# High Yielding Corn: Implementing Research and Adapting for Profitability

## Fluid Fertilizer Forum

## February 16, 2015

**4R Plant Nutrition:**

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

**Russell French, CCA**
**Account Manager**
**Amarillo, TX**
**DuPont Pioneer**

**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?***

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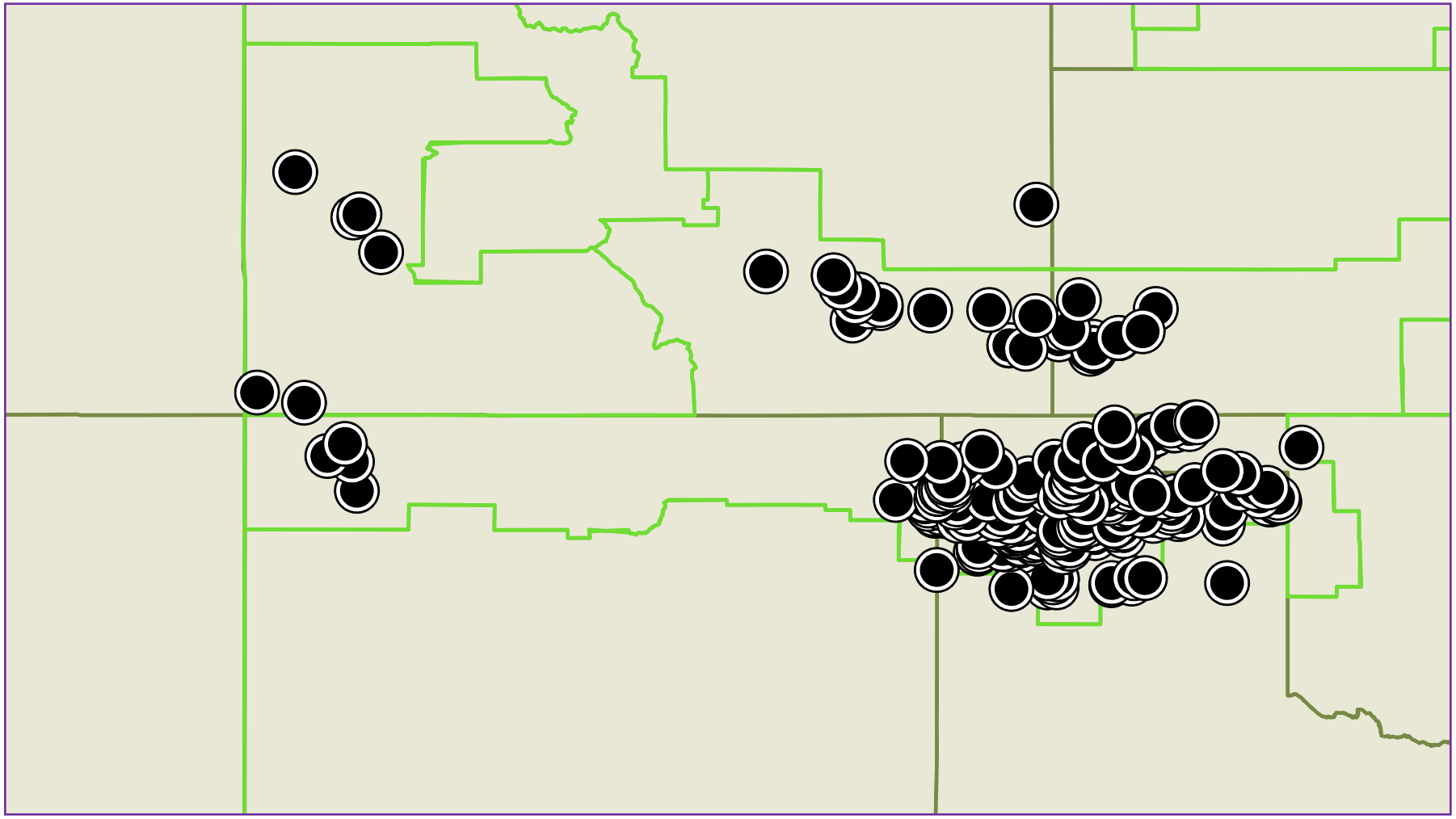
# Plot Locations (2010-2013)
# Spatial and Temporal Analyses



# Irrigation Capacity Impact on Yield

| Irr Capacity GPM/A | Predicted Yield | 2011 Yield | 2012 Yield | 2013 Yield |
|---|---|---|---|---|
| 3.0 - 3.9 | 120-160 | 75 | 140 | 170 |
| 4.0 - 4.4 | 160-180 | 120 | 180 | 205 |
| 4.5 – 4.9 | 190-220 | 177 | 221 | 240 |
| 5.0 - 5.5 | 230-250 | 223 | 238 | 254 |
| 5.6 - 5.9 | 250-270 | 234 | 265 | 262 |
| 6.0+ | 270+ | 242 | 265 | 270 |

