



2014 Research Update

Doing a Little “Data Mining” - Lime & Tile...

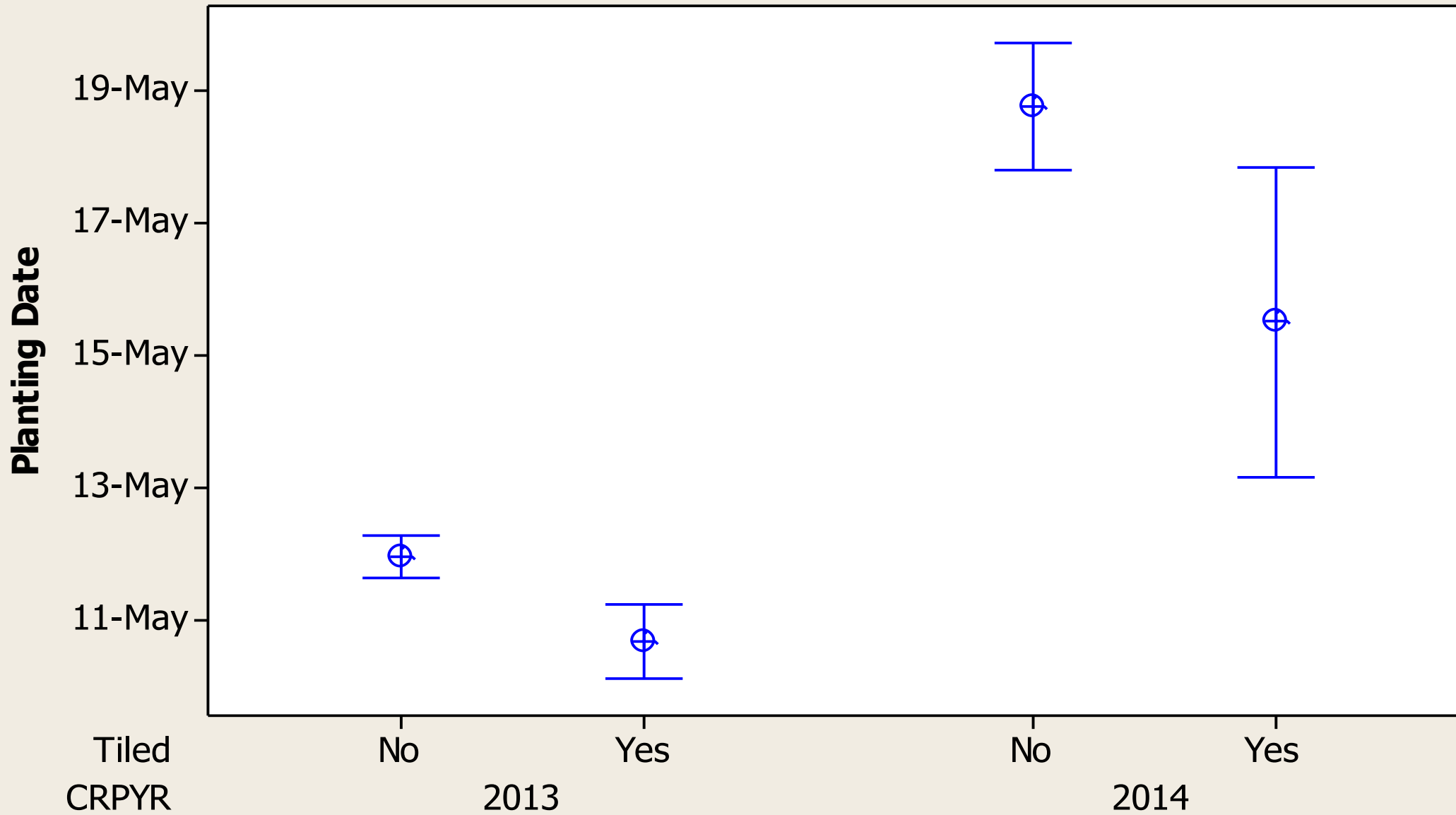


| 2013 | % Tare | % Sugar | % Purity | TPA | RSA |
|-------------------|-------------|-------------|-------------|-------------|---------------|
| No Tile | 3.00 | 16.18 | 88.34 | 25.01 | 6,813 |
| Tile | 3.15 | 16.32 | 88.88 | 25.76 | 7,026 |
| Difference | 0.15 | 0.13 | 0.54 | 0.76 | 213.18 |
| <i>p</i> (0.05): | NS | NS | NS | NS | NS |

| 2014 | % Tare | % Sugar | % Purity | TPA | RSA |
|------------------|--------------|-------------|-------------|-------------|---------------|
| No Tile | 1.72 | 17.03 | 89.13 | 21.30 | 6,135 |
| Tile | 1.63 | 17.43 | 89.16 | 23.59 | 6,937 |
| Difference | -0.09 | 0.40 | 0.02 | 2.29 | 801.26 |
| <i>p</i> (0.05): | NS | ** | NS | ** | ** |

Interval Plot of Planting Date

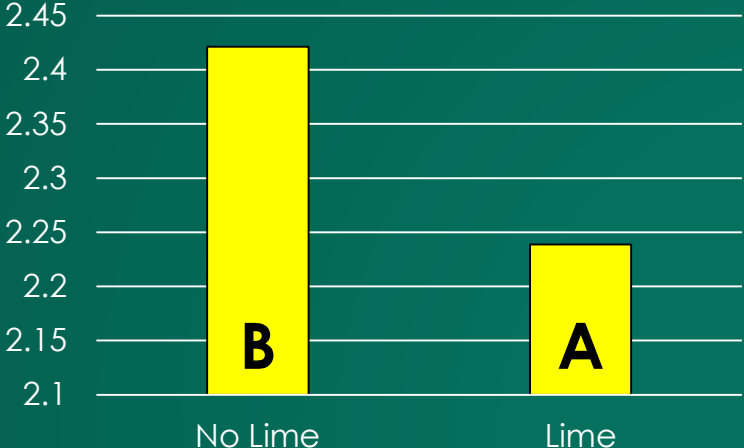
95% CI for the Mean



Keep on Liming!!!



Percent Tare



Percent Sugar

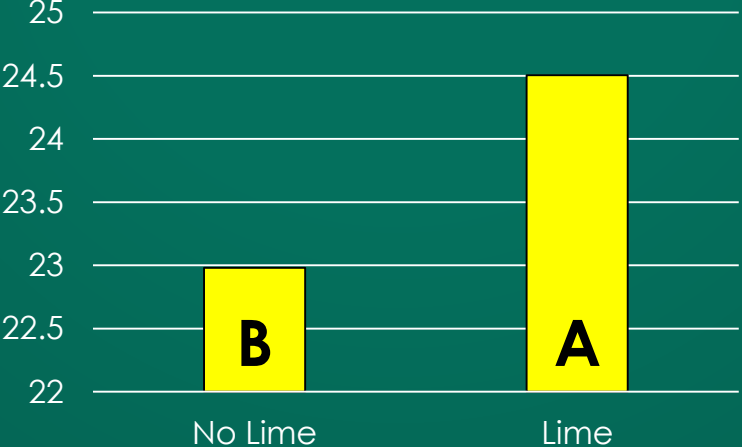


All Tests: p(0.05)

