr 1 28	Apr 2 21	Apr 3 15

Numbers in each box indicate the forecasted 5-day accumulated GDDs, starting on the given date. Daily GDDs are based on NWS Forecasts for days 0-7, and on historical averages for days 8+. 5-day accumulations shown may be based on a combination of NWS forecasts and historical data.

Please Note: Actual conditions may differ from local forecasts and historical averages. We recommend you return to this tool for updated forecast information.

Three Bright Hopes for Success in 2024!

1. Adaptive Genetics that Respond to the Environment

2. Getting Off to the Right Start

3. Understanding Symbiotic Microbiota and Using them to overcome limitations in the soil and weather environment

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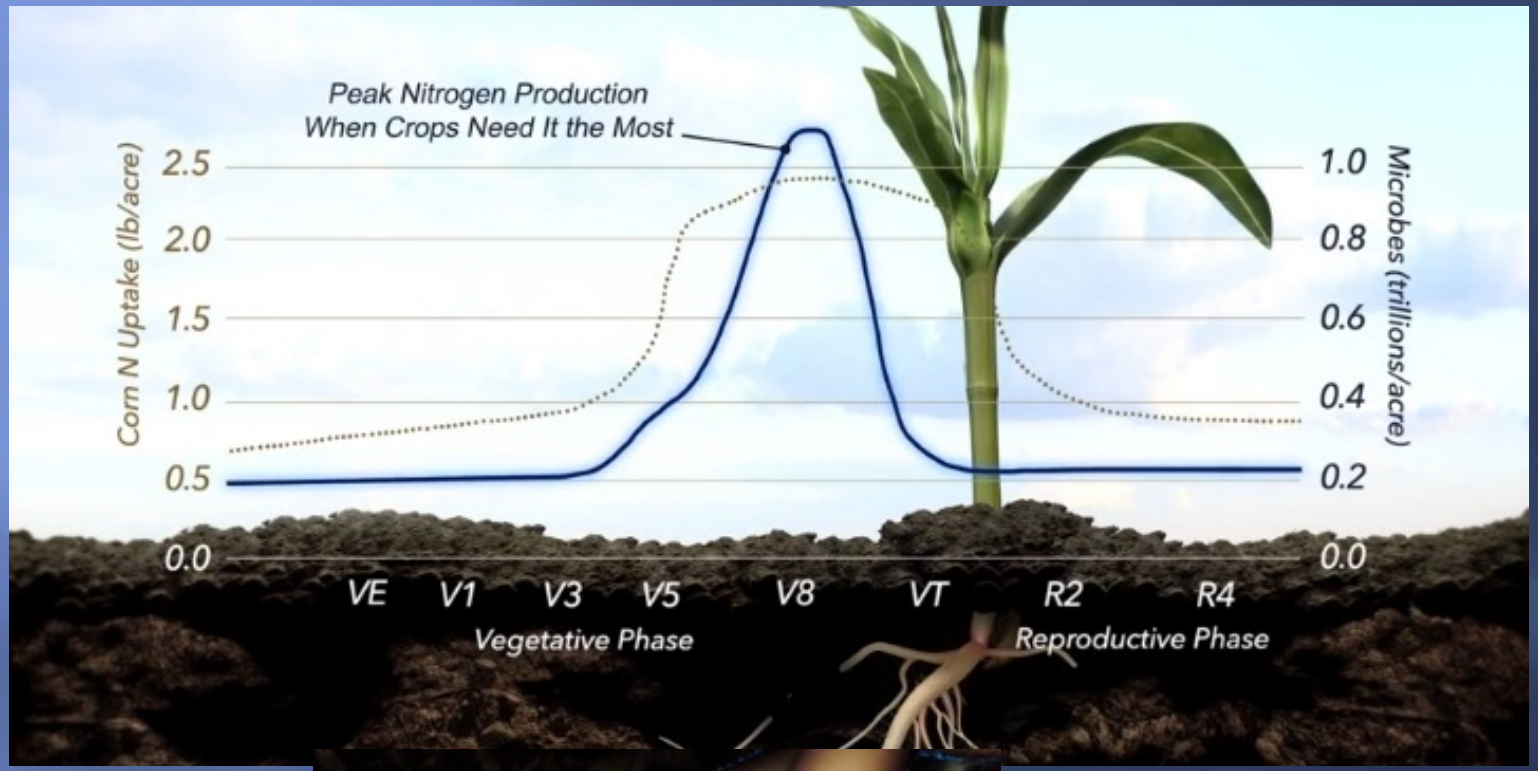

