# Sugarbeet Diseases/Insects That Will Impact The RRV

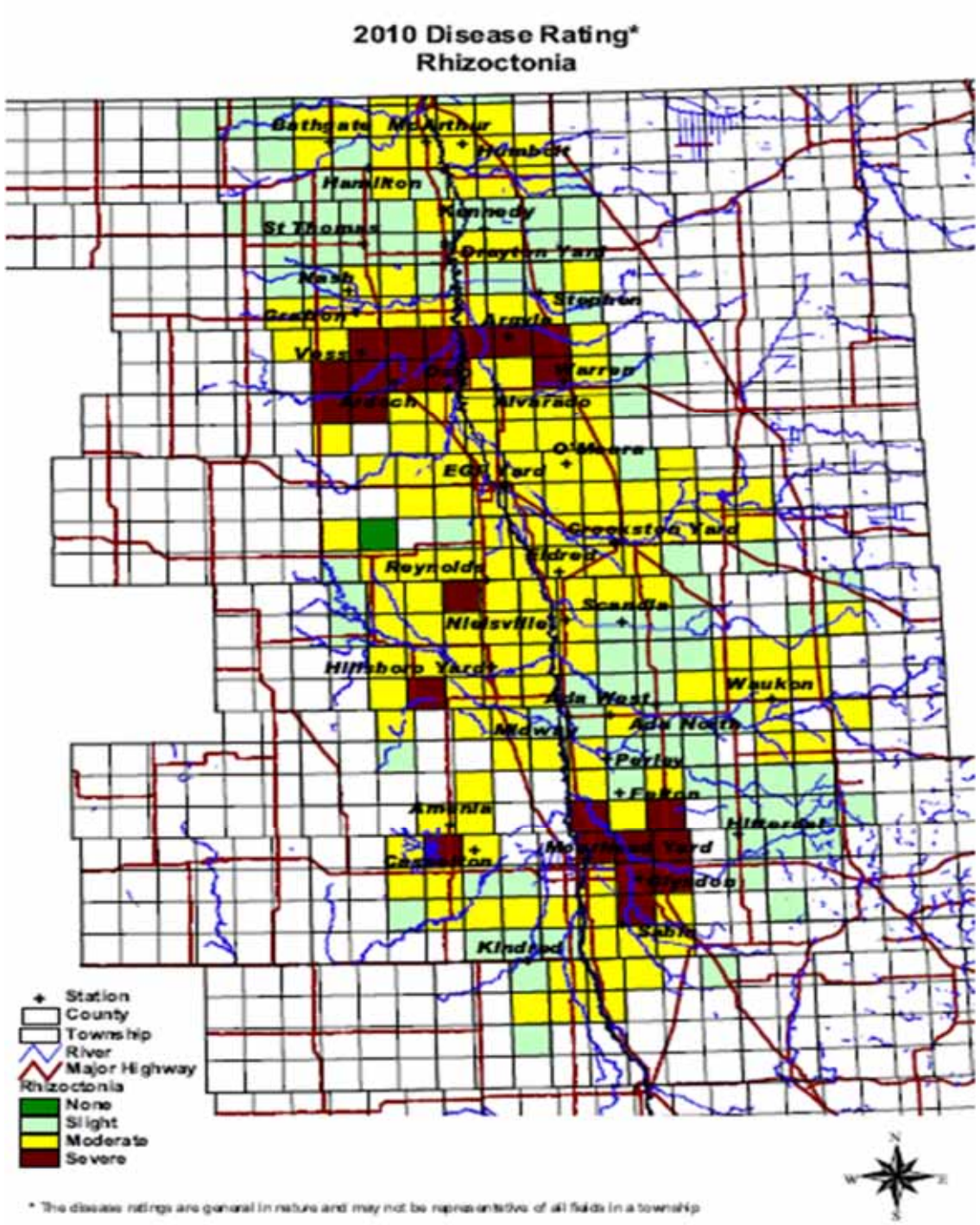
Your Way to Grow 2012

# Agenda

- Diseases
  - Rhizoctonia
  - Aphanomyces
  - Rhizomania
  - Fusarium
  - Cercospora
- Insects
  - Root Maggot
  - Springtail

# Rhizoctonia Management

- Rhizoctonia has quickly become one of the most serious diseases in the RRV
- 54,893 acres treated with Headline at-plant in 2011
- 190,212 acres treated with Quadris post emerge in 2011
- Susceptible crops to Rhizoctonia include sugarbeet, soybean, dry bean, corn, canola, flax, potato, sunflower and alfalfa




* The disease ratings are general in nature and may not be representative of all fields in a township

# Rhizoctonia Control Strategies

- Select variety with a Rhizoctonia rating of 3.82 or <
- Use seed treatments
- In-furrow fungicides
- Keep soil out of the crown
- Apply fungicide on 4-6 leaf beets as soil temps reach 65°F (timing very critical)
- Crop rotation planning
  - Wheat or Barley will slow inoculum buildup