Percent Purity



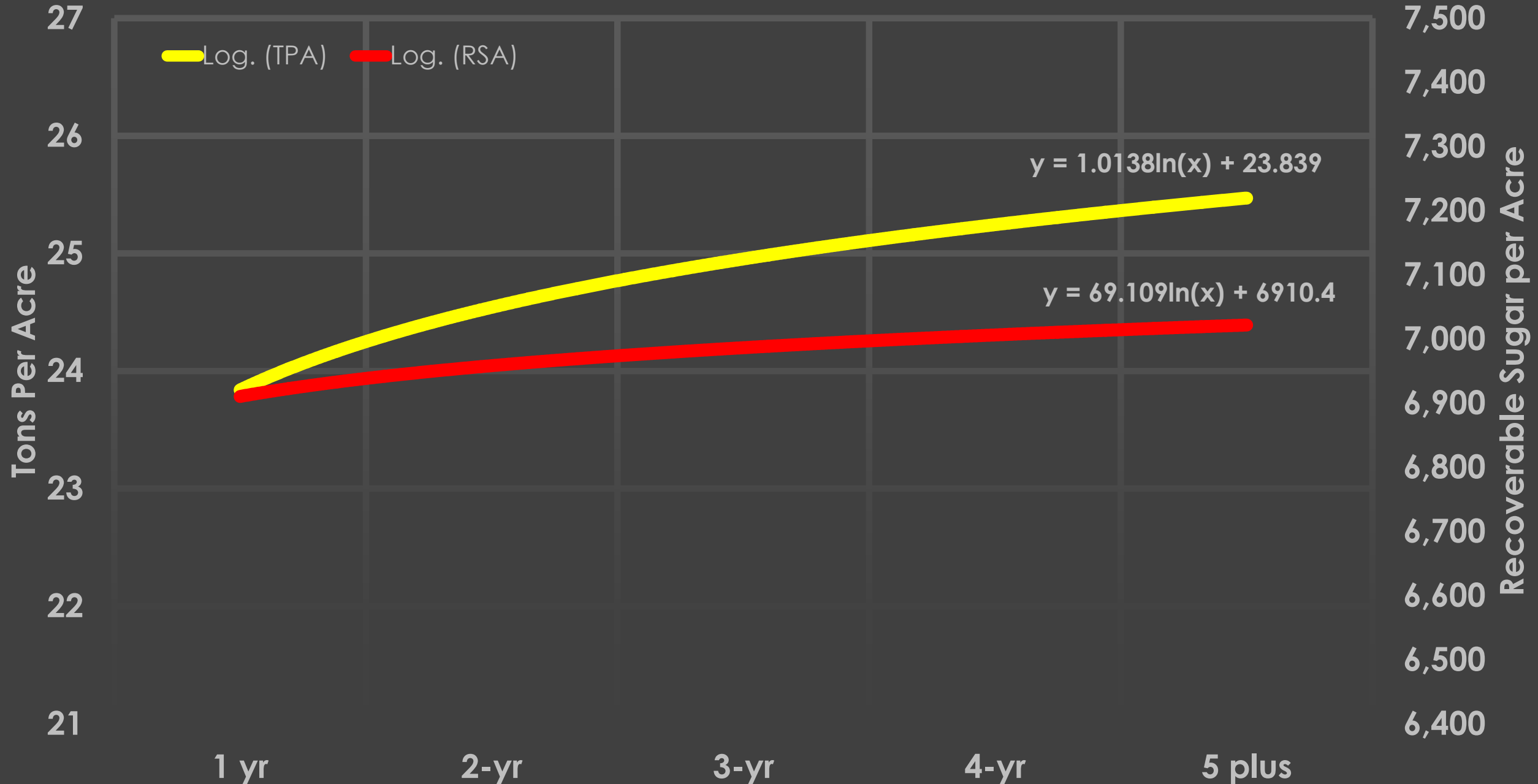
Tons per Acre

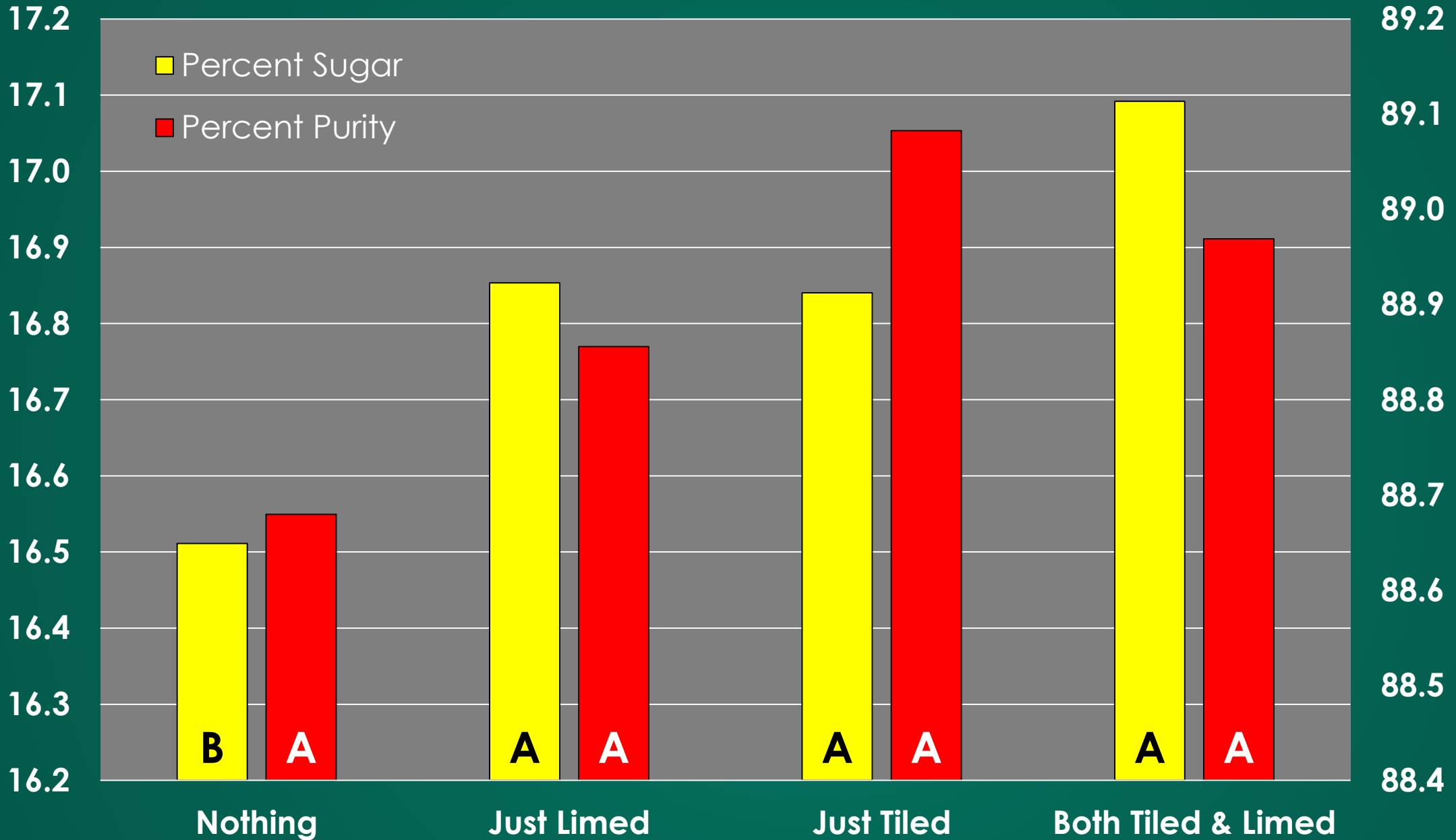


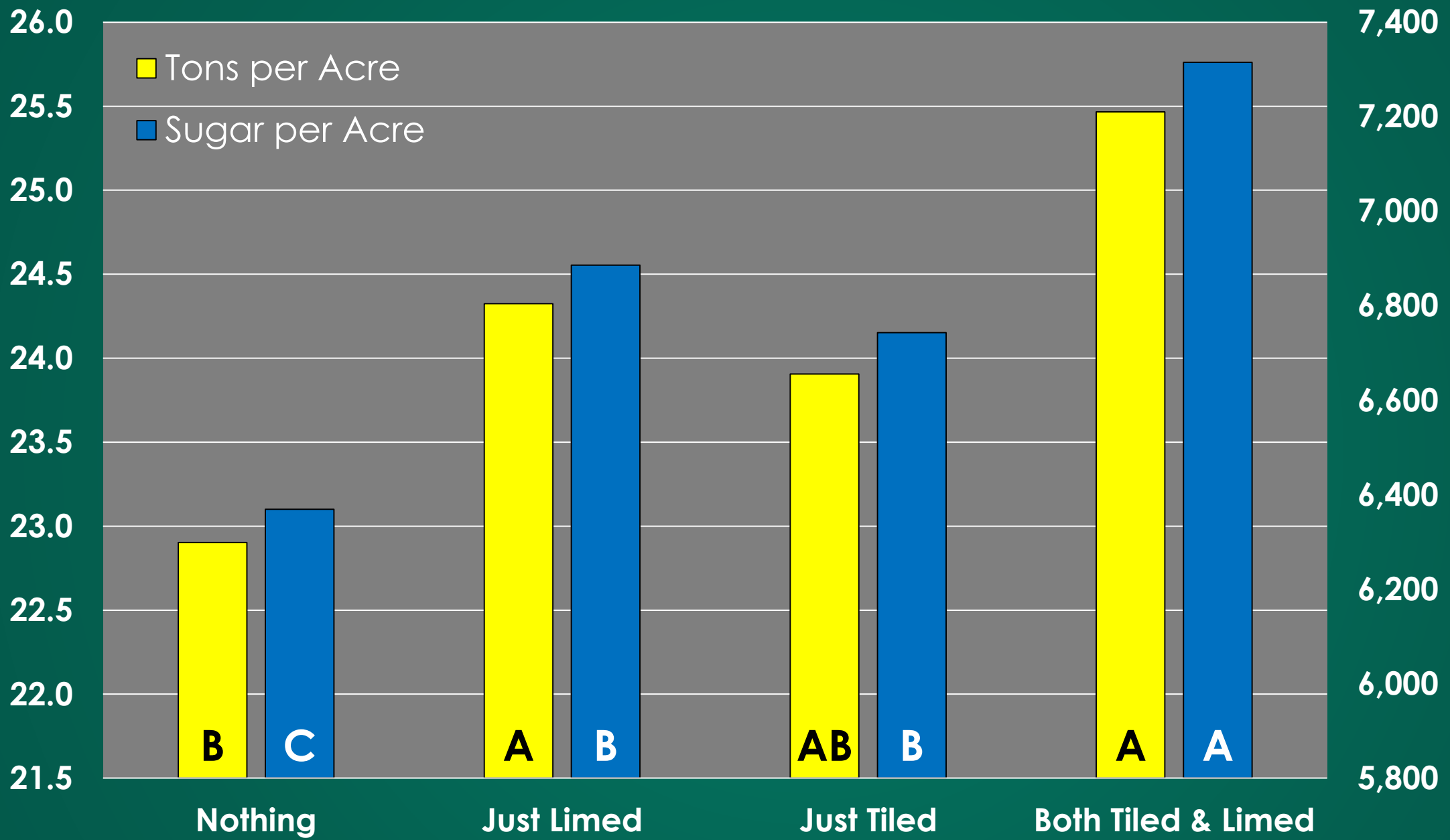
Sugar per Acre



Years After Initial Lime Application







Update on Lime Research...



- Site still located on the Pat Freese Farm just north of Breckenridge
- 2014 was the study's 10th year
- Now What???

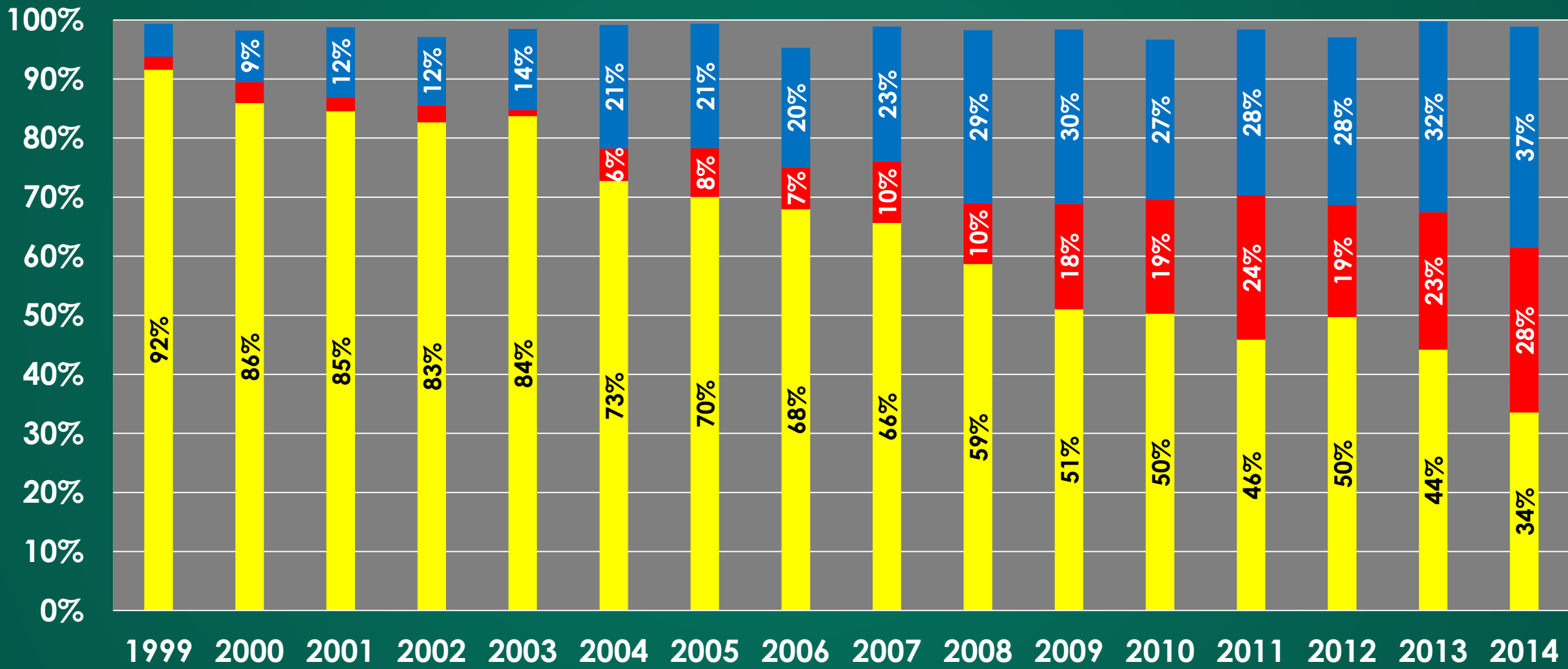
 - U of MN
 - MDFC



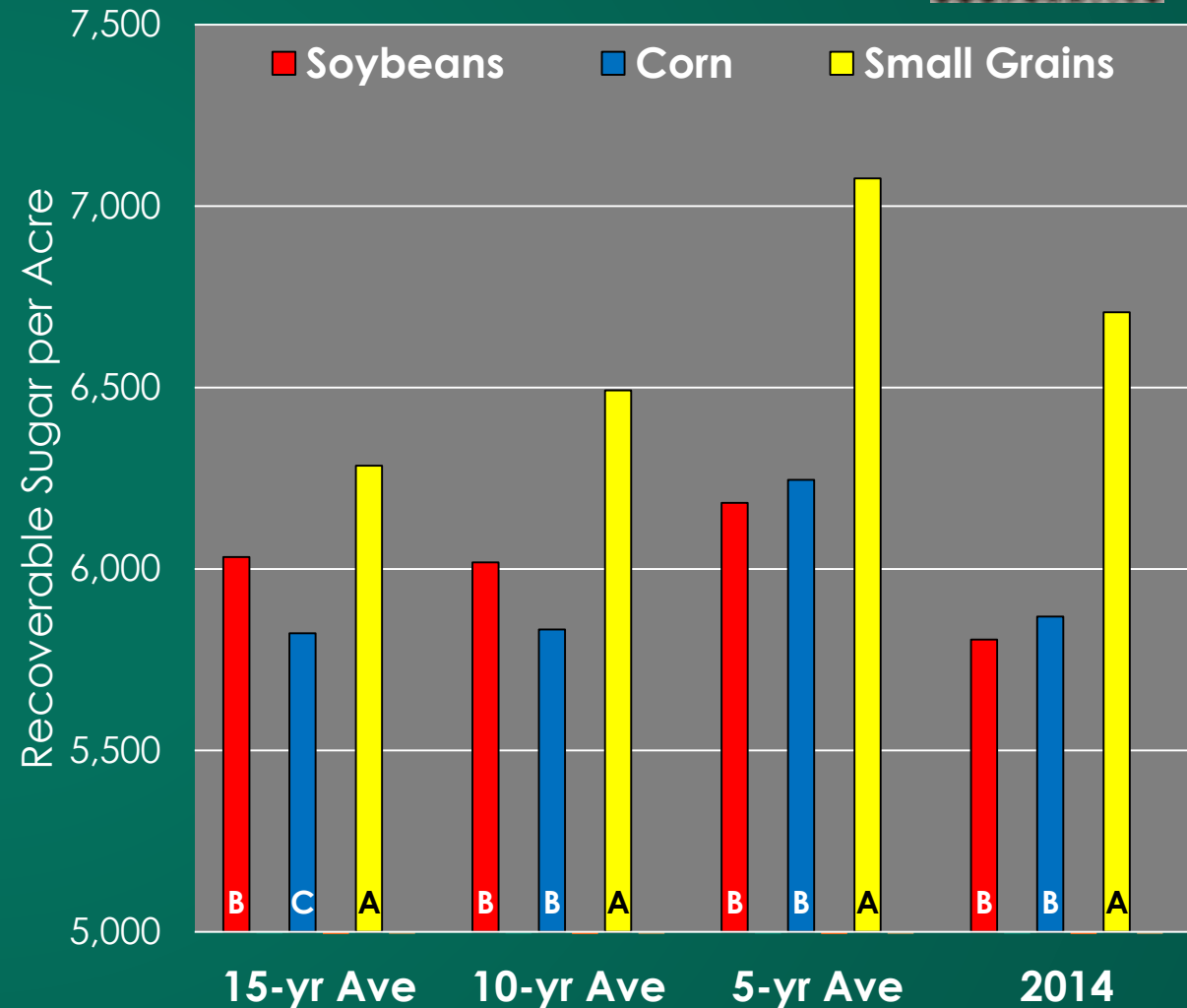
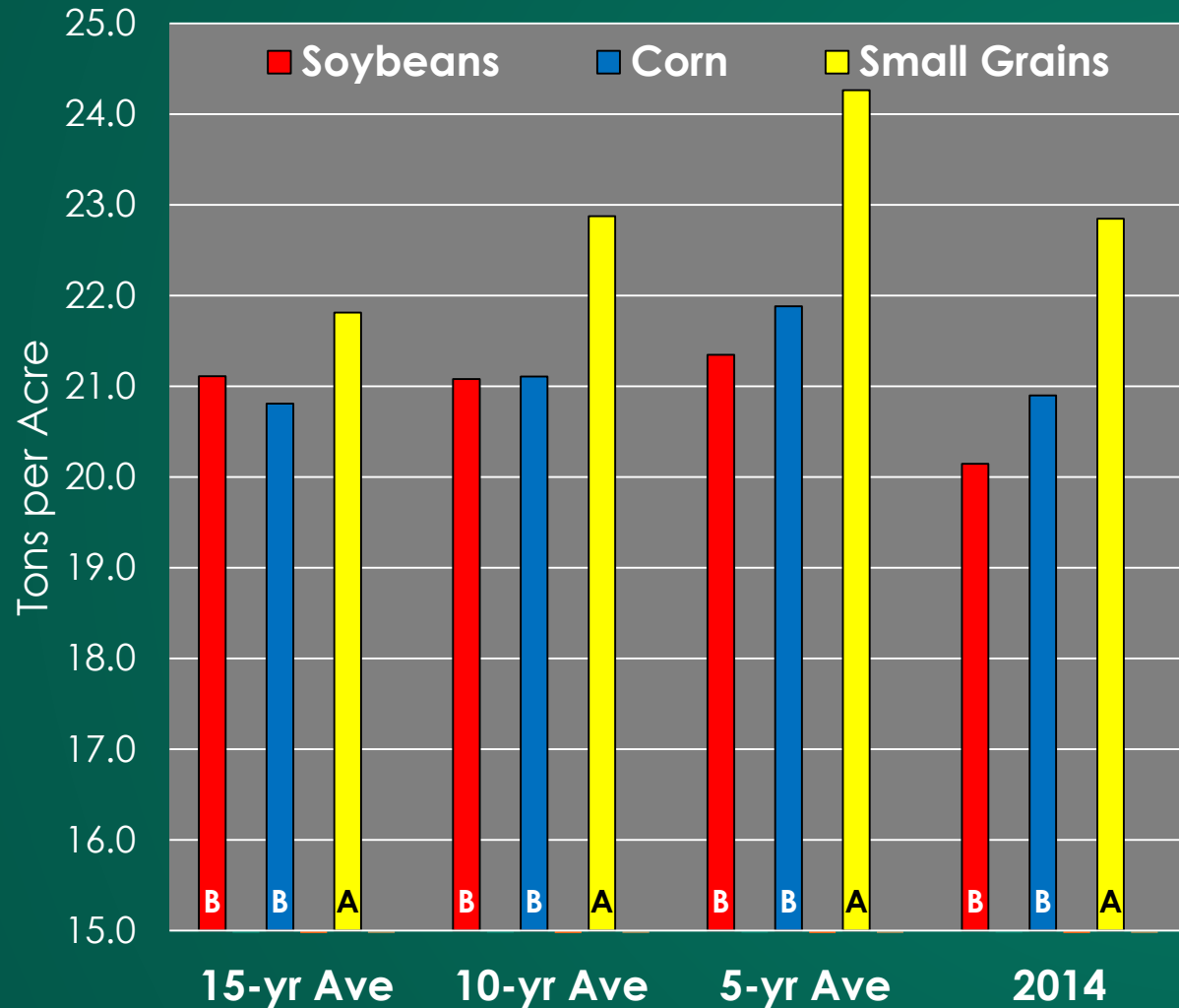
15-yr Previous Crop Data...