Can Microbes Fix Enough N from the Air to Supply N for Corn

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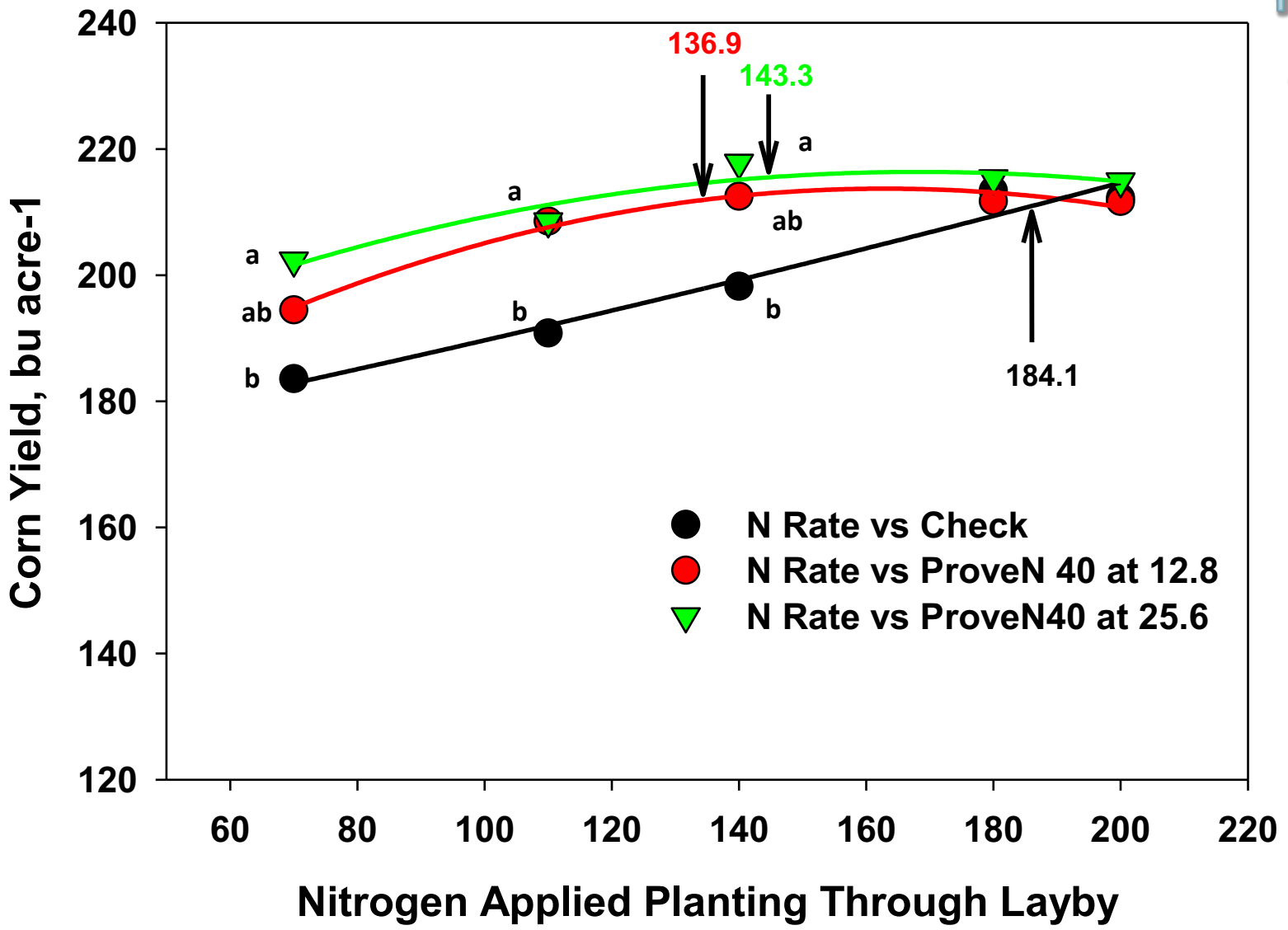
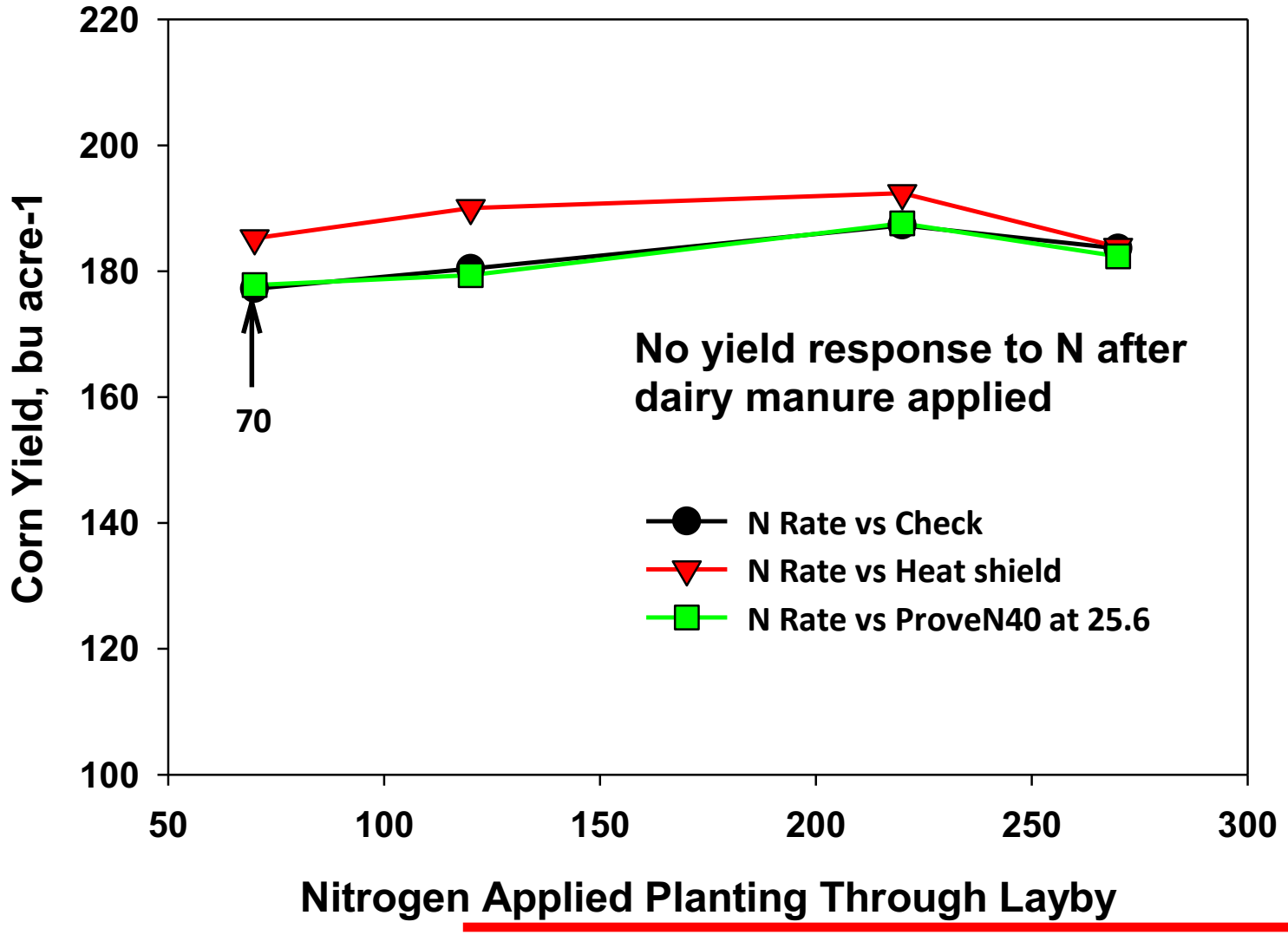
Yield Response to N with and without ProveN 40 Harris Farm – 2022



Decreased economic optimum N rate ($1.00 per lb N and $7.50 per bu corn) by 40.8 lbs N acre^{-1}

Time Interval	TRS
	Accumulated precipitation, in
April 1 – 15	0.18
April 16 – 30	0.40
May 1 - 15	0.19
May 16 - 31	0.12
June 1 - 15	1.49
June 16 - 30	1.02
July 1 - 15	5.28
July 16 - 31	0.25