# 2010 Plot Averages by Nitrogen Timing

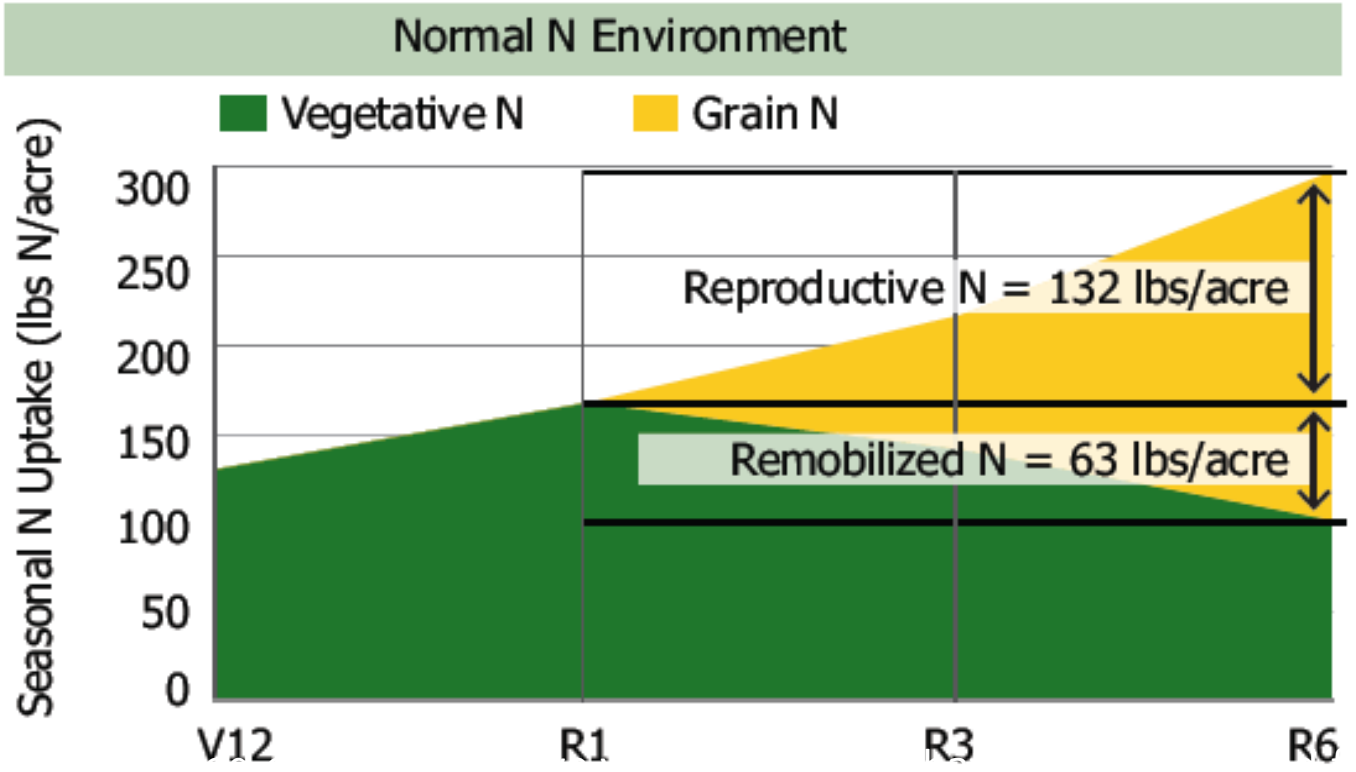
| No post tassel nitrogen<br>*19 Plots* | Nitrogen applied brown silk<br>*21 plots* |
|---|---|
| Avg Yield 217 bu/acre | Avg Yield 248 bu/acre |
| Low yield: 170 bu/acre<br>High yield: 269 bu/acre | Low yield: 183 bu/acre<br>High yield: 302 bu/acre |
| 3 plots over 240+ bu/acre | 14 plots over 240+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

**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-flowering N uptake |
|---|---|---|---|---|
| | - - - - lbs N / acre - - - - | | | % |
| Old (1940 to 1990)† | 102 | 145 | 43 | 28% |
| New (1991 - 2011) | 97 | 152 | 55 | |
| Old (1970)‡ | 125 | 162 | 37 | 40% |
| New (2000) | 125 | 177 | 52 | |