■ Small Grains ■ Soybeans ■ Corn



So What's the Impact???



$p(0.05)$



10-Year

Sugar per Acre

Lost Revenue per Acre

Small Grains

6,492

Soybeans

6,018

- \$84.93

Corn

5,833

- \$118.11



10-Year

Tons per Acre

Sugar per Acre

Small Grains

24.2

8,107

Soybeans

23.0

7,613

Corn

22.7

7,423



5-Year

Sugar per Acre

Lost Revenue per Acre

Small Grains

7,076

Corn

6,245

- \$161.90

Soybeans

6,182

- \$174.29



5-Year

Tons per Acre

Sugar per Acre

Small Grains

25.0

8,450

Corn

23.3

7,666

Soybeans

23.0

7,659



2014

Sugar per Acre

Lost Revenue per Acre

Small Grains

6,707

Corn

5,869

- \$113.78

Soybeans

5,806

- \$122.32



2014

Tons per Acre

Sugar per Acre

Small Grains

23.7

7,750

Soybeans

21.7

7,009

Corn

21.2

6,763

Take Home Message Regarding Data Mining...



- Both Lime & Drain Tile show significant benefits to both yield and quality
- Lime is like a fine wine – it gets better with age...
- This time next year we will have data on “supplemental” lime

- In terms of sugarbeets, corn and beans are an invasive species
- In 2014 alone, ~ 2/3 of the beet acres followed crops that are “less than ideal”
- Wheat has been a common theme and very beneficial practice
- Fill Out Your Grower Practice Records
 - Will be getting easier to do so this coming Spring!!!

2014 MDFC Research Plots...



- Bottom line: They were a HUGE success... 2x!!!
- Lot of positive comments in the grapevine
- A little luck helped out...
- Three people need to be recognized:
 - Lacy – Al – Blair
- Cooperating Growers:
 - KCCC Hought
 - Etten Farms
 - David Simmer
 - CDJK Hasbargen
 - Dennis & Brady Butenhoff
 - Brent Torkelson
 - Matz Farms











MicroEssentials™ SZ Distribution



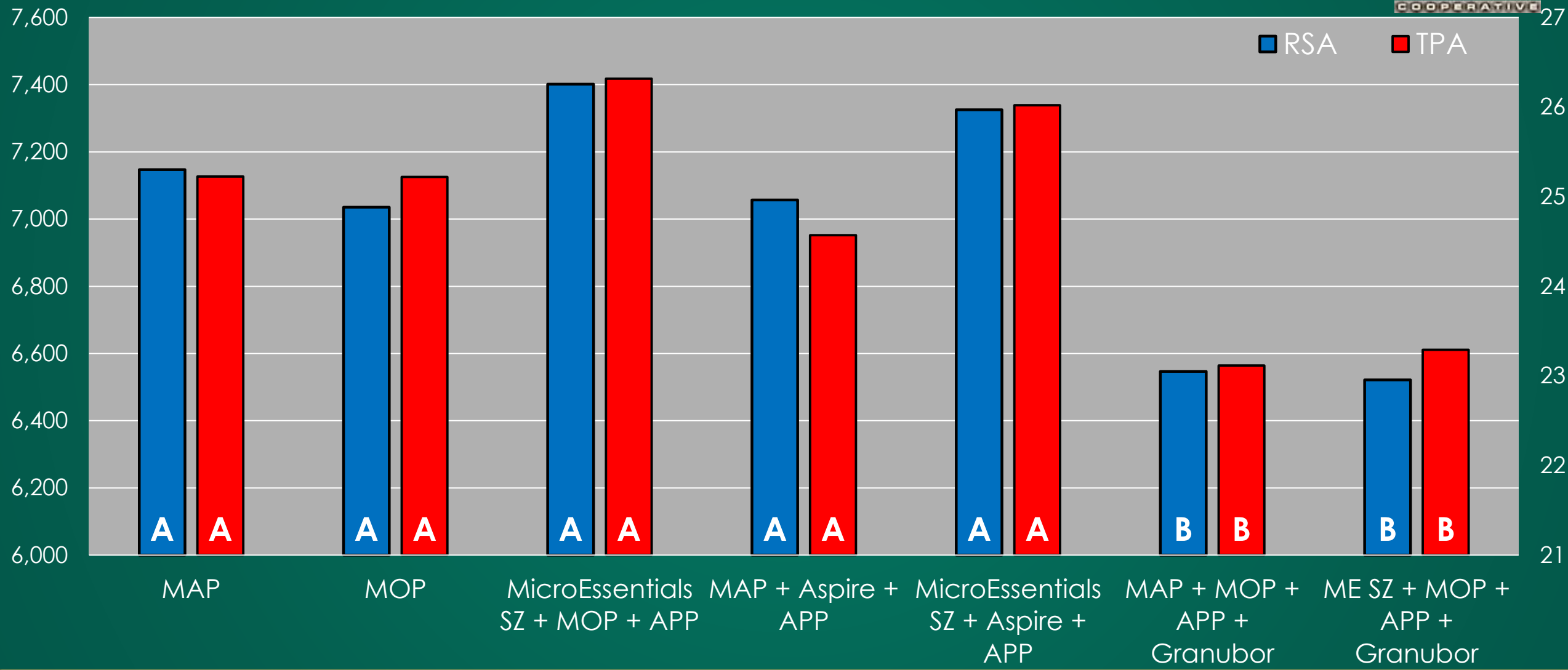
● Ammonium Sulfate ○ Mono-Ammonium Phosphate ● Elemental Sulfur ● Zinc

4-Way Blend Fertilizer Distribution



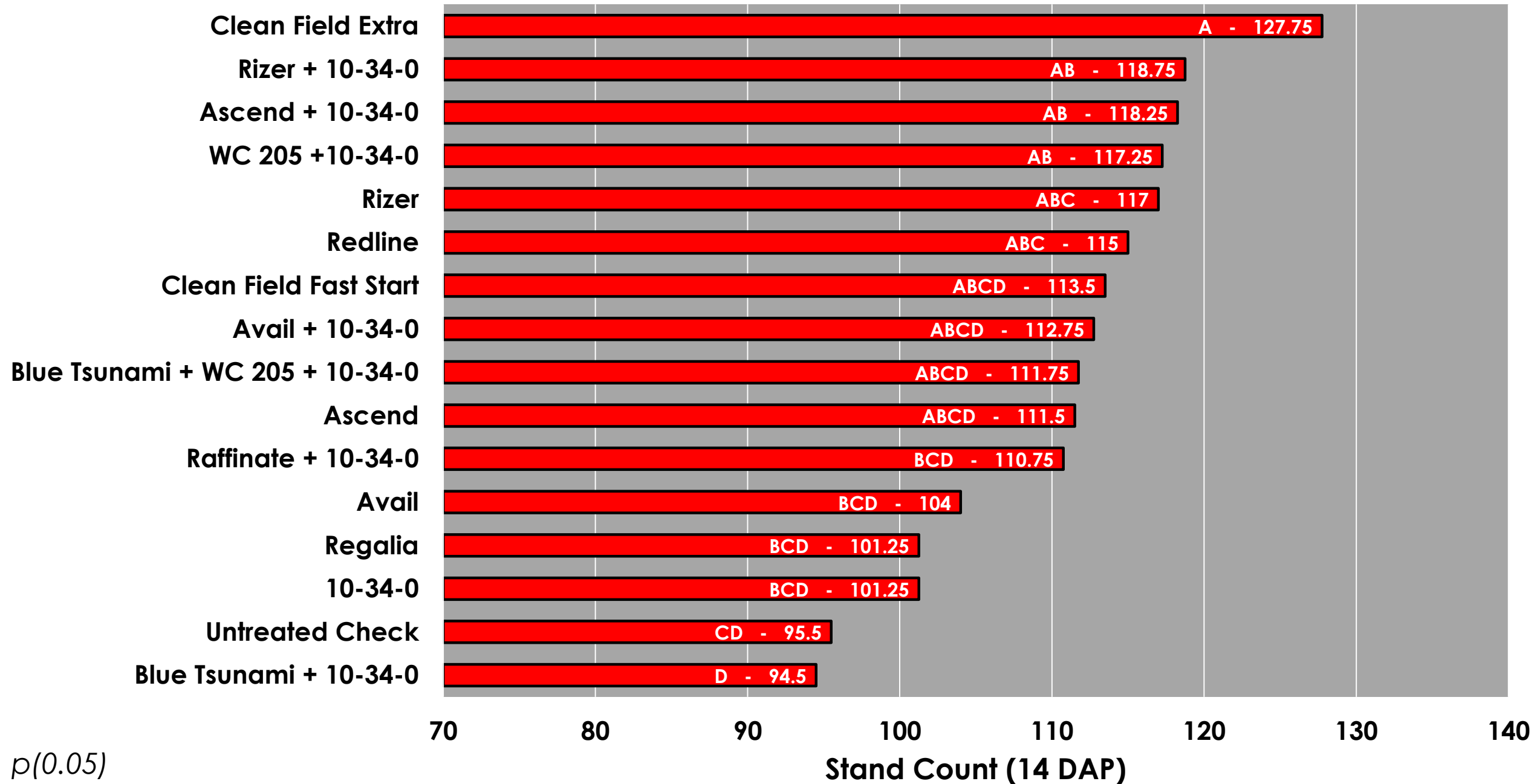
12-40-0-10S-12n
Detail of MicroEssentials SZ Granule
Nitrogen & Zinc Distributed Through

MicroEssentials Trial...