Yield Response to N when Manure has been applied Prior to Planting Yadkin County – 2022



Late Season Leaf Greenness Peanut Belt Research Station – 2022

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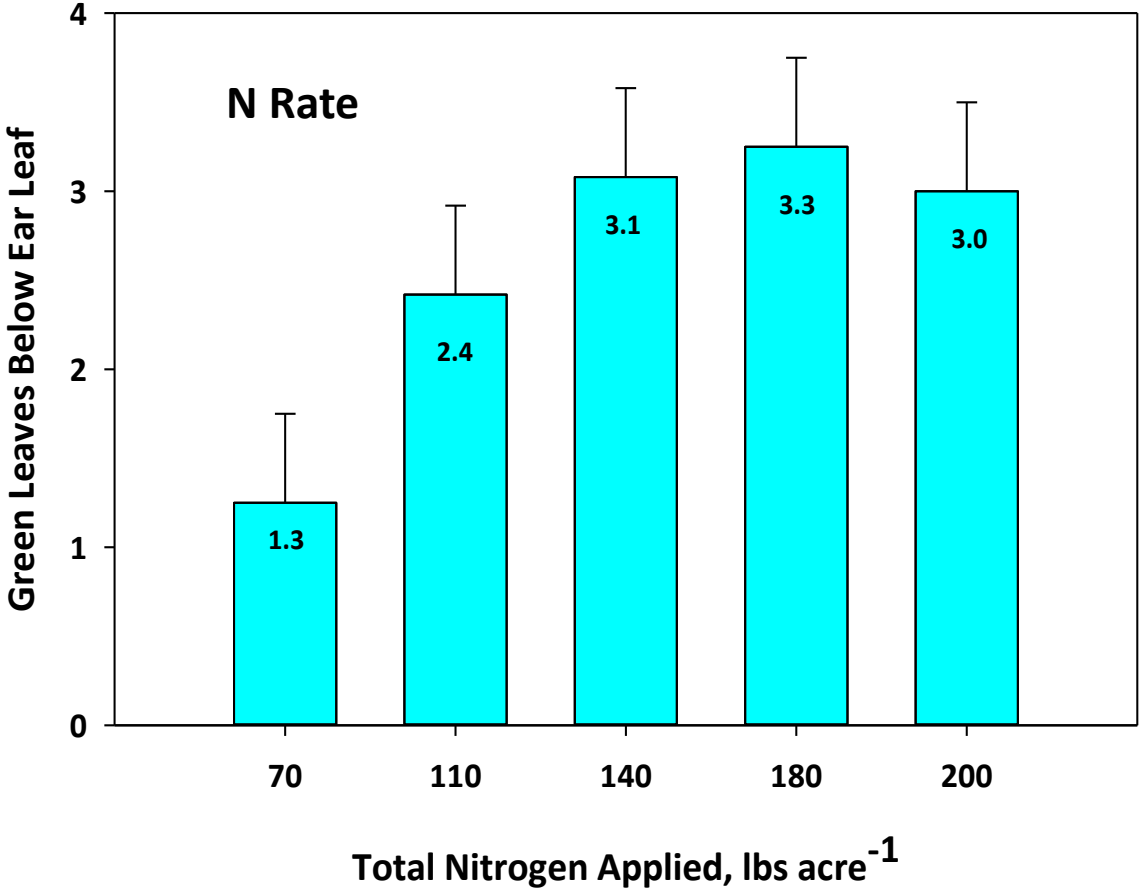
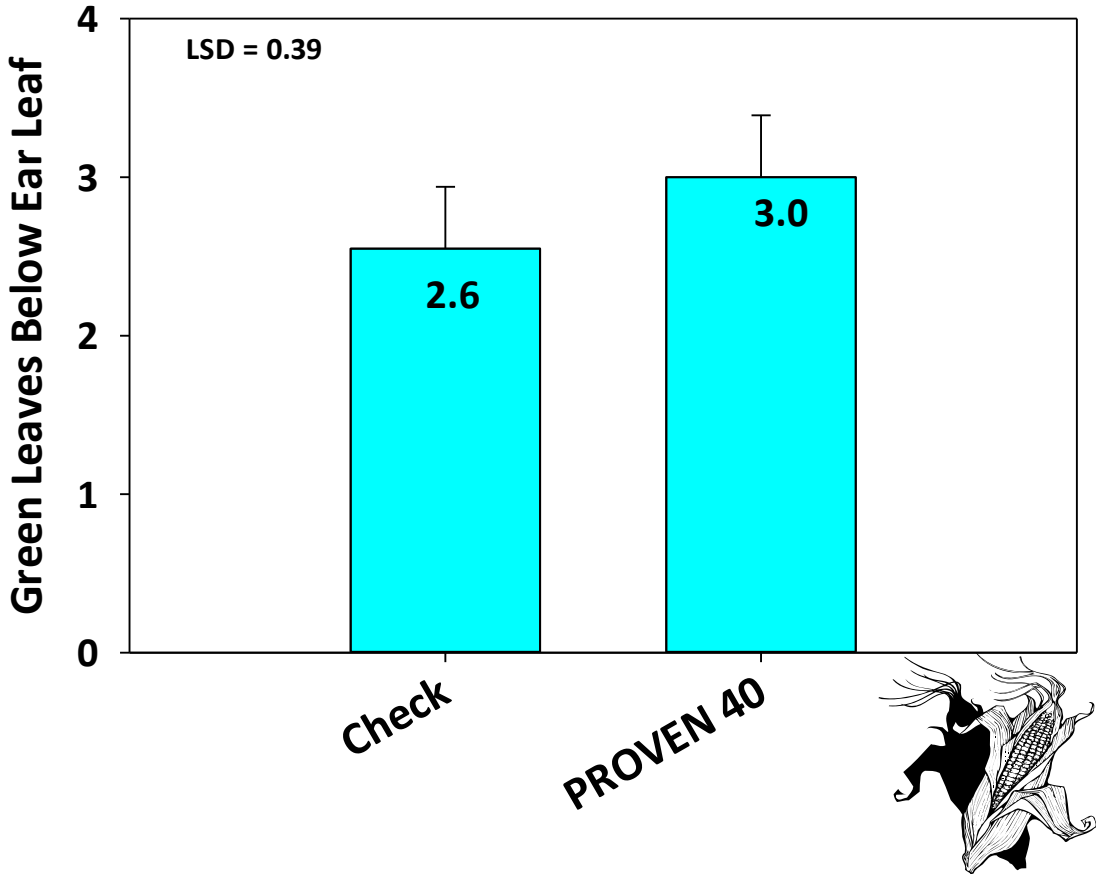
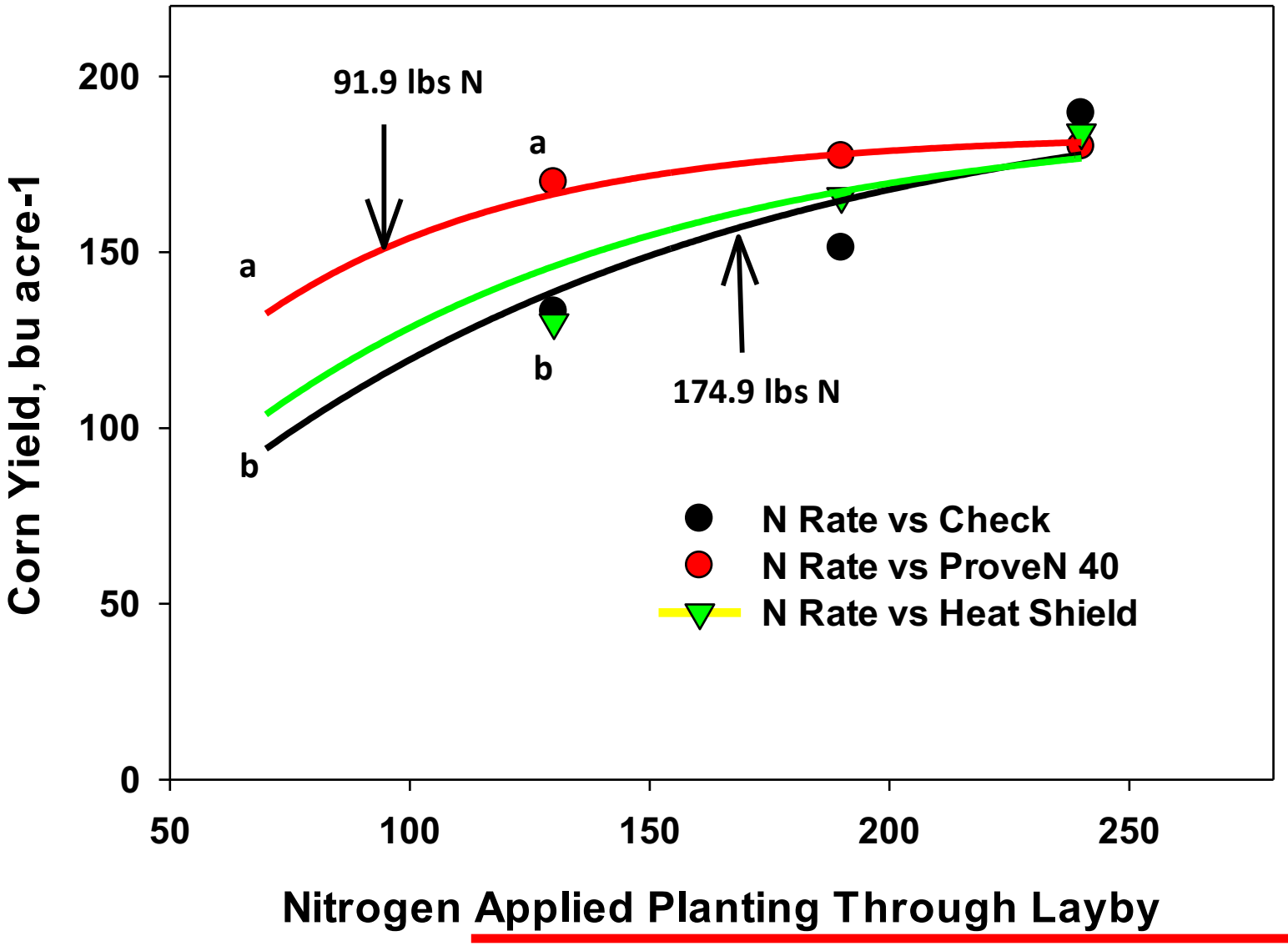
Leaf Firing in Response to N Rate or Treatment
Peanut Belt Research Station – 2022