† Ciampitti and Vyn , 2012 ‡ Haegele et al., 2013

# Nitrogen Uptake During Grain Fill




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

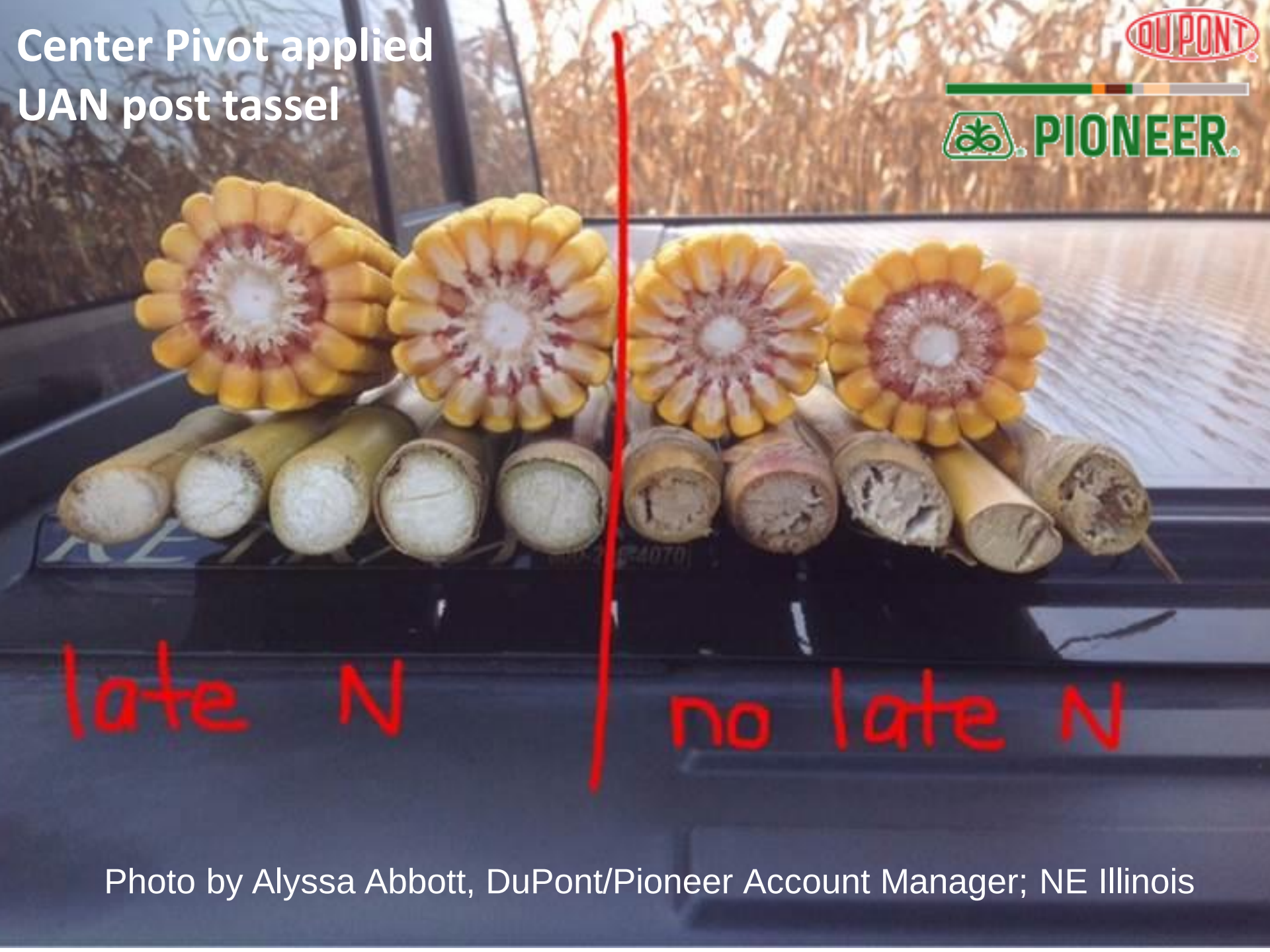



Photo by Alyssa Abbott, DuPont/Pioneer Account Manager; NE Illinois

