4R Plant Nutrition:

- Right Source
- Right Rate
- Right Time
- Right Place

High Yielding Corn: Nitrogen and Best Management Practices

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Farmers ask: Do I need more/less fertilizer?

When do I need to apply?

Is Product A better than B?

Is Method A better than B?

Will it pay?

What would you do if you were me?





Plot Locations (2010-2013) Spatial and Temporal Analyses







2010 Plot Averages by Nitrogen Timing

No post tassel nitrogen	Nitrogen applied brown silk		
19 Plots	21 plots		
Avg Yield 217 bu/acre	Avg Yield 248 bu/acre		
Low yield: 170 bu/acre	Low yield: 183 bu/acre		
High yield: 269 bu/acre	High yield: 302 bu/acre		
3 plots over 240+ bu/acre	14 plots over 240+ bu/acre		

Nitrogen Effectiveness by Timing 1998 – 2007 TX & OK Hi-Plains

N Application Timing	75%+ Total N as Pre-Plant	75%+ Total N as In- Season
Avg Yield	207.7	215.9
Avg #N Used/A	247	192
N Use/Bushel	1.19	0.86

In-Season N 28% more efficient than preplant

Source: Better Harvest Inc., Dumas, TX



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🙈. PIONEER.

Table 1. Nitrogen uptake timing and quantities for old and new hybrids.

Era of hybrid release	N at R1	N at R6	Post- flowering N uptake	Increase in post-flower- ing N uptake	
		lbs N /	acre	%	
Old (1940 to 1990)†	102	145	43	280/	
New (1991 - 2011)	97	152	55	28%	
Old (1970)‡	125	162	37	400/	
New (2000)	125	177	52	40%	
† Ciampitti and Vyn,	‡ Haeg	gele et al., 201	3		



Nitrogen Uptake During Grain Fill



Newer hybrids take up additional N post-flowering compared to older hybrids

Center Pivot applied UAN post tassel



Photo by Alyssa Abbott, DuPont/Pioneer Account Manager; NE Illinois



Pivot Applied UAN Post Tassel

Photo by Alyssa Abbott, DuPont/Pioneer Account Manager; NE Illinois



Photo by Alyssa Abbot, DuPont/Pioneer Account Manager; NE IL

OlbsN

Photo by Alyssa Abbott, DuPont/Pioneer Account Manager; NE IL





Power of Proactive N Management Momence 2015

P1417AMX | 268# Total N Fertigation: 60# @ V6 | 60# @ V12 | 40# @ R1 P1417AMX | 168# N Fertigation: 60# @ V6



P1197AM | 268# Total N Fertigation: 60# @ V6 | 60# @ V12 | 40# @ R1 Photo by Alyssa Abbott; DuPont Pioneer Account Manager P1197AM | 168# N Fertigation: 60# @ V6



2015 Pivot Trial Momence, IL





B. **PIONEER**.

2013 Top 10 Highest Average Plots Texas & Oklahoma Panhandles

Location	Avg Yield	Plant Date	GPM/acre	Tillage	Starter	Miticide Pre-Tassel	Post Tassel Nitrogen
Sherman Co	285.2	5-17-13	5.5	ST	Y	Y	Y
Hansford Co	284.5	5-4-13	6.0	ST	Y	Y	Y
Hansford Co	282.2	5-10-13	5.3	ST	Y	Y	Y
Moore Co	281.4	4-30-13	6.0	ST	Y	Ν	Ν
Texas Co	280.9	5-17-13	5.6	ST	Y	Y	Y
Ochiltree Co	275.0	5-17-13	6.0	ST	Y	Y	Y
Sherman Co	267.2	5-13-13	5.4	ST	Ν	Y	Y
Moore Co	265.4	4-29-13	5.0	ST	Y	Y	Y
Texas Co	263.4	5-13-13	6.0	NT	Y	Y	Y
Hansford Co	262.7	5-22-13	4.5	ST	Y	Y	Y



Strip-Tilled & Fertilized







Starter Effects on Corn Yield (bu/a) 3-Year Avg

Starter	In-furrow	2x2	Surface Band	Row Band
			2X0	Broadcast
5-15-5	172	194	190	179
15-15-5	177	197	198	180
30-15-5	174	216	212	192
45-15-5	171	215	213	195
60-15-5	163	214	213	201
Average	171	207	205	189

Dr. Barney Gordon, Kansas State University



Positional Availability





Corn Ear Development



Girth (rows around) is determined by 8-leaf stage so ear girth can be affected by early moisture stress & nutrient deficiency



Starter Fertilizer @ V6





Dual Starter Placement Utilize best of In-Furrow Technology





Dual Starter Placement Utilize best of In-Furrow Technology





2x0 Surface Band





12 row coulter rig for side dressing 32-0-0 UAN in strip-till

Sidedress UAN with coulter rig in heavy residue with wet soil. No pre herbicide movement, no fertilizer burn.

Sidedress anhy burn due to wet soil. Pre herbicide barrier disturbed by shank.

Adjusting N Rate in Season



- Ear size estimate @ R1 Plant Pop in 1/1000 acre
- Use Factor to Estimate Yield (girth x length x pop) x Specific Hybrid Factor
- Evaluate Plant Health, Subsoil Moisture, Extended Forecast
 - + or N amount post tassel based on new goal

Adjusting N Rate in Season



- Ear size estimate (2014) (17x40x36)x.0118=288
- Potential yield was 285 to 290. 150 lbs on 7-25
- Post-tassel N application increased from 50 to 90 units of N/acre









- Final ear size was 17by-40 average
- 288 estimate
- 285 bu/a was final yield 2014
 - .84 lbs applied N/bu



FOUR KEY INPUTS HELP ADVANTAGE THE ENCIRCA SERVICES NITROGEN MODEL











EVOLVE.

EncircaSM services provide estimates and management suggestions based on statistical and agronomic models. Encirca services are not a substitute for sound agronomic and management practices. Individual results may vary and are subject to a variety of factors, including weather, disease and pest pressure, soil type, and management practices.





P1197AM

150# N + 0# P preplant band Soil test 96 ppm on P₂O₅ (manure)

10 gal starter per acre 2x0 (APP + 28-0-0-5)

3) 50# N 32-0-0 at V6

4) 100# N 32-0-0 beginning R2



3 pints Comite per acre by air at V14

6.8 oz Aproach Prima at R3

July Yield Estimate (19x40x34K) (.0118) = 305 bu/acre

2015 yield: 300 bu





A Special "Thank You" to my Colleague

Alyssa Abbott - DuPont Pioneer