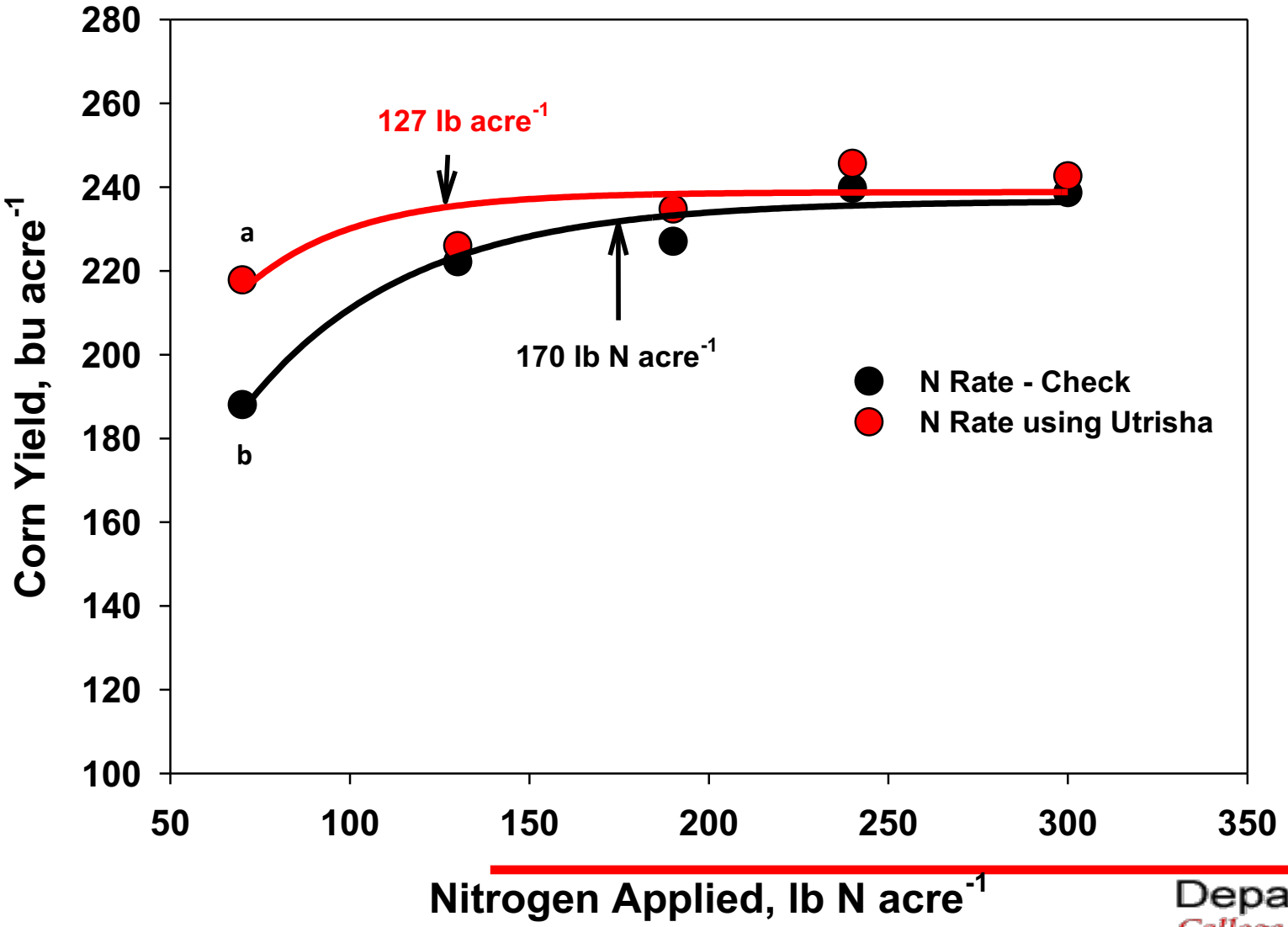


Yield Response to N
Surry County – 2023



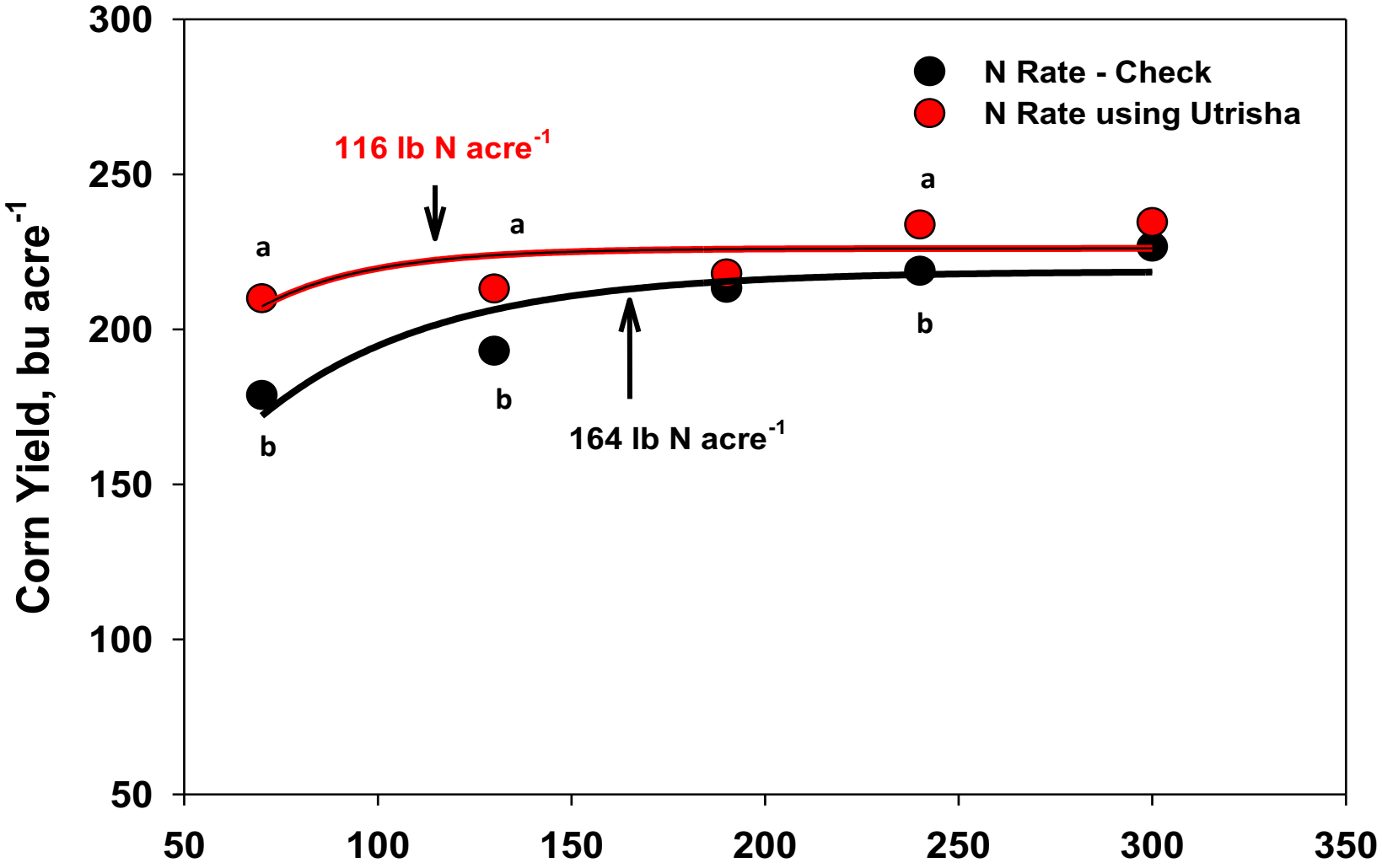
Time Interval	Mt Airy
	Accumulated precipitation, in
April 1 – 15	3.25
April 16 – 30	3.97
May 1 - 15	0.14
May 16 - 31	3.70
June 1 - 15	1.89
June 16 - 30	3.53
July 1 - 15	3.63
July 16 - 31	1.64
Aug 1-15	3.98
Aug 16-30	3.58