# Pivot Applied UAN Post Tassel

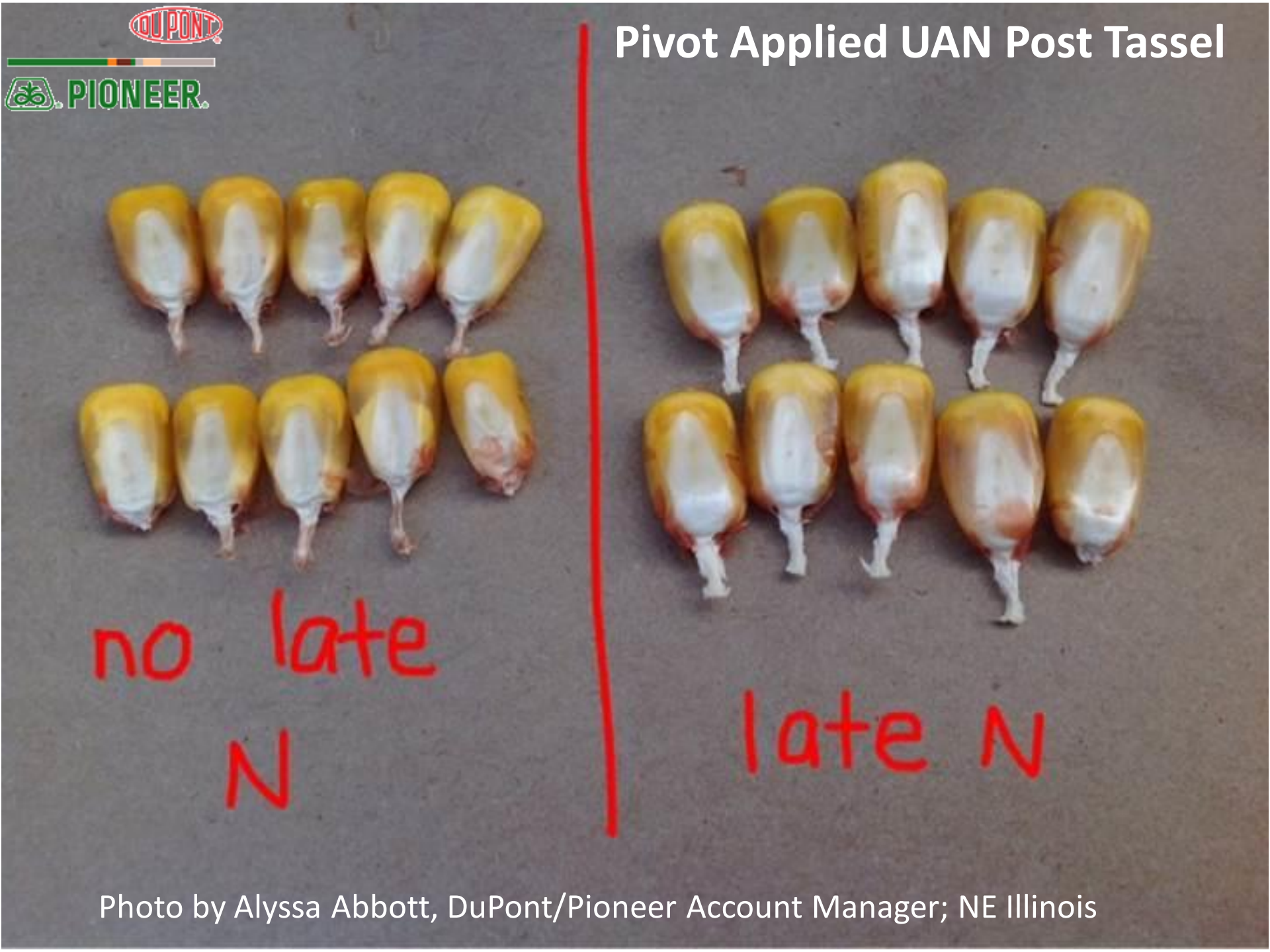



Photo by Alyssa Abbott, DuPont/Pioneer Account Manager; NE Illinois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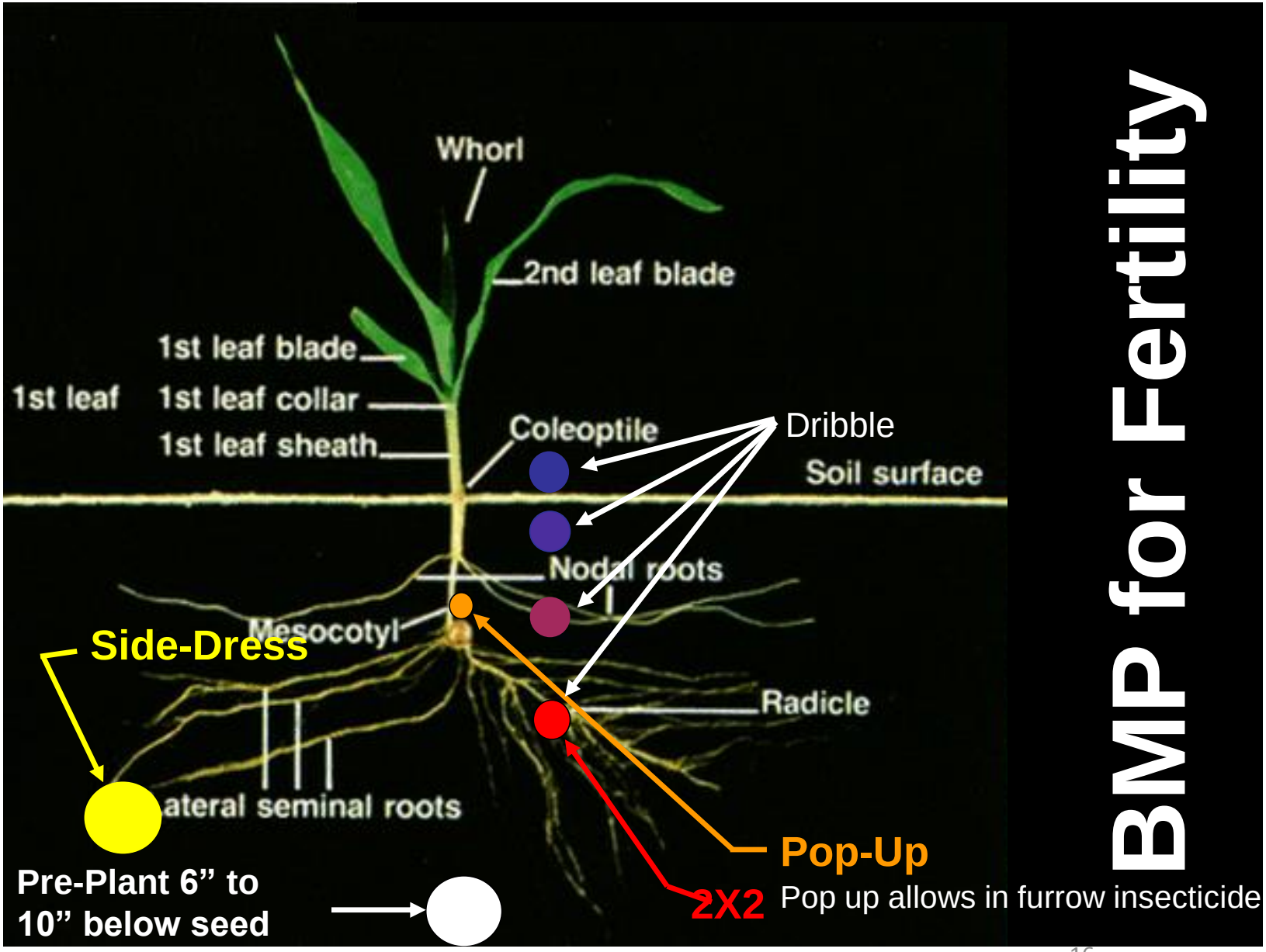
# 2013 Top 10 Highest Average Plots
# Texas & Oklahoma Panhandles