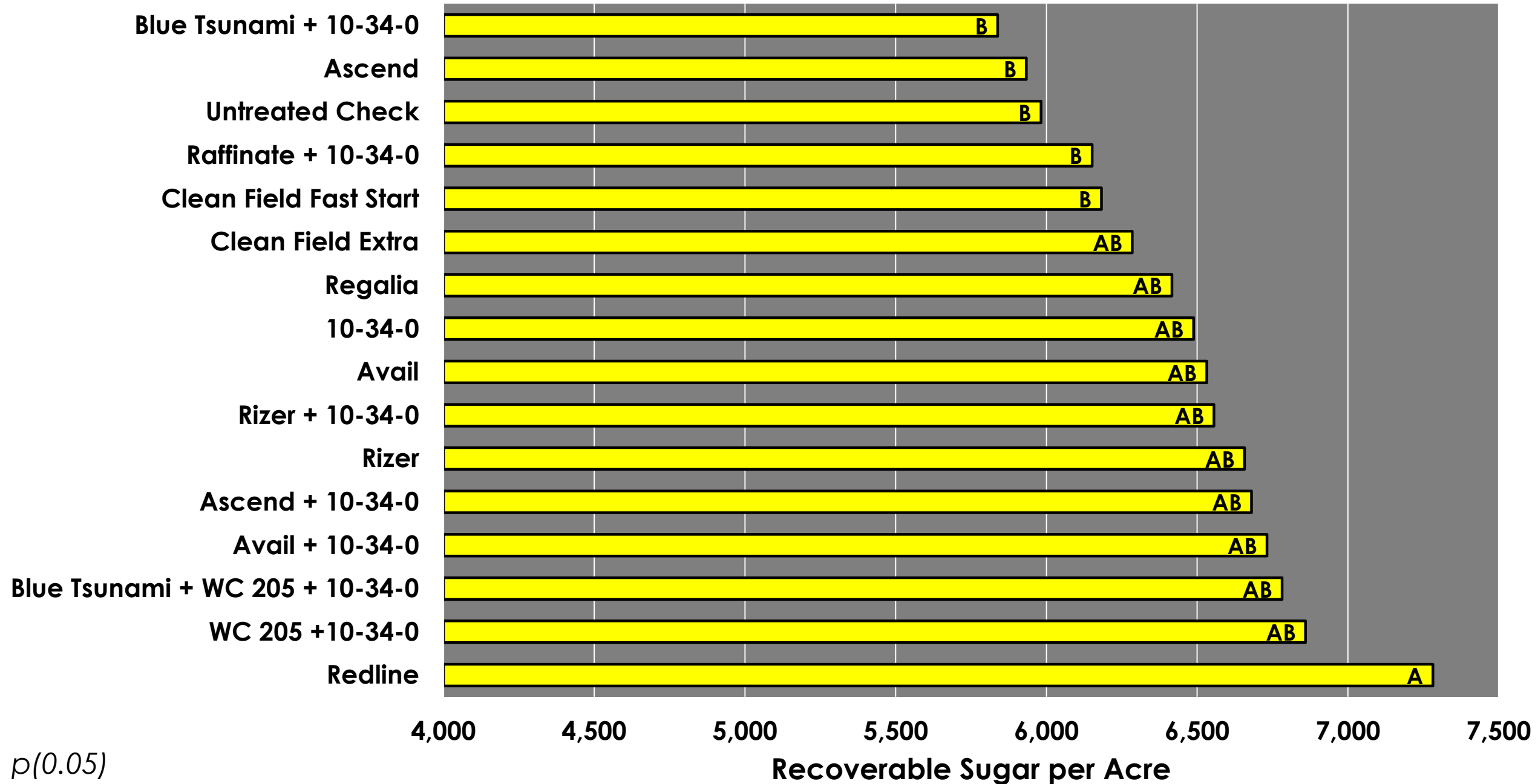


$p(0.10)$

MDFC Starter Fertilizer Trial

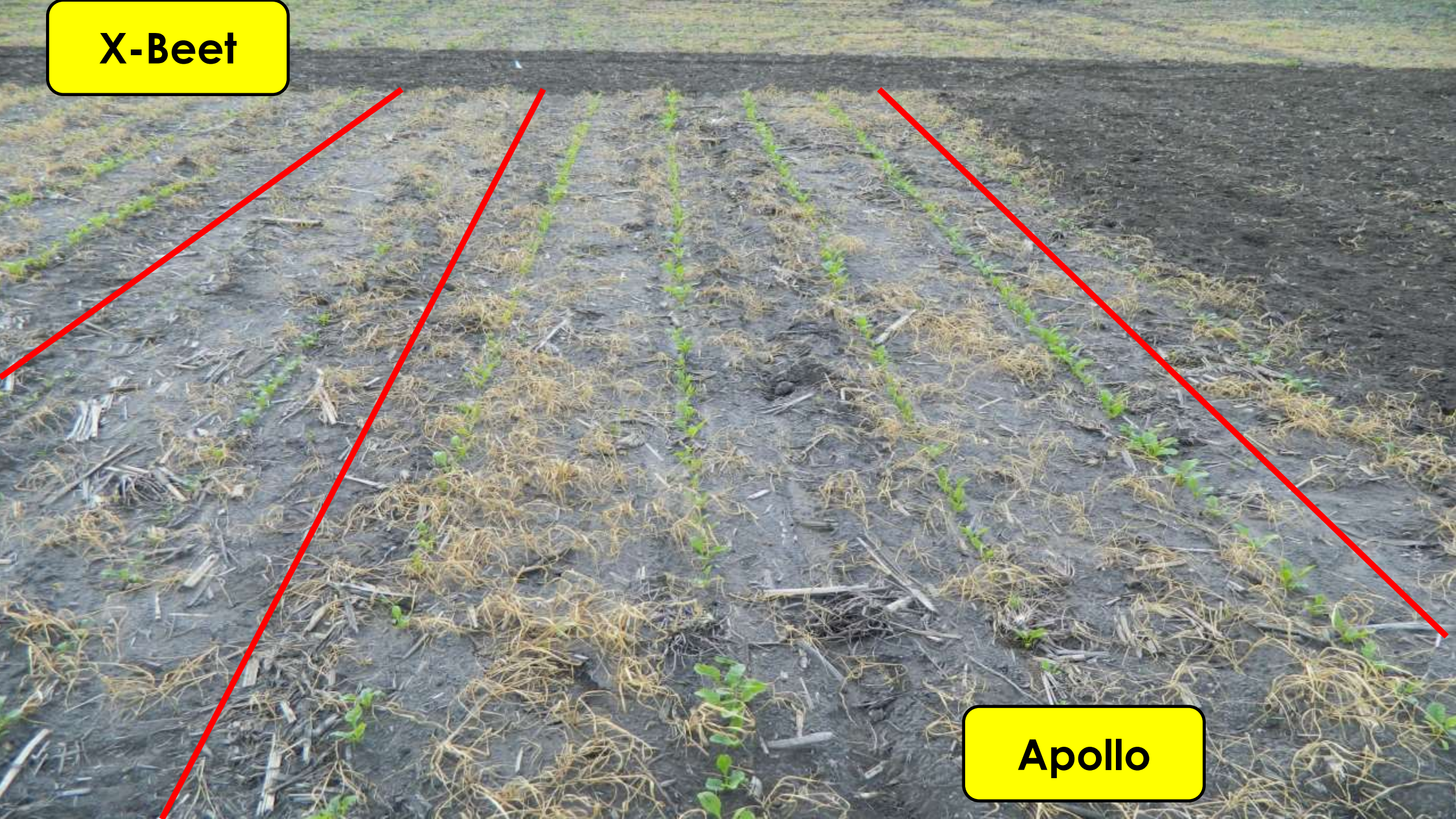


MDFC Starter Fertilizer Trial



X-Beet

Apollo

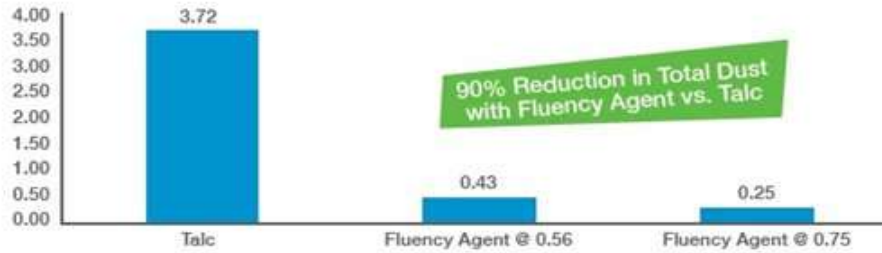


NEW
FLUENCY AGENT
 FROM Bayer CropScience



LABORATORY EVALUATION

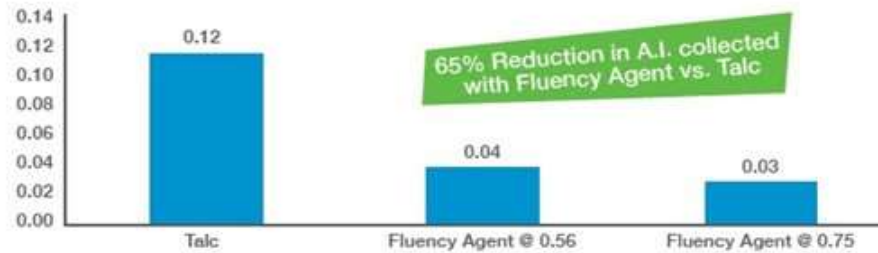
Talc versus Fluency Agent – Gms Total Dust / 100K Seed



* Poncho / VOTIVO and Poncho 1250 + VOTIVO in John Deere Vacuum Meter

LABORATORY EVALUATION

Talc versus Fluency Agent – Gms Insecticide Active ingredient Dust Per 100K Seed



Stand Establishment Summary...



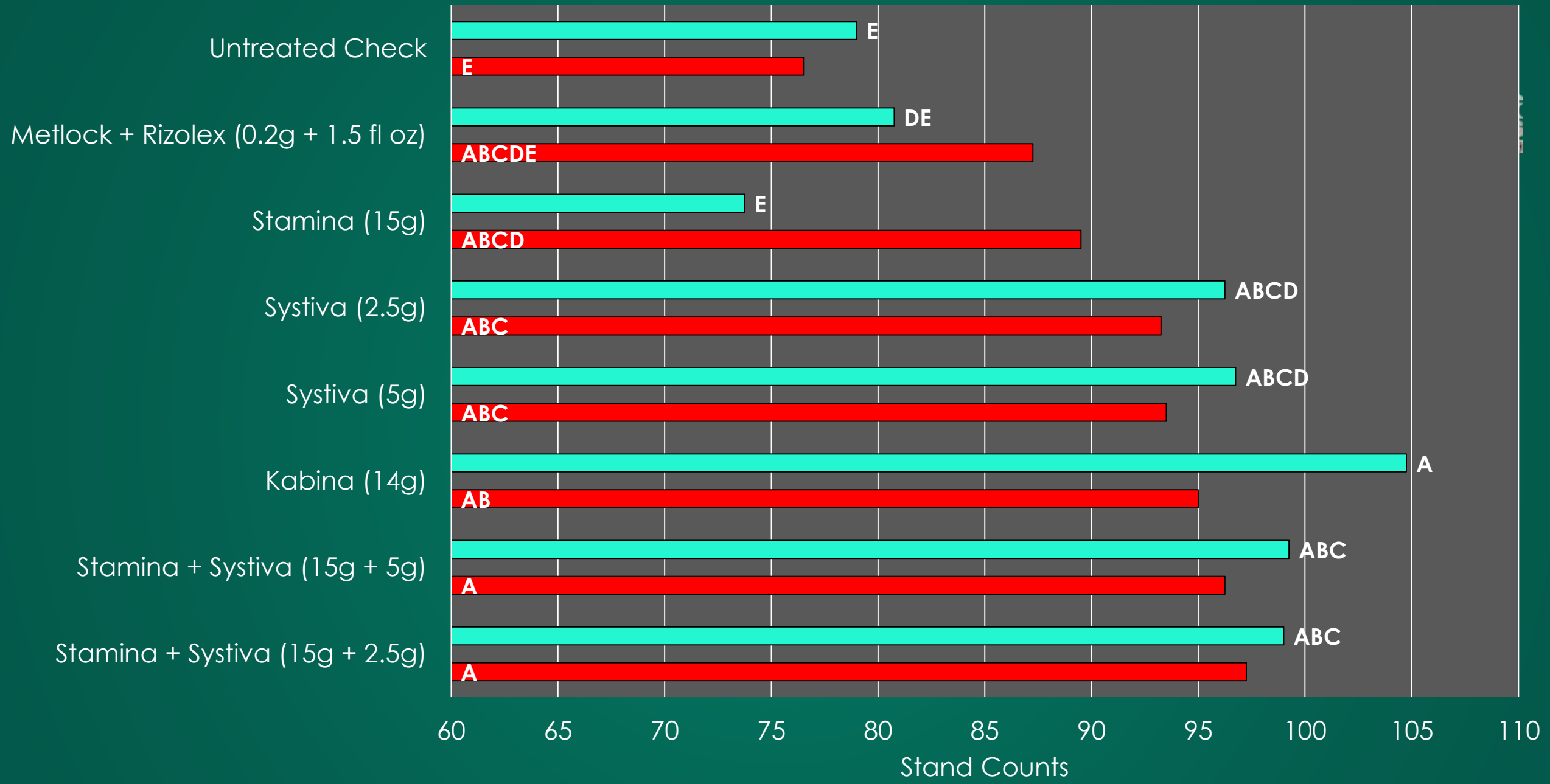
- **Do not** raid the grocery stores for sugar...
 - Expanded experimentation planned for 2015 – Stay Tuned!!!
- Did not see a benefit to Mosaic's Micro Essentials on beets
 - Boron toxicity with Granubor???
- Clean Field Extra (3-18-18) gave the highest stand count in the starter products trial
- Redline was the only product that showed a significant increase in RSA over the Untreated Check (but not SD from 10-34-0)
- Apollo-enhanced seed topped the charts (2-year)
- Don't be surprised (or worried) if your seed comes treated with Fluency

Major Focus on Rhizoctonia...