Sampson Co. – Norfolk loamy sand - 2023



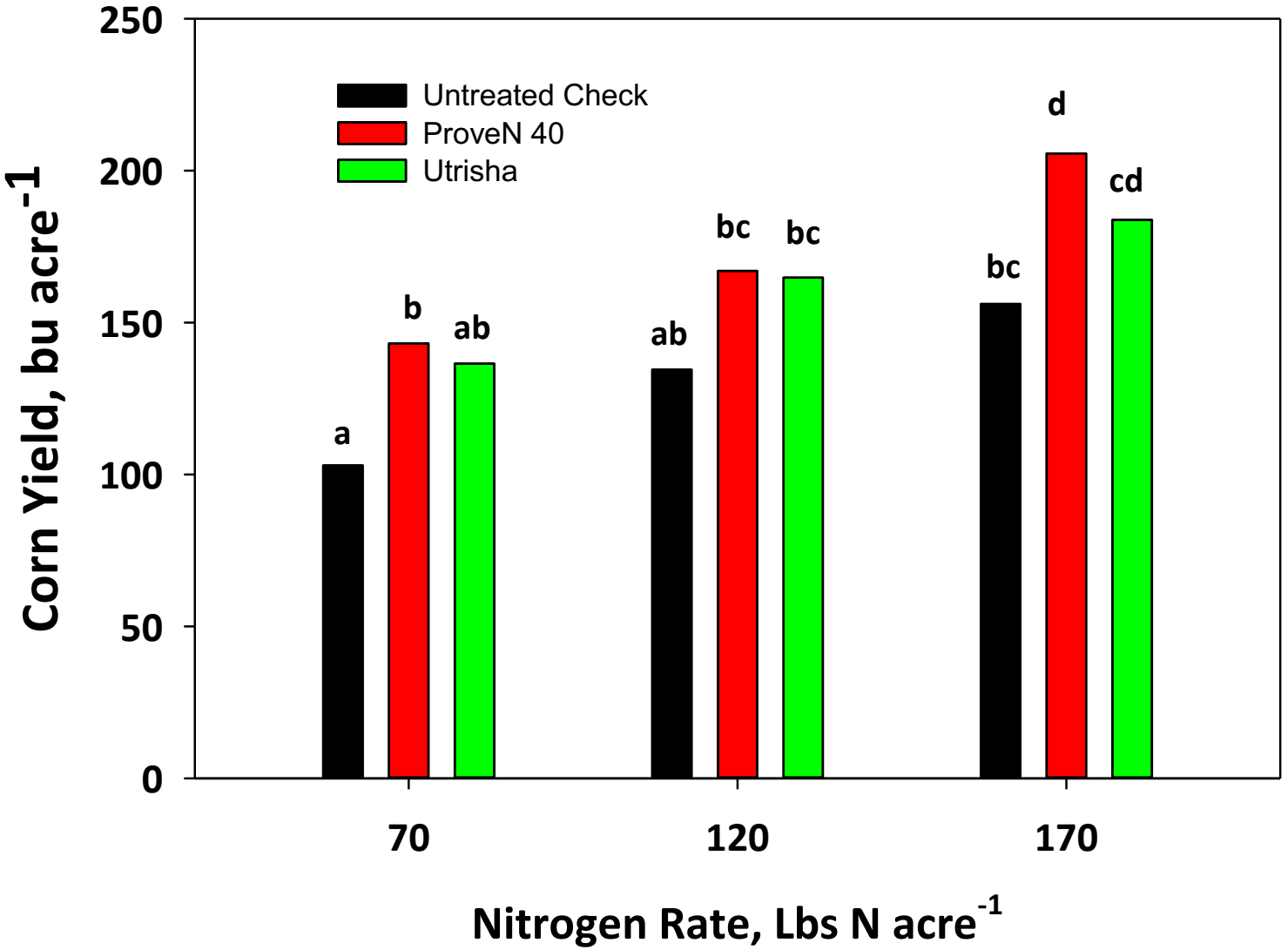
Time Interval	Precipitation, inch
April 1 – 15	0.77
April 16 – 30	1.21
May 1 - 15	0
May 16 - 31	1.34
June 1 - 15	1.27
June 16 - 30	1.38
July 1 - 15	3.52
July 16 - 31	1.21
4 inches was applied through irrigation from 20 June to 31 July	

Tyrrell Co. – Hyde Loam - 2023



Time Interval	Precipitation, inch
April 1 – 15	1.89
April 16 – 30	2.82
May 1 - 15	0.34
May 16 - 31	1.85
June 1 - 15	19.8
June 16 - 30	0.78
July 1 - 15	4.34
July 16 - 31	1.89

Yield Response to Biological N Fixing Materials Surry County – 2023



Tips to Using Biological N Fixation

- HANDLE WITH CARE –
  - Proven OS – Use seed within 60 d of treating, store in cool conditions
  - ProveN IF – Do not mix with fungicides, make sure to ask before applying in tank mix
  - Utrisha – Use material the same day it is mixed, store in cool environment

- Reduce your N rate by 23 to 25%. The purpose is to supply Nitrogen NOT INCREASE OPTIMUM YIELD!

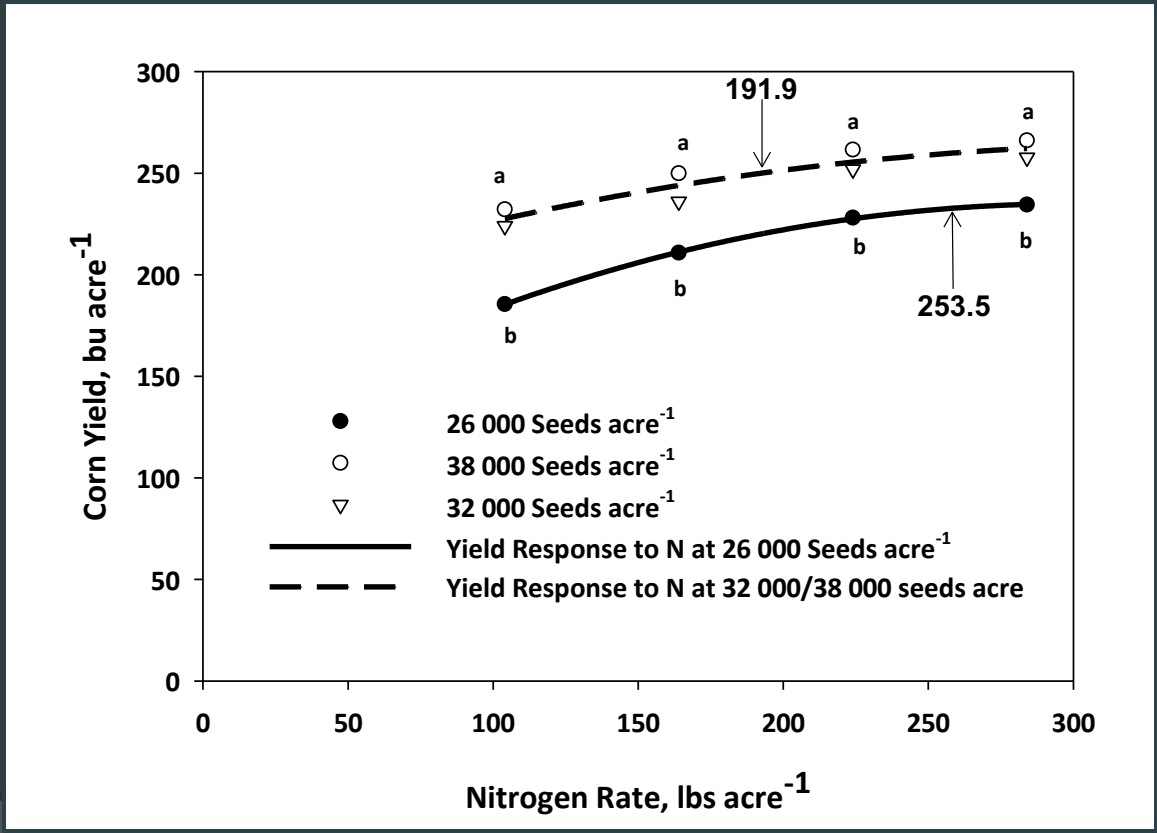
- These materials fix N at later stages of crop growth from V10 through R5. Do not rely on them to supply N from planting to V10.