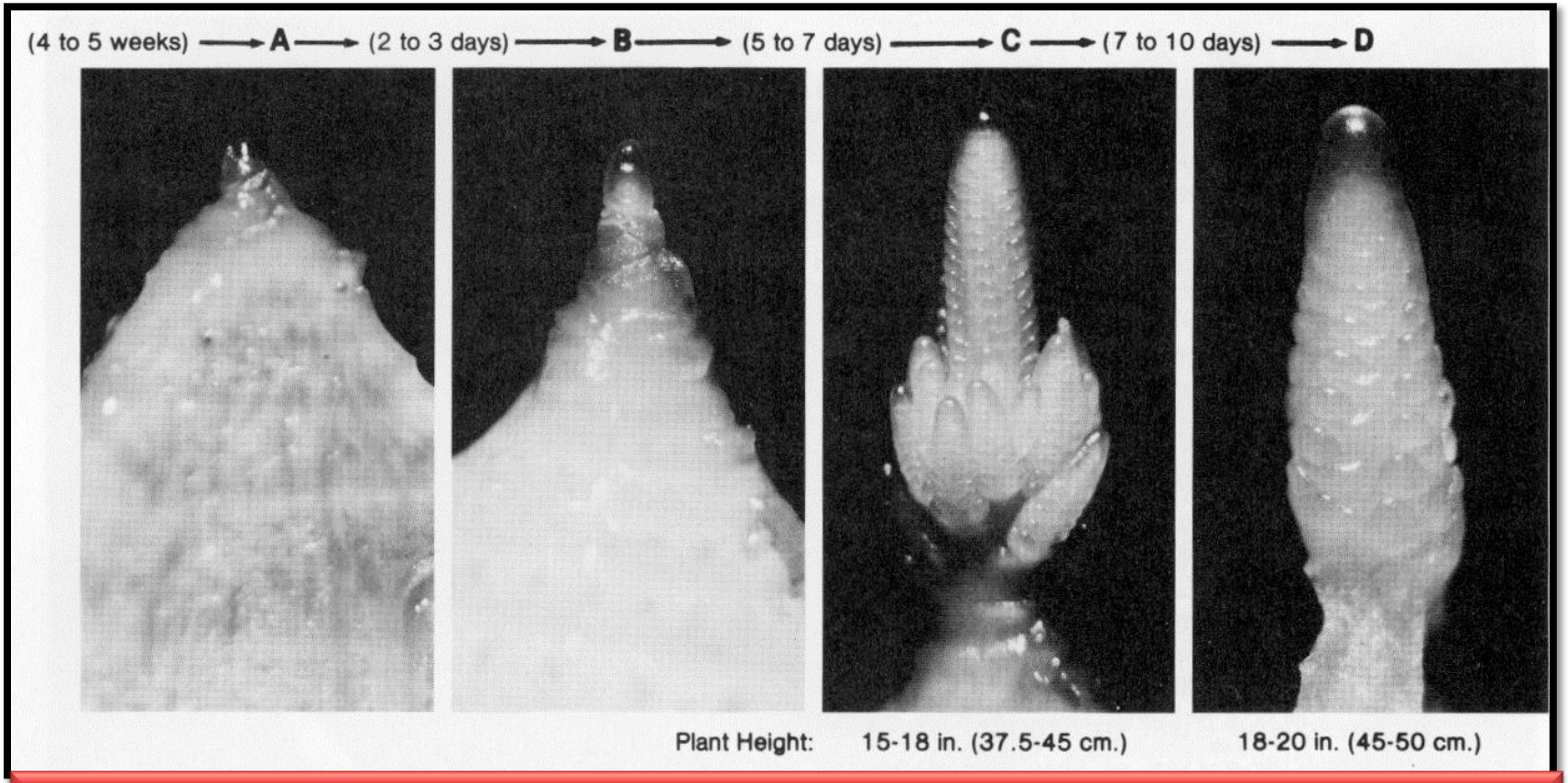
| Location | Avg Yield | Plant Date | GPM/acre | Tillage | Starter | Miticide Pre-Tassel | Post Tassel Nitrogen |
|---|---|---|---|---|---|---|---|
| Sherman Co | 285.2 | 5-17-13 | 5.5 | ST | Y | Y | Y |
| Hansford Co | 284.5 | 5-4-13 | 6.0 | ST | Y | Y | Y |
| Hansford Co | 282.2 | 5-10-13 | 5.3 | ST | Y | Y | Y |
| Moore Co | 281.4 | 4-30-13 | 6.0 | ST | Y | N | N |
| 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 | N | 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


JOHN DEERE
8320


Whorl
2nd leaf blade
1st leaf blade
1st leaf
1st leaf collar
1st leaf sheath
Coleoptile
Dribble
Soil surface
Nodal roots
Mesocotyl
Side-Dress
Radicle
ateral seminal roots
Pop-Up
2X2
Pop up allows in furrow insecticide
Pre-Plant 6" to
10" below seed
BMP for Fertility

# 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

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

| Starter | In-furrow | 2x2 | Surface Band 2X0 | Row Band 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