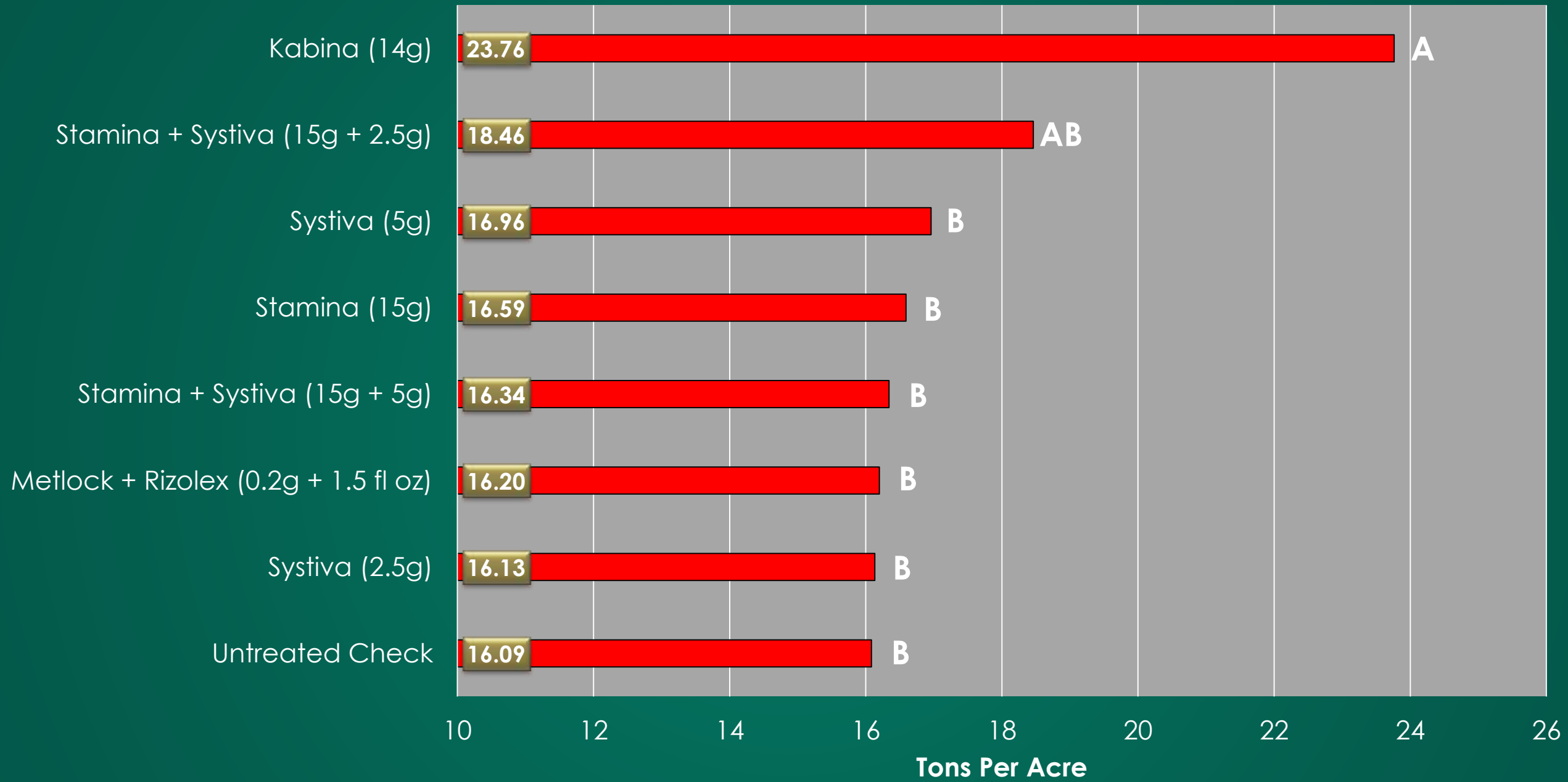


- BASF Priaxor Trial
- BASF Seed Treatment Trial
- MDFC Seed Treatment Trial
- Mitsui – AgroChemical Trial
- Valent Seed Treatment Trial
- Valent S-2399 Trial
- Syngenta Seed Treatment Trial
- Bayer CropScience Biological Trial
- U of MN
 - Disease Progress - Beans
 - Disease Progress – Corn
 - IPM