- Soil moisture is critical for ProveN or Proven OS to work properly. Dry soil during the period from V10 to R1 will limit the performance of this product.

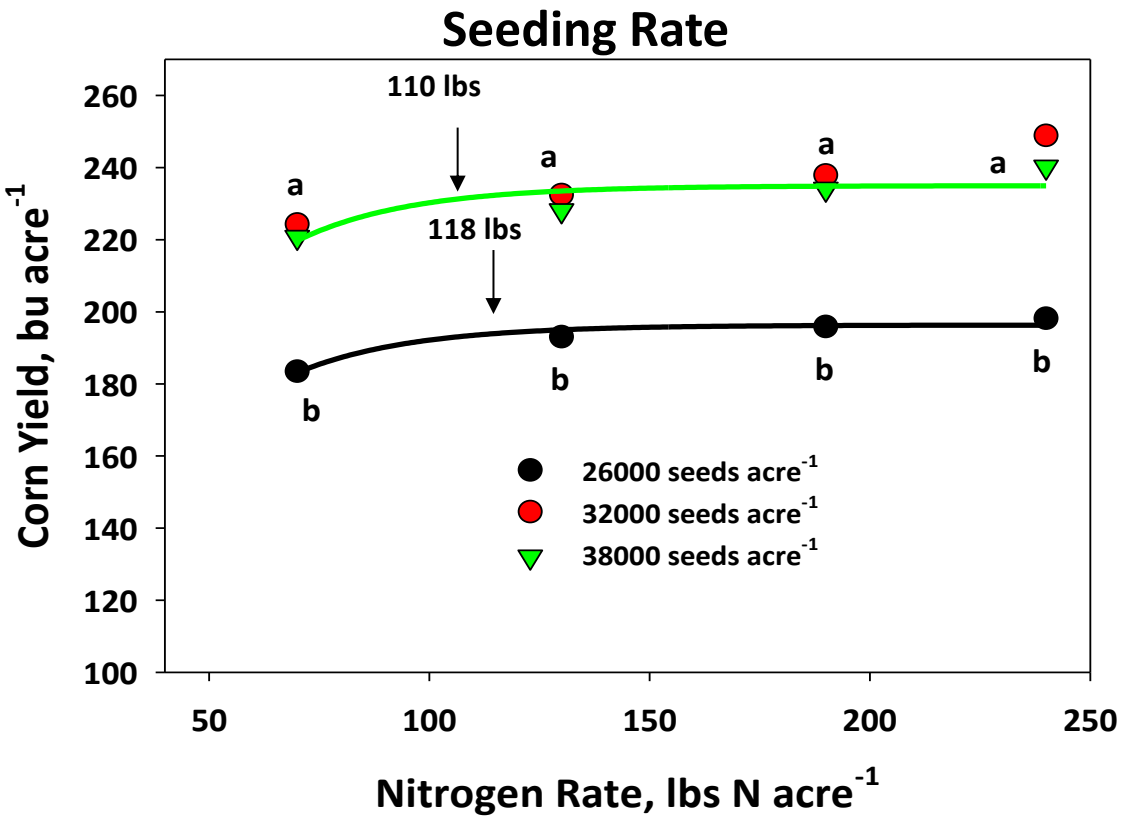
- These materials have the capability to cover the crop N needs during grain fill resulting in an increase in kernel weight and grain yield.