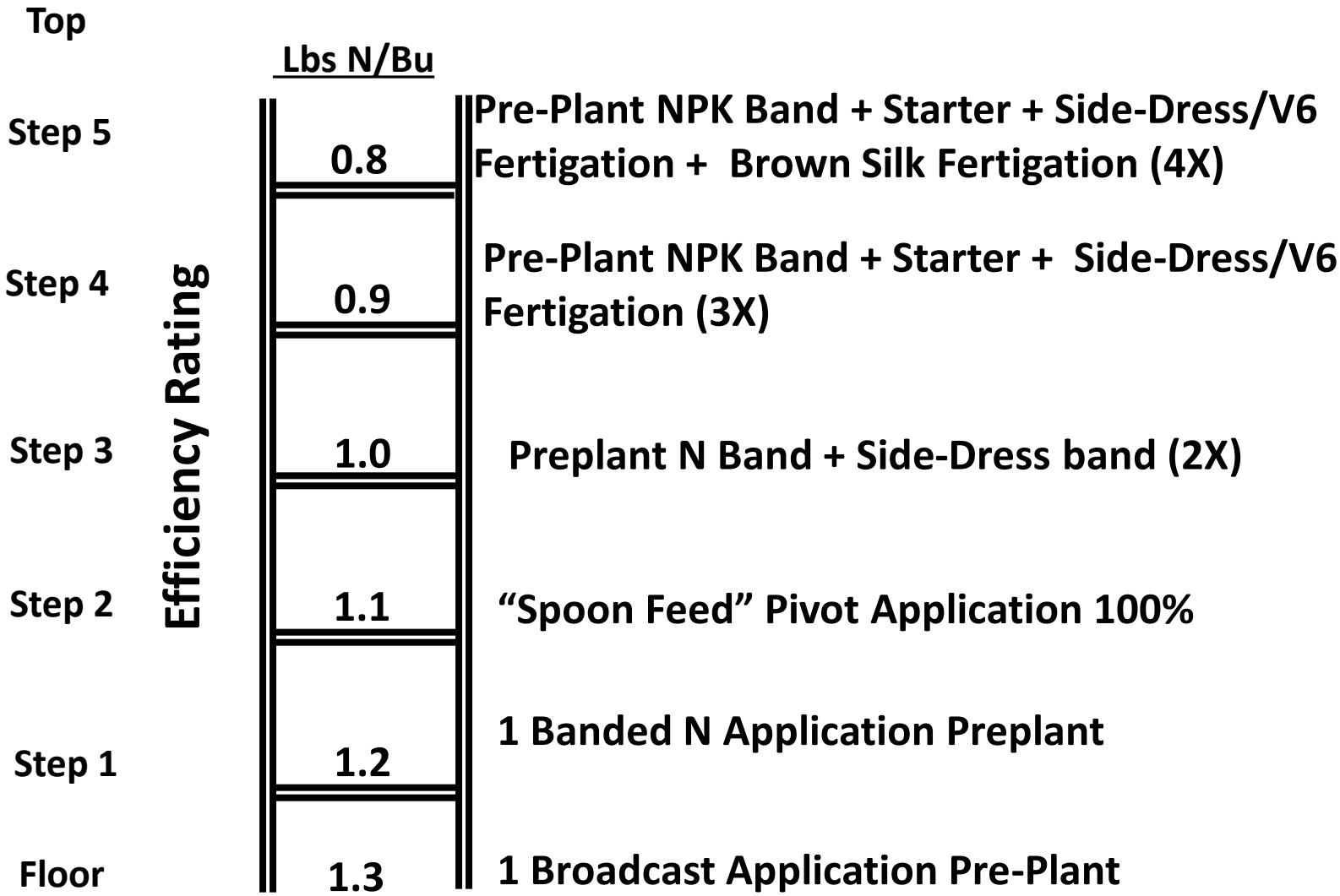

2x0 Surface Band

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.