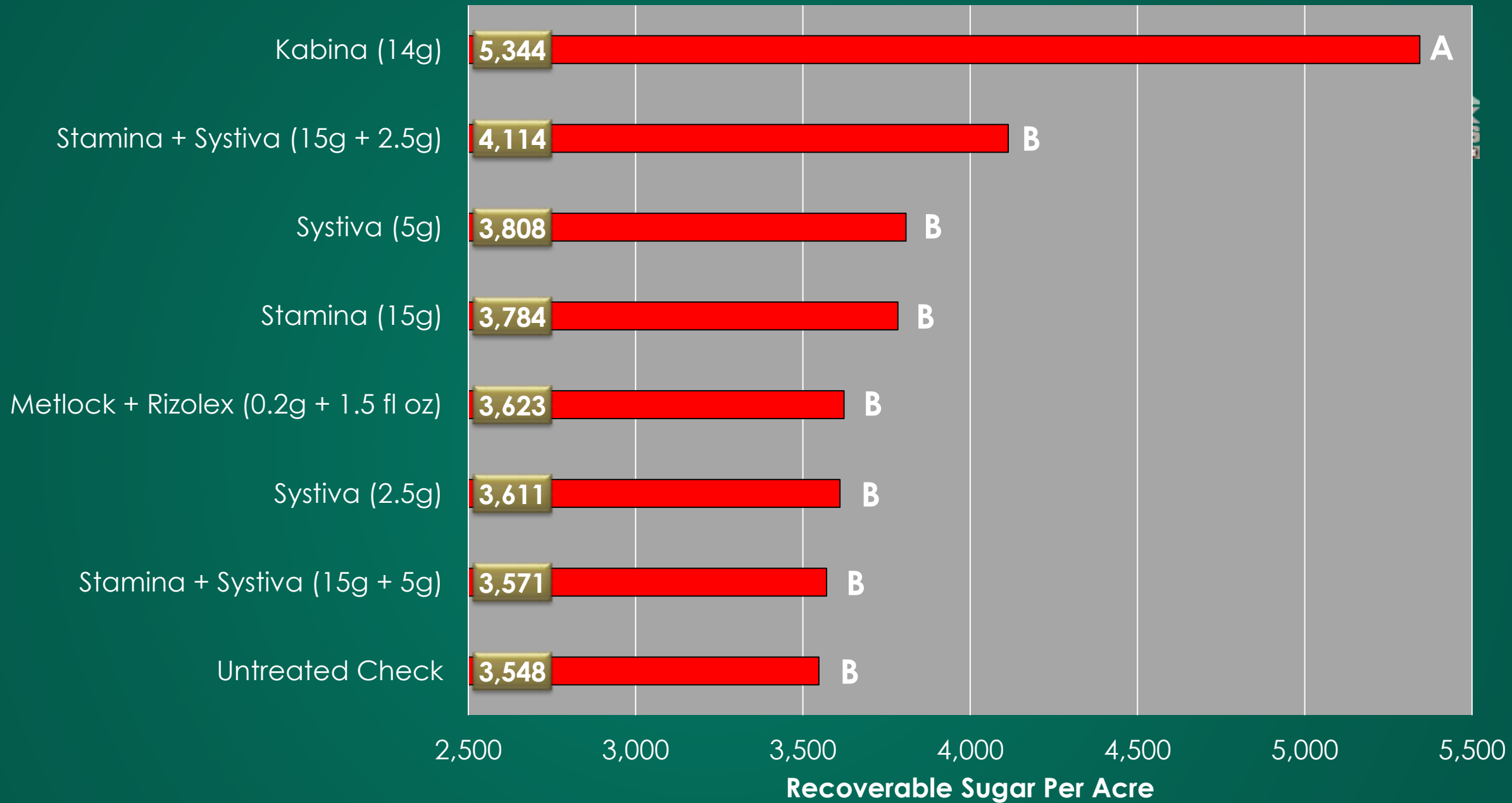




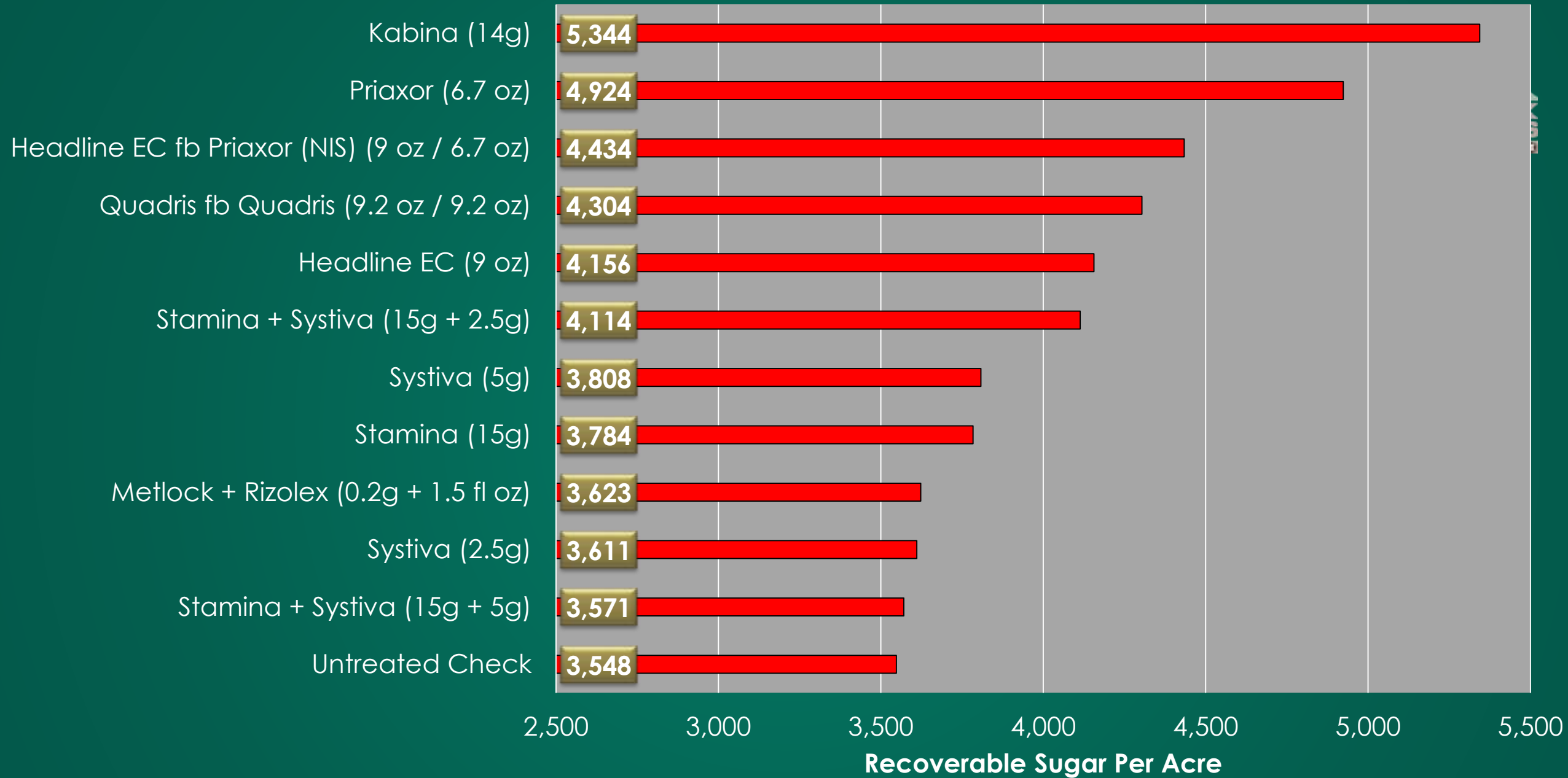
$p(0.05)$



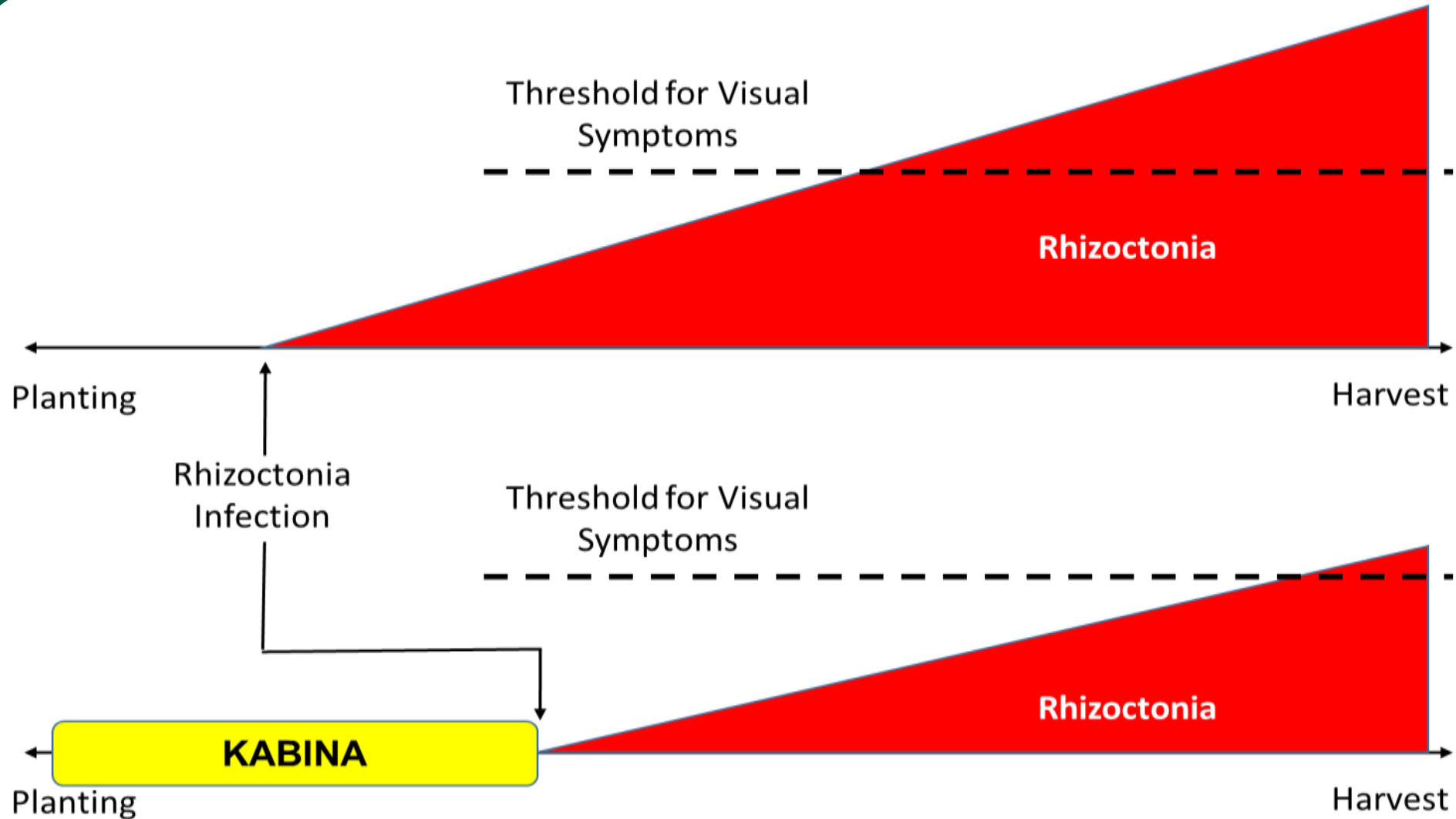
$p(0.05)$



$p(0.05)$



Why Seed Treatments Work...



Seed Treatments at Work...



Untreated Check



Evergol Extend



Evergol Extend + Serenade Soil



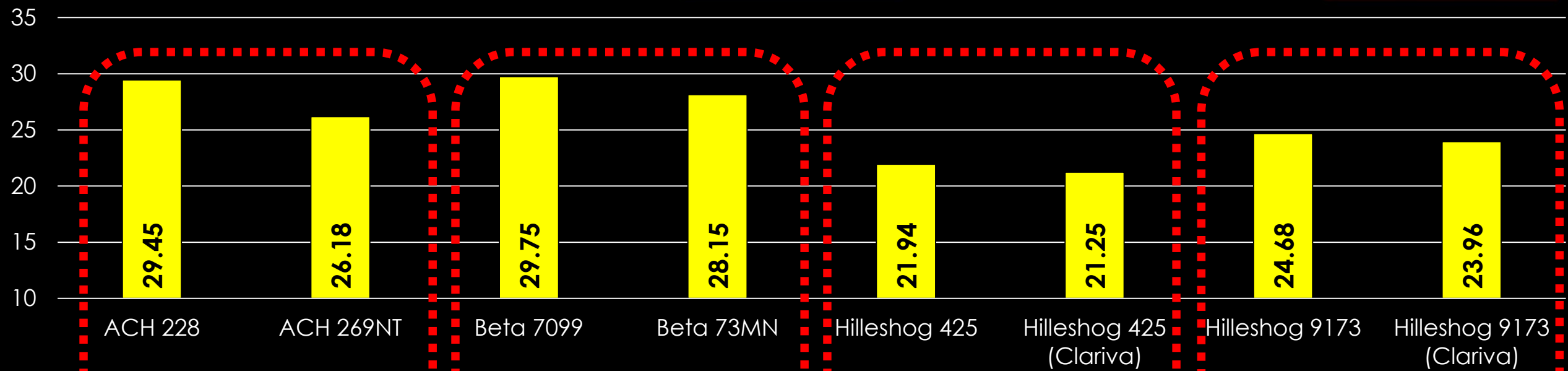
Rhizoctonia Summary...



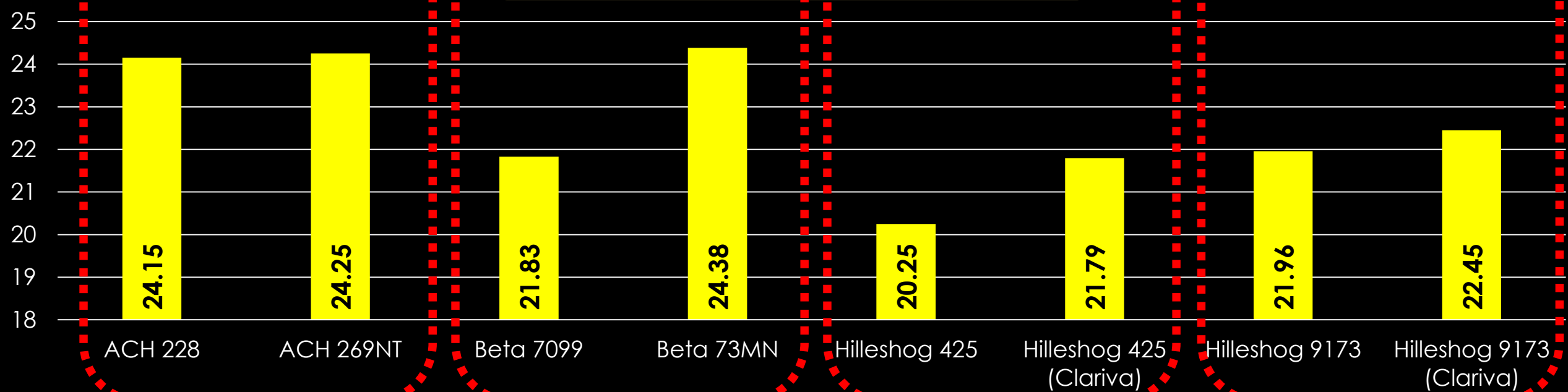
- Resistant Varieties are still your best bet & do most of the “work”
- Control is most effective when the resistant variety is “complemented” by a seed treatment (Kabina)
- Stamina & Systiva work best in combination and have longer control
- Metlock-Rizolex appeared to be tough on stand (3-yr)
- Post-Emerge applications did not work as well this year – Late Spring?
- Serenade Soil (biological) really looks promising (+ Kabina?)
- Wheat in the rotation will help break up this disease cycle
 - AG 2-4(iib)

Clean Ground

Tons per Acre



U of MN Soybean Nematode Location



Sugarbeet Injury & Control of Common Ragweed (2014 - Mayville, ND)



Up to one inch common ragweed

| Herbicide Treatment ¹ | Rate | July 7 Beet Injury | July 7 Rweed Control | July 14 Rweed Control | July 25 Rweed Control |
|------------------------------------|------------------|--------------------------|----------------------------|-----------------------------|-----------------------------|
| | fl oz/A | ------(%)----- | | | |
| PowerMax / PMax / PMax | 28 / 28 / 22 | 1 | 74 | 74 | 76 |
| PMax+Stinger / PMax+Stinger / PMax | 28+2 / 28+2 / 22 | 3 | 89 | 88 | 92 |
| PMax+Stinger / PMax+Stinger / PMax | 28+4 / 28+4 / 22 | 9 | 95 | 95 | 95 |
| <i>LSD (0.05)</i> | | <i>10</i> | <i>14</i> | <i>11</i> | <i>10</i> |

¹All treatments were applied with N-Pak AMS at 2.5% v/v and Prefer 90 NIS at 0.25% v/v

Sugarbeet Injury & Control of Common Ragweed (2014 - Mayville, ND)



Up to two inch common ragweed

| Herbicide Treatment ¹ | Rate | July 7 Beet Injury | July 7 Rweed Control | July 14 Rweed Control | July 25 Rweed Control |
|------------------------------------|------------------|--------------------------|----------------------------|-----------------------------|-----------------------------|
| | fl oz/A | ------(%)----- | | | |
| PowerMax / PMax / PMax | 28 / 28 / 22 | 11 | 81 | 76 | 75 |
| PMax+Stinger / PMax+Stinger / PMax | 28+2 / 28+2 / 22 | 14 | 84 | 83 | 89 |
| PMax+Stinger / PMax+Stinger / PMax | 28+4 / 28+4 / 22 | 10 | 84 | 84 | 93 |
| <i>LSD (0.05)</i> | | <i>10</i> | <i>14</i> | <i>11</i> | <i>10</i> |

¹All treatments were applied with N-Pak AMS at 2.5% v/v and Prefer 90 NIS at 0.25% v/v

Control of common ragweed - 1 inch or less...



PowerMax plus Stinger, 28 fl oz + 2 fl oz fb
PowerMax plus Stinger, 28 fl oz + 2 fl oz fb
PowerMax, 22 fl oz

PowerMax, 28 fl oz fb PowerMax, 28 fl oz fb
PowerMax, 22 fl oz



Control of common ragweed - 2 inches or less...



PowerMax plus Stinger, 28 fl oz + 4 fl oz fb
PowerMax plus Stinger, 28 fl oz + 4 fl oz fb
PowerMax, 22 fl oz

PowerMax, 28 fl oz fb PowerMax, 28 fl oz fb
PowerMax, 22 fl oz





Recommendations for Common Ragweed Control

- For common ragweed control **less than 1" tall**
 - Roundup PowerMax at 28 fl oz/A + Stinger at 2 fl oz/A
 - Make a repeat application approximately 14 days following the 1st application.
- For common ragweed control **less than 2" tall**
 - Roundup PowerMax at 28 fl oz/A + Stinger at 3 fl oz/A
 - Make a repeat application approximately 14 days following the first application.
- For common ragweed control in fields **that are up to 4" tall**
 - Roundup PowerMax at 28 fl oz/A + Stinger at 4 fl oz/A or
 - Roundup PowerMax at 28 fl oz/A + Stinger at 2 fl oz/A + either ethofumesate at 4 fl oz/A, UpBeet at 0.5 oz/A or Betamix at 12 fl oz/A
 - Make a repeat application approximately 14 days following the first application

**Use AMS at 8.5-17 lb per 100 gallon and NIS surfactant at 0.25% v/v; use HSMOC at 1.5 pt/A with ethofumesate or Betamix

Control of Volunteer RR Canola..