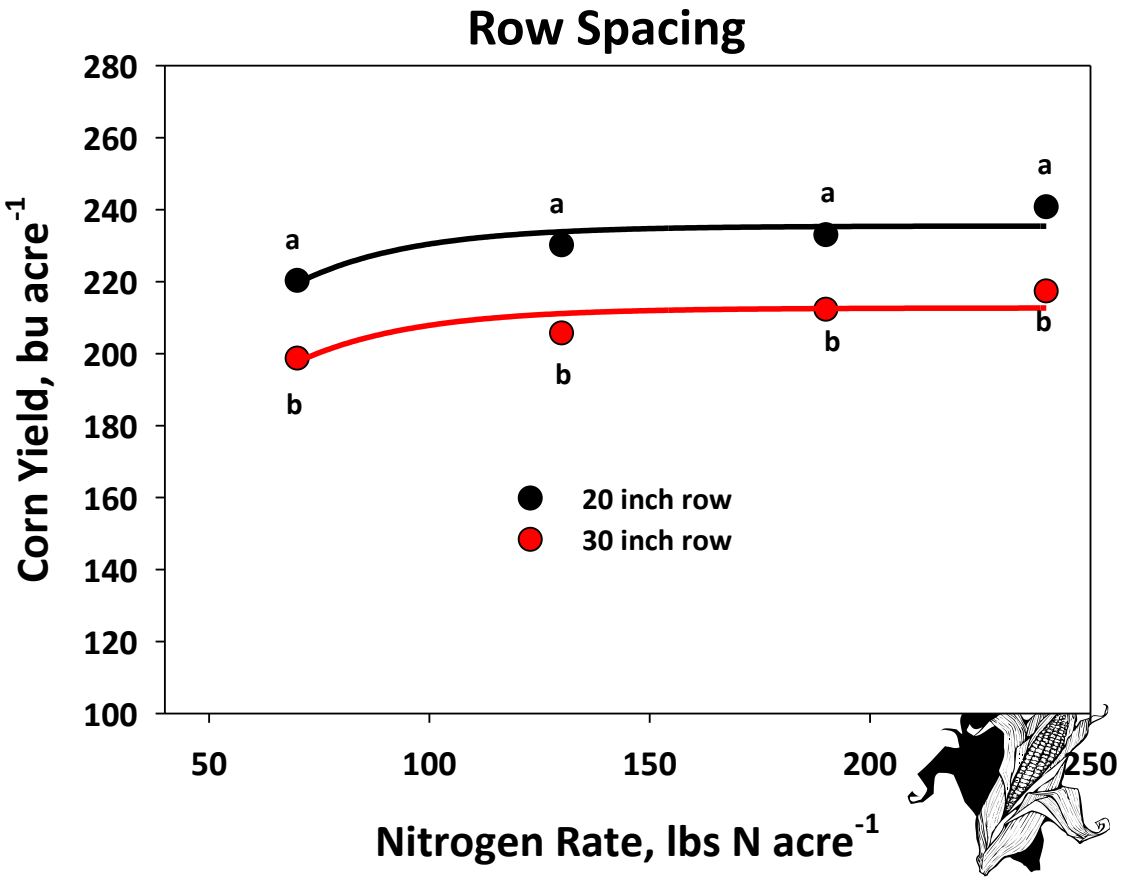
Other Methods of Increasing Nutrient Use Efficiency

- Managing to Improve Nutrient Uptake by the Roots

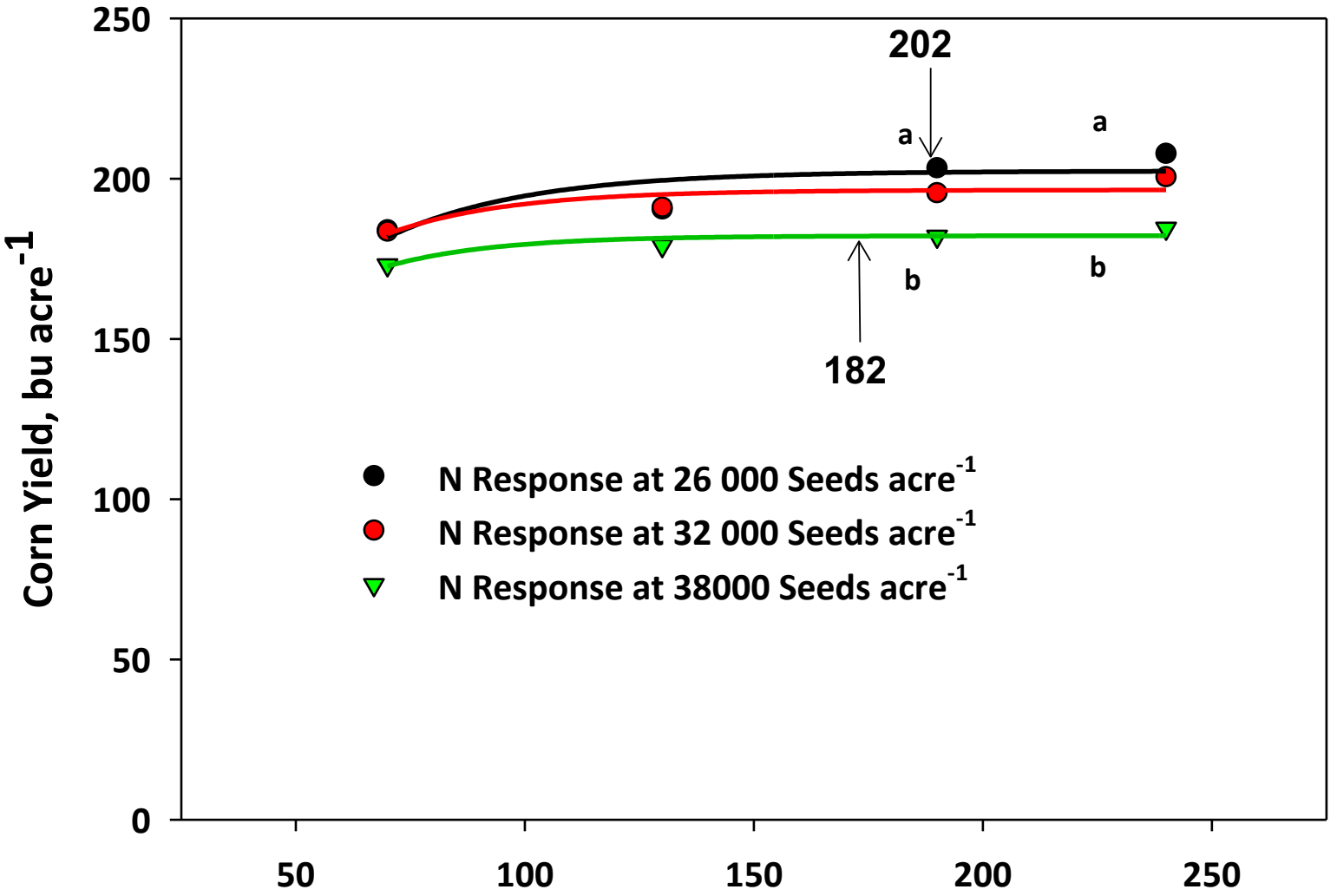


Impact of Seeding Rate and Row Spacing on Nitrogen Uptake – Pasquotank County 2023





Impact of Seeding Rate on Optimum N Rate – Wayne County 2023



Golden Rule: Either Place Your Roots Close to Where Your Nutrients are Located OR Place Your Nutrients Where Your Roots are Located

Conclusions

1. Challenges are Great! But Haven't They Always been!
2. It will be the Human Factor that Matters the MOST! – Brilliant minds willing to sacrifice their comforts for humanity!
3. Great Ideas – Hard Work – Understanding the little things in Nature! That will be what makes the difference between success and failure.
4. What will future generations say about what they inherit from YOU!

Questions

Romans 5:3-5 "Not only so, but we also glory in our sufferings, because we know that suffering produces perseverance; perseverance, character; and character, hope. And hope will not disappoint us …..