# Corn Nitrogen Management Ladder

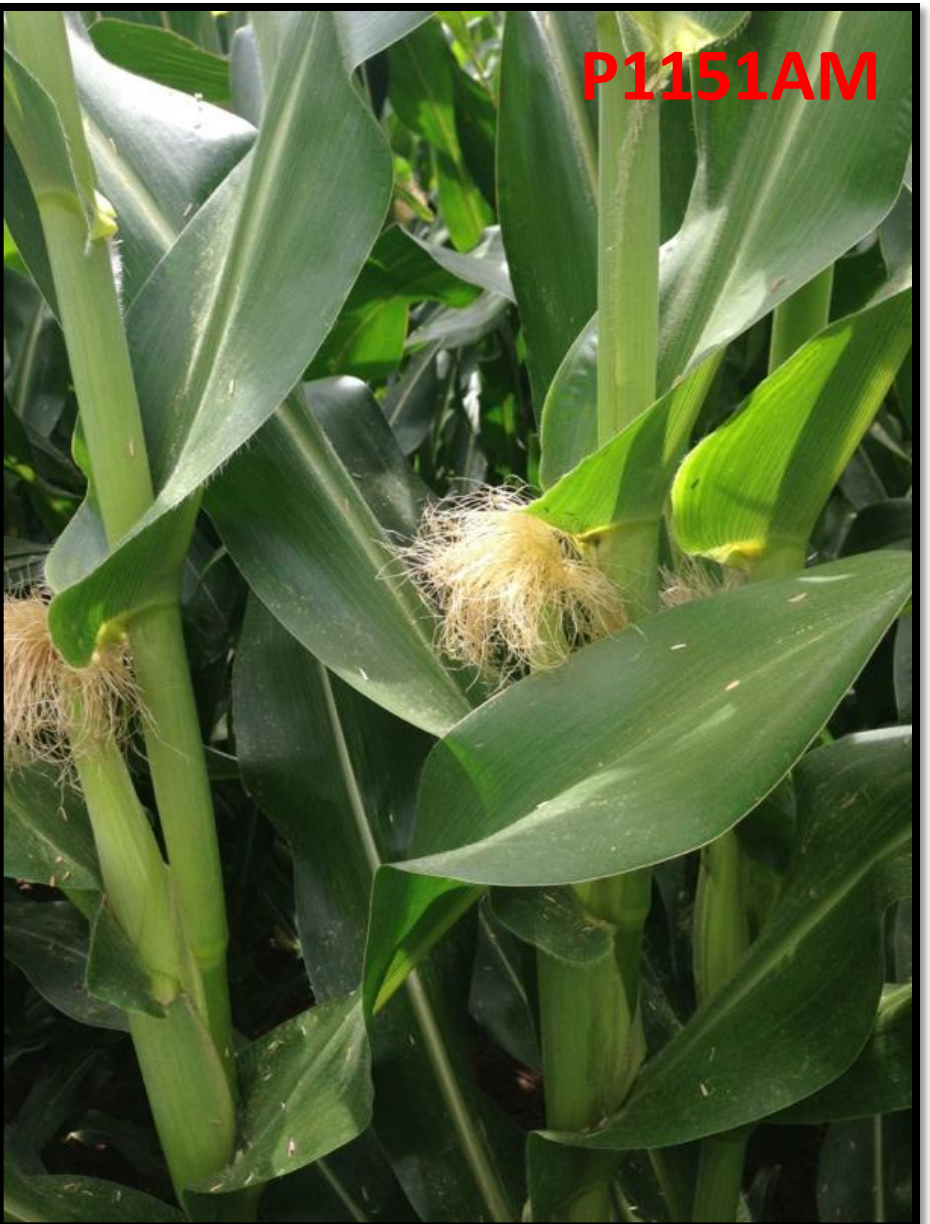


# Moore Co TX N Monitoring Project

- 6000 acres of center pivot irrigated corn
- Yield Goal was 250 bushel/acre
- Extensive Compost & Manure Use
- Pivots soil tested at V4-V6 and V14-VT at 30” depth for $NO_3$ & $NH_4$
- Tissue samples taken at V4-V6 and V14-VT
- Pretassel & Post Tassel N applications adjusted based on test results
- Lower Stalk Nitrate Test run at black layer to 3 weeks after black layer