- Just like with common ragweed – Size Matters!!!
- Canola control from UpBeet at 0.25 oz/A at cotyledon to 2-leaf canola and twice sequentially provided greater than 95% control
- Need to start herbicide applications before volunteer canola gets beyond the 2-leaf stage...
- Increasing the UpBeet rate to 0.5 oz/A and applying twice sequentially gave near complete canola control



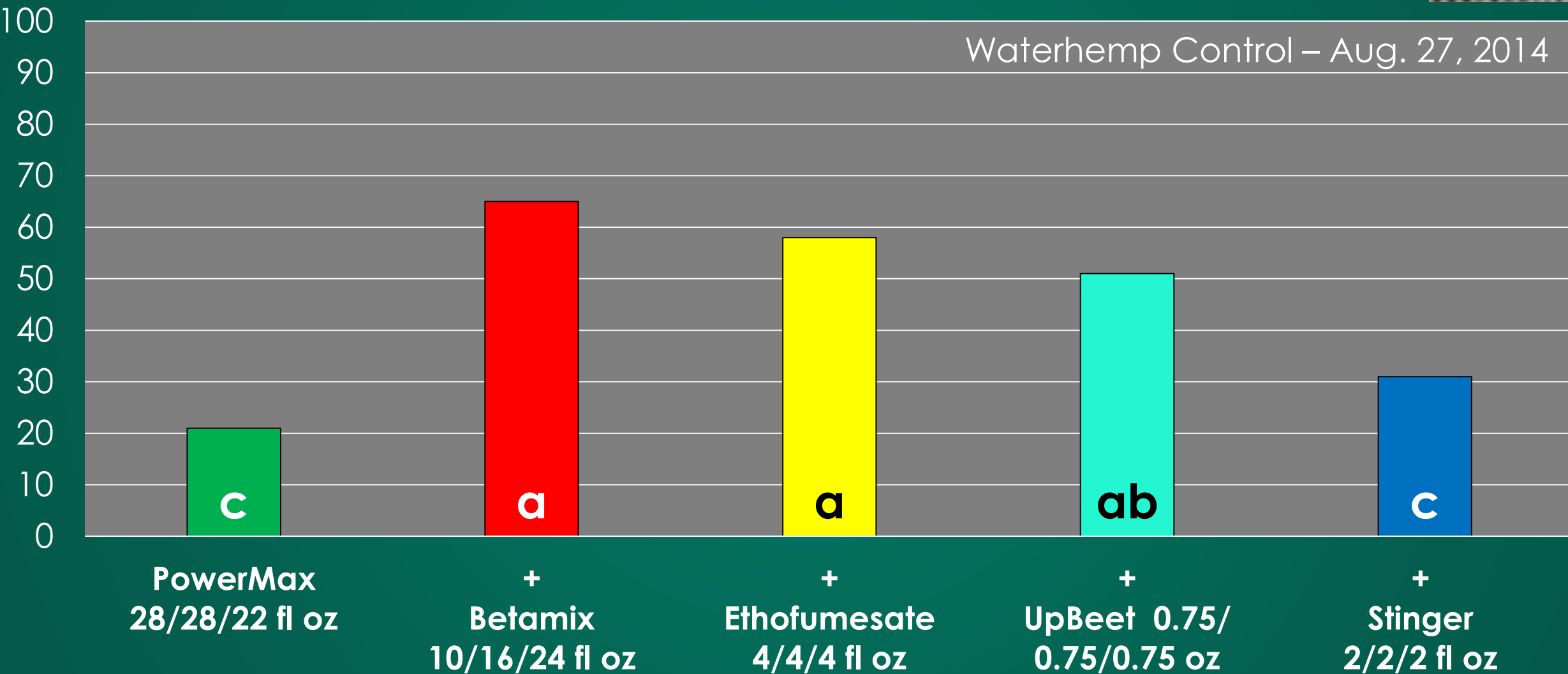
Waterhemp Control...

- Trials at 3 locations, Lake Lillian, Herman and Moorhead, MN
- Herman, MN
 - Planted May 30, 2014
 - Treat center 4 rows of 6 row plots
 - PRE treatments applied May 30th
 - Three POST applications
 - June 23rd, July 2nd & July 10th
 - Evaluate Post-Emerge, Pre-Emerge and Lay-By applications

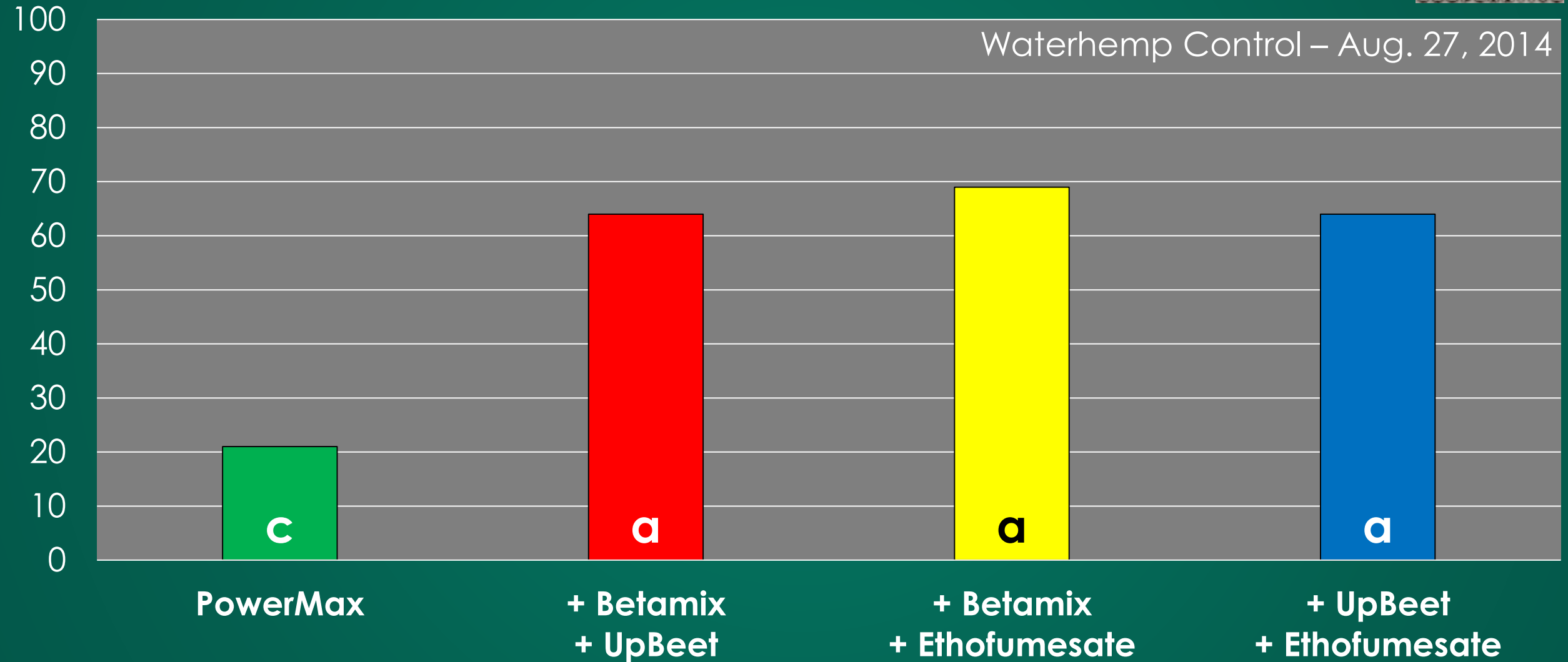


Post-Emergence Treatments...

Waterhemp Control – Aug. 27, 2014



Post-Emergence Treatments...





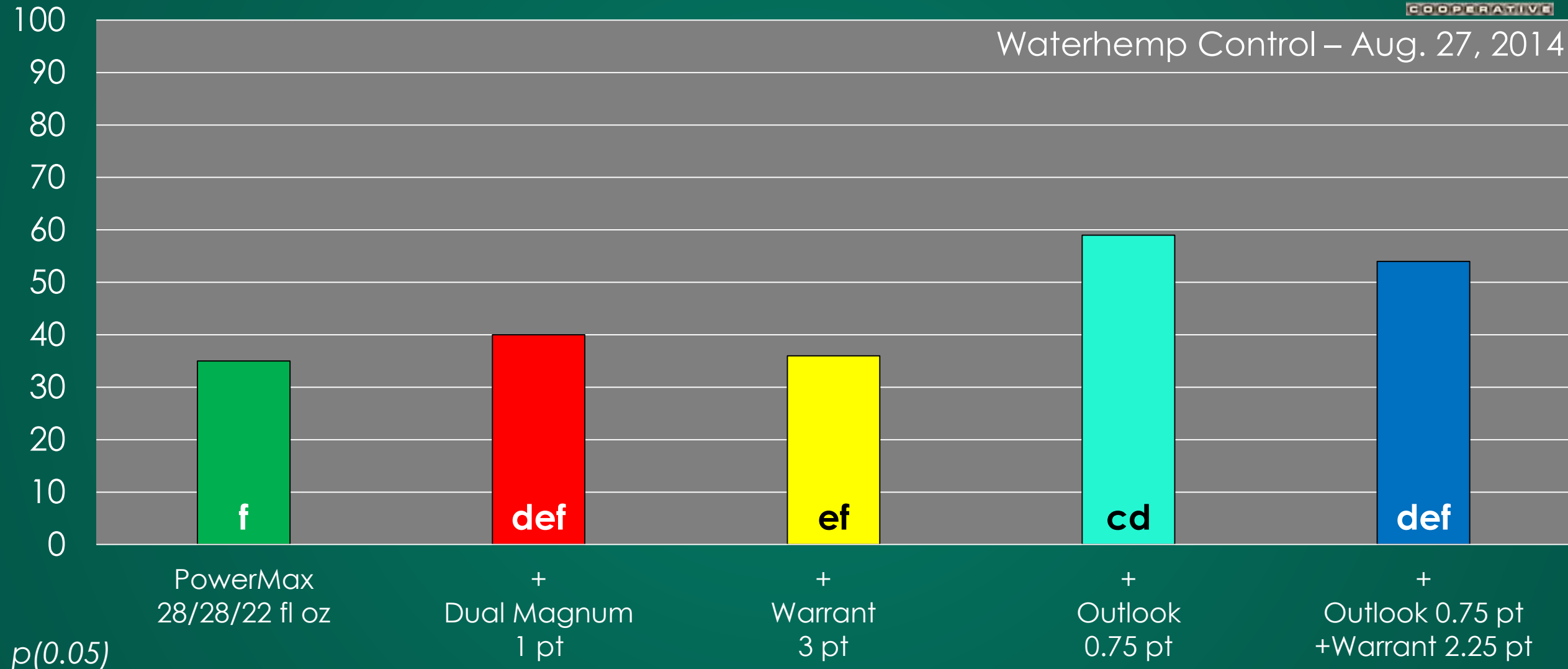
**Glyphosate
(14 days after last treatment)**



**Glyphosate + Ethofumesate
(14 days after last treatment)**

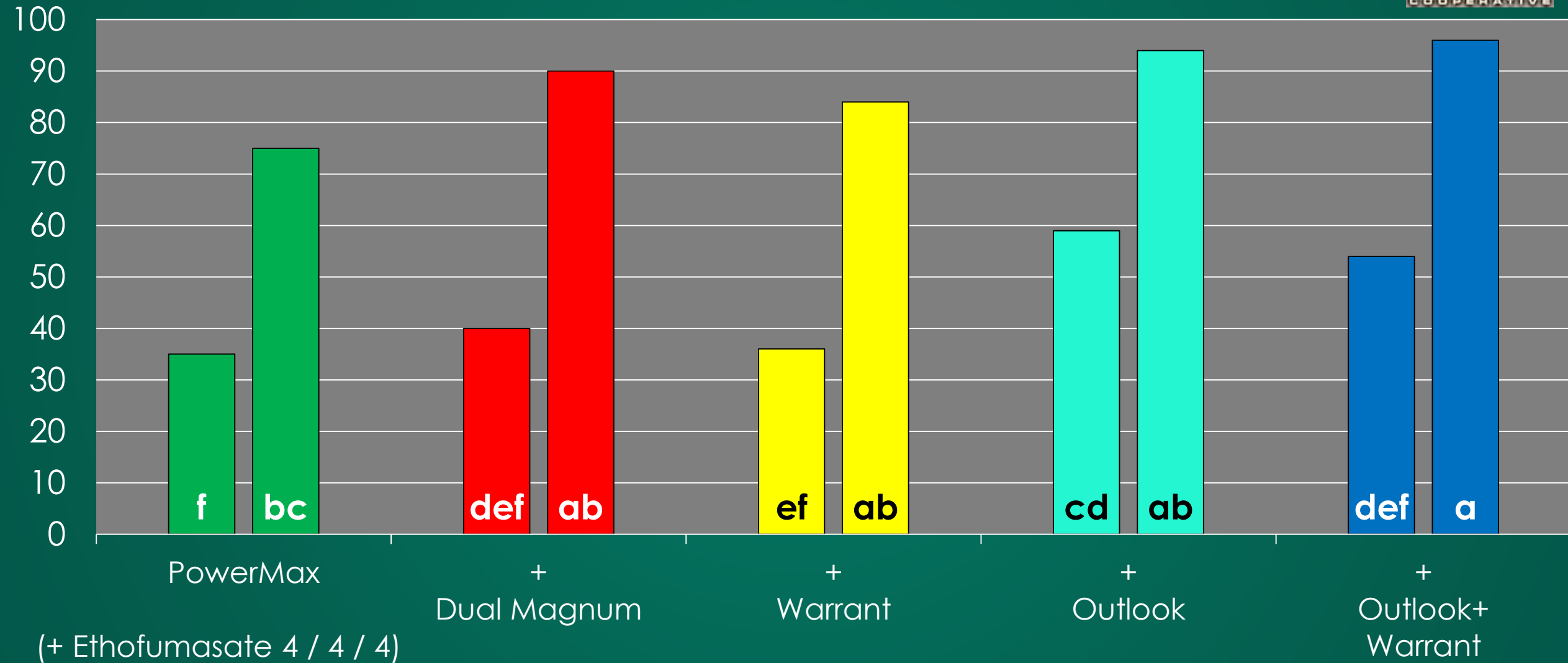
Lay-By Application

Waterhemp Control – Aug. 27, 2014



Lay-By Application was made on June 23rd / 4-6 lf Beets / 2.5" Waterhemp

Lay-By Application + Ethofumasate





PowerMax
(48 days after last trt)