- ***2013 Results: 6000 acres averaged 253 bushels/acre***

# Adjusting N Rate in Season




- Ear size estimate
- (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


Verizon LTE
3:24 PM
288.864
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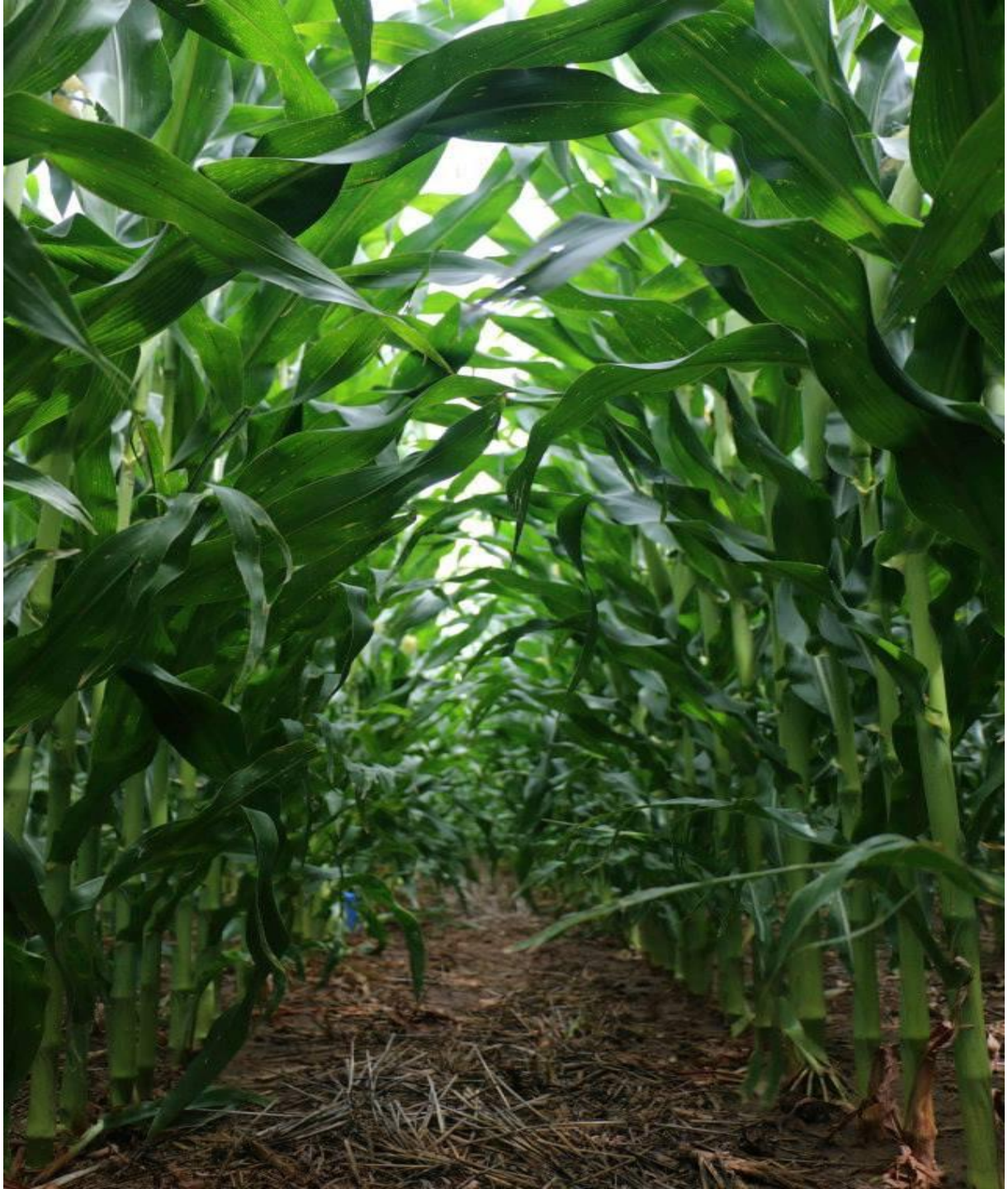
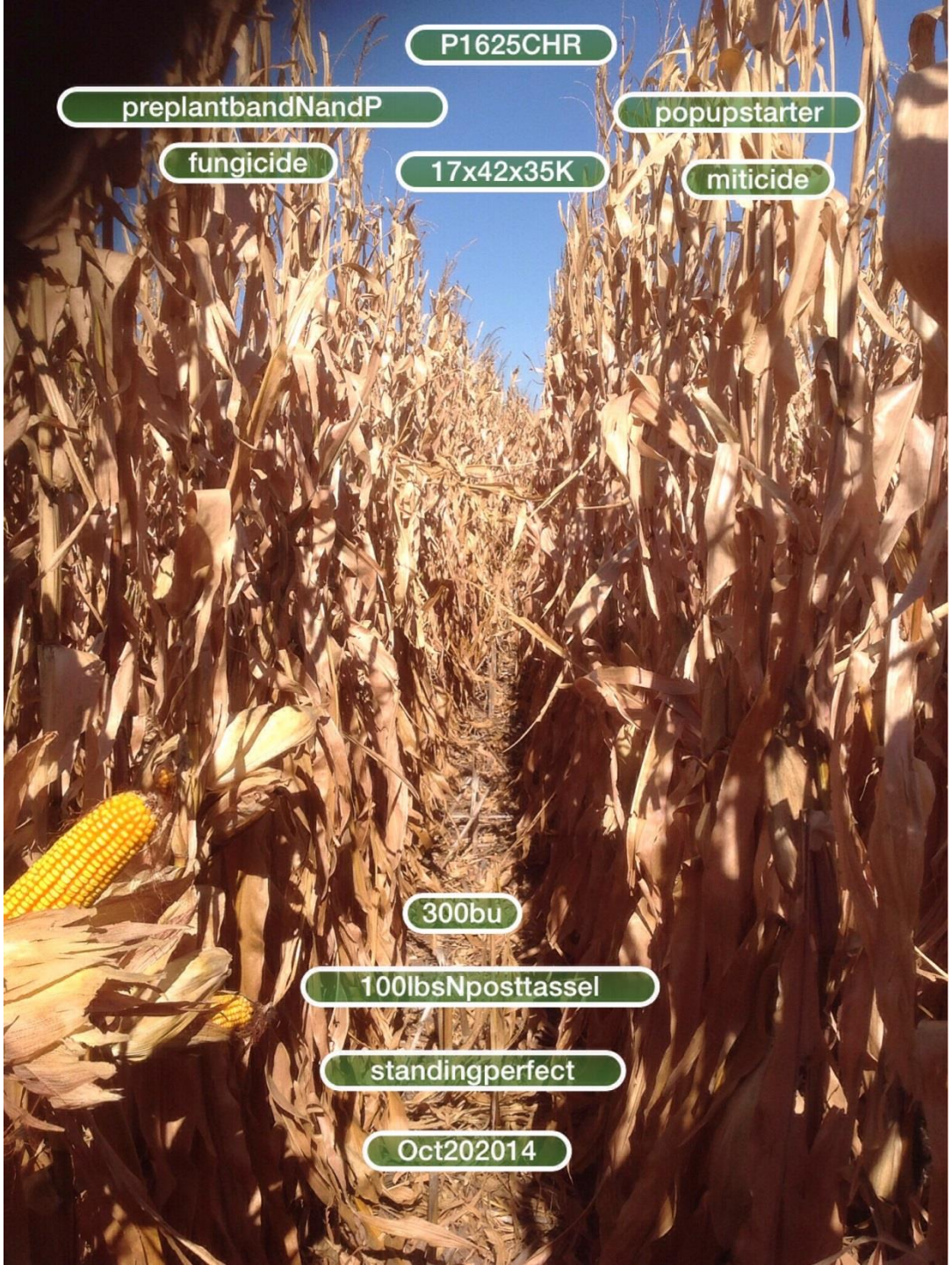



- Final ear size was 17-by-40 average
- 288 estimate
- 285 bu/a was final yield 2014
- .84 lbs applied N/bu


P1625CHR
preplantbandNandP
popupstarter
fungicide
17x42x35K
miticide
300bu
100lbsNposttassel
standingperfect
Oct202014

# KRASNADOR, RUSSIA; Sept 2014 Pioneer Field Day

# Высокоурожайная Кукуруза: Внедрение исследования и адаптация для увеличения прибыльности

## Конференция Денвер 2014

**4П Питания растений:**

- **Правильный источник**
- **Правильная доза**
- **Правильное время**
- **Правильное место**

**Рассел Френч, ССА**
**Amarillo, TX**
**DuPont Pioneer**

DUPONT PIONEER.

# *A Special "Thank You" to my Colleagues*

Dr. Robert Bowling - *DuPont Pioneer*
Alyssa Abbott - *DuPont Pioneer*
Dr. Mike Stewart - *IPNI*