PowerMax + Ethofumesate
(48 days after last trt)



**PowerMax + Outlook
(48 days after last treatment)**

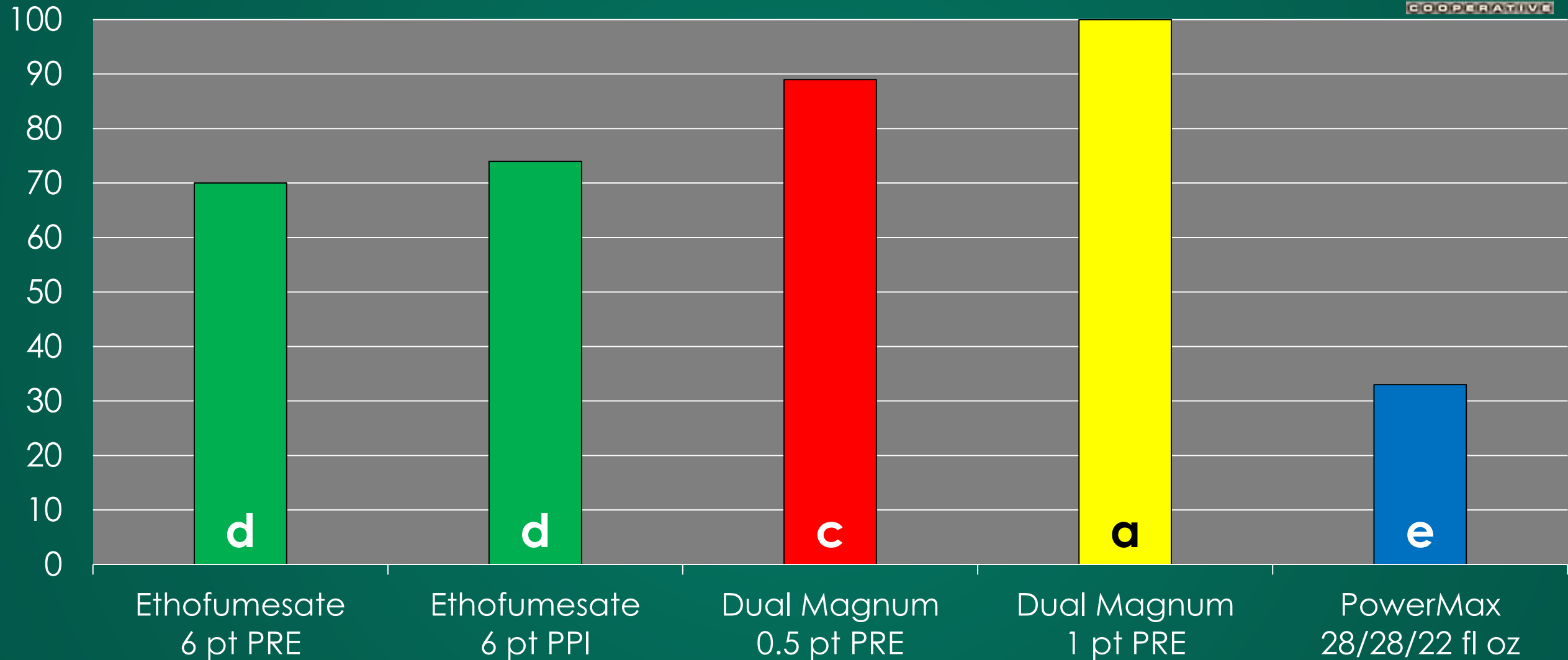


**PMax + Ethofumasate + Outlook
(48 days after last treatment)**

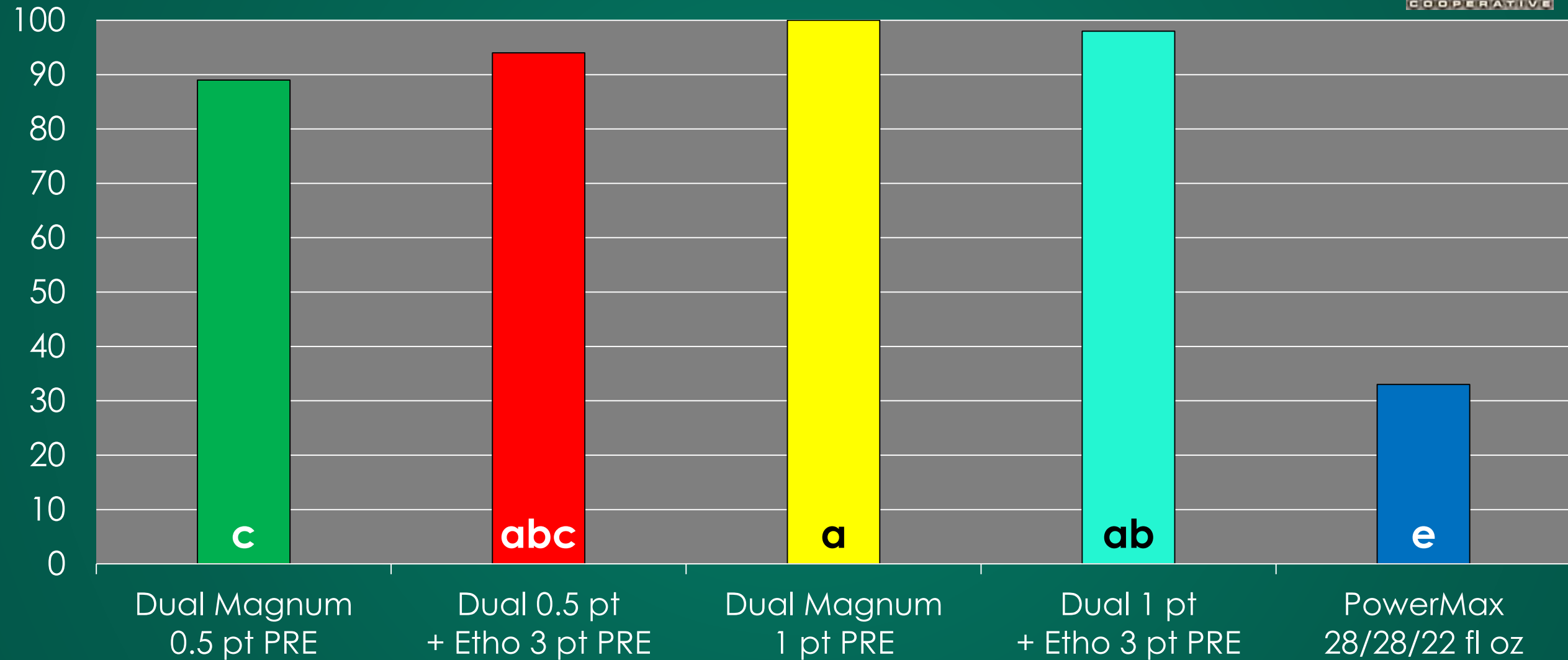


Pre-Emerge Herbicides at Work

Pre-Emergence Treatments...



Pre-Emergence Treatments...

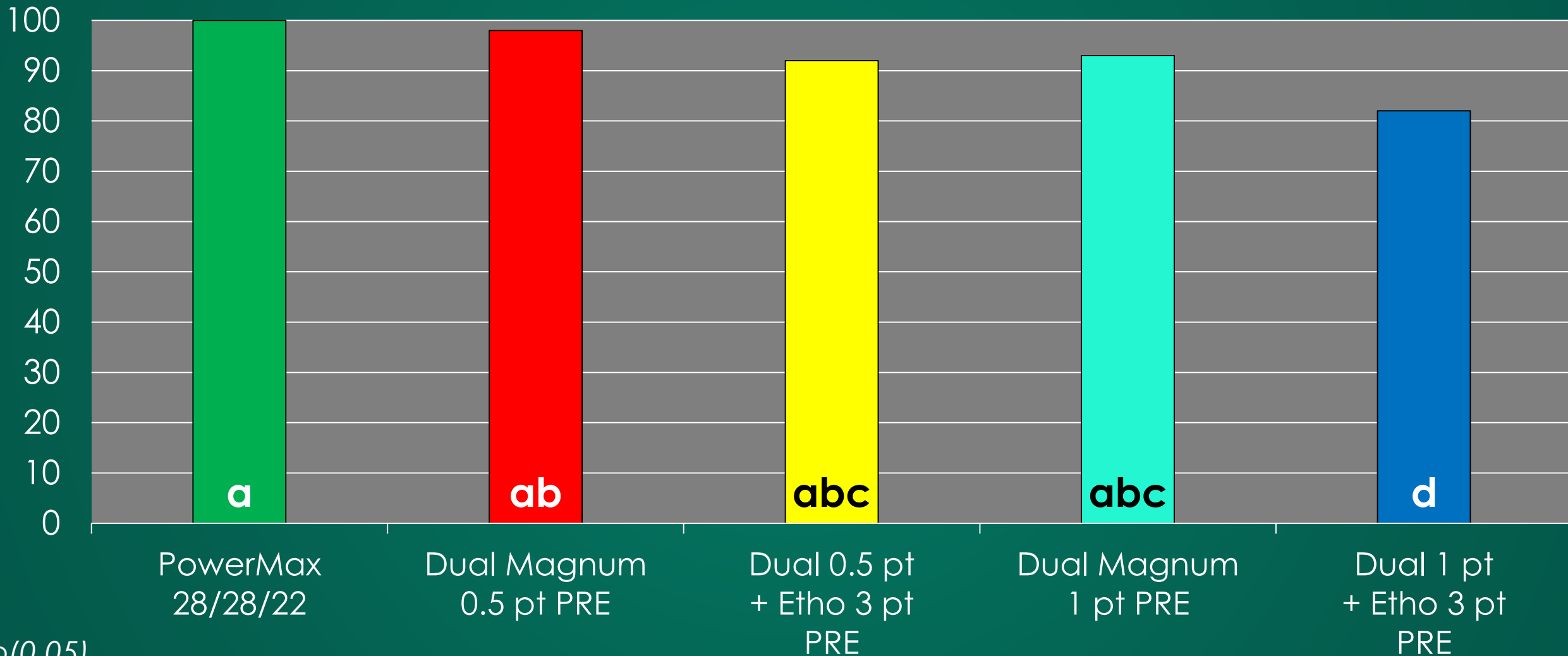




**PowerMax
(48 days after last treatment)**

**PRE Dual (0.5 pt) + Etho (3 pt)
(48 days after last treatment)**

Pre-Emergence Treatments...





Waterhemp Summary...

Waterhemp as a Minor Weed

- Glyphosate 0.98 / 0.98 / 0.77 (PowerMax 28/28/22 fl oz)** + Ethofumesate 4 / 4 / 4 fl oz + AMS + HSMOC

OR...

- Glyphosate 0.98 / 0.98 / 0.77 (PowerMax 28/28/22 fl oz)** + Befamix 10 / 16 / 24 fl oz + AMS + HSMOC

**Glyphosate at 1.125 lb/A (PowerMax 32 fl oz) if one application before 8-If sugarbeet stage



Waterhemp Summary...

Known resistance - Low to Moderate Infestation

- Glyphosate 0.98 / 0.98 / 0.77** + Betamix 10 / 16 / 24 + Ethofumesate 4 / 4 / 4 fl oz + AMS + HSMOC + **lay-by herbicide (2 lf sgbt)**

OR...

- **PRE Dual Magnum 0.5 pt + Ethofumasate 2.0 pt/A** fb Glyphosate 0.98 / 0.98 / 0.77** + Betamix 10 / 16 / 24 + Ethofumesate 4 / 4 / 4 fl oz + AMS + HSMOC

**Glyphosate at 1.125 lb/A (PowerMax 32 fl oz) if one application before 8-leaf sugarbeet stage



Waterhemp Summary...

Known resistance – Moderate to Heavy Infestation

- **PRE Dual Magnum 0.5 pt + Ethofumasate 2.0 pt/A** fb Glyphosate 0.98 / 0.98 / 0.77** + Betamix 10 / 16 / 24 + Ethofumesate 4 / 4 / 4 fl oz + AMS + HSMOC + **lay-by herbicide (2 lf sgbt)**

OR...

- **PRE Dual Magnum 0.75 pt/A** fb Glyphosate 0.98 / 0.98 / 0.77** + Betamix 10 / 16 / 24 + Ethofumesate 4 / 4 / 4 fl oz + AMS + HSMOC + **lay-by herbicide (2 lf sgbt)**

**Glyphosate at 1.125 lb/A (PowerMax 32 fl oz) if one application before 8-If sugarbeet stage

A Couple Last Thoughts on Weed Control...



- Consider your rotation:
 - Liberty-Link[®]
 - Enlist Duo[®]
 - Wheat (or other small grains)
- Need to start accepting a “moderate” level of beet injury to get adequate weed control...