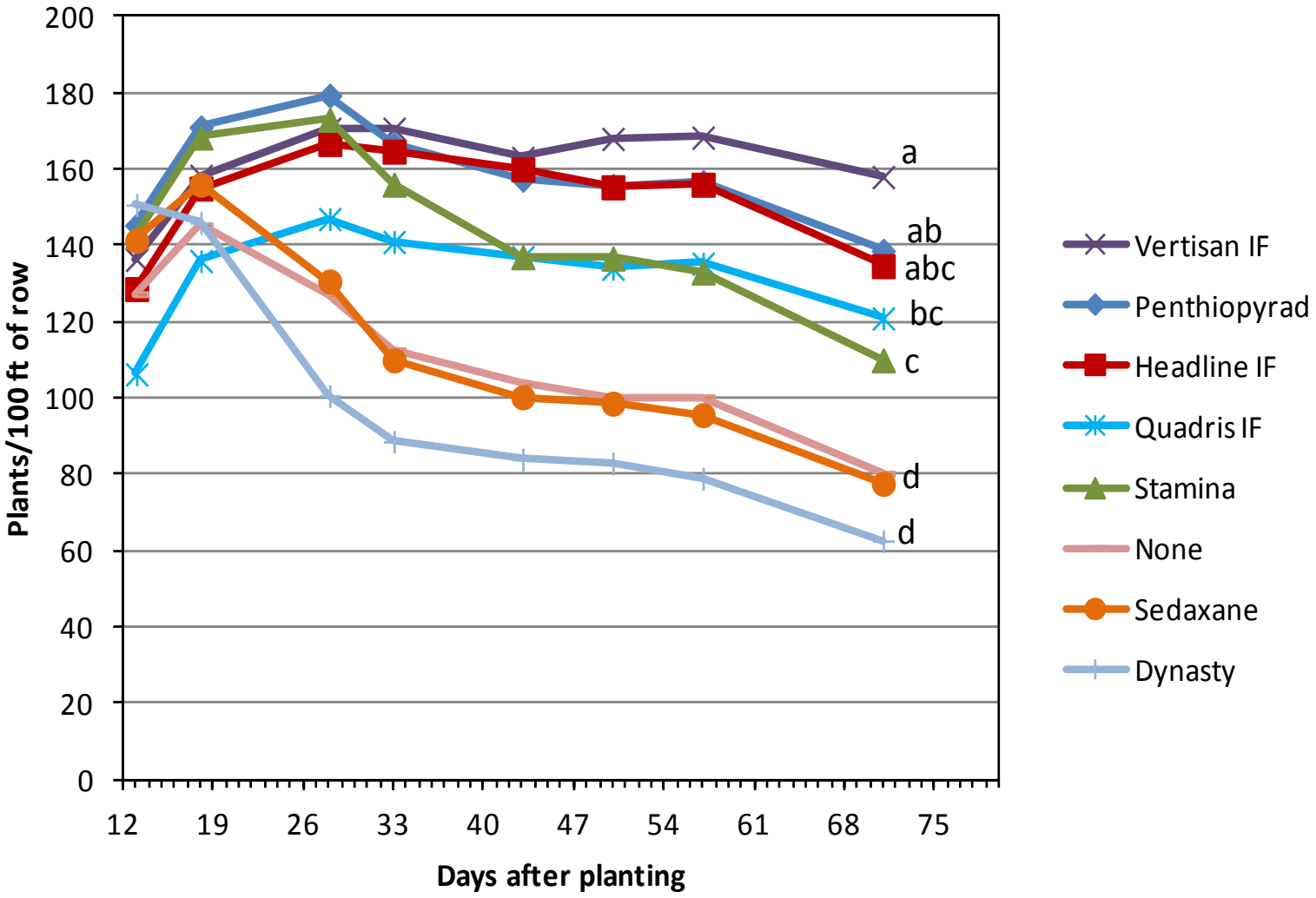
# Seed Treatments

- The only seed treatment currently available in 2012 is Metlock (metconazole and metalaxyl)
- Tested by Carol Windels in 2010
  - Page 253 in 2010 Sugarbeet R & E Reports
  - Tested by Mark Bredehoft (SMBSC) in 2011
- Metlock only fair for seedling Rhizoctonia control

# At-Plant Treatments

- Quadris must be applied in a 4” T-band at 10 - 14 oz/acre rate
  - Stand loss may occur especially in-furrow with starter
  - Risk of stand loss with T-band is pretty low
- Headline can be applied in-furrow w/starter
  - Slight Rhizoctonia pressure use 6 – 9 oz/acre
  - Moderate to Severe pressure use 9 – 12 oz/acre
    - Some risk of stand loss
- Vertisan no current label
  - Likely to be commercially available in 2013
  - Will be most effective at-plant option

Stand establishment of sugarbeet seed treated with different fungicides or in-furrow applications of fungicides in a field trial with severe early-season disease pressure from R. Solani AG 2-2. (Windels and Brantner, 2011).



# Site 1: At-plant treatment harvest results

## Windels and Brantner, Univ. of MN NWROC, 2011

| Treatment | RCRR (0-7) | Yield (T/A) | % Sugar | lb recov./A |
|---|---|---|---|---|
| Control | 4.9 ab | 16.8 bc | 16.7 c | 5081 bc |
| Dynasty | 5.5 a | 13.4 c | 17.1 bc | 4196 c |
| Penthiopyrad | 3.8 cd | 23.0 a | 17.3 bc | 7317 a |
| Sedaxane | 5.1 ab | 16.7 bc | 16.7 c | 5094 bc |
| Stamina | 4.5 bc | 19.9 ab | 17.2 bc | 6207 ab |
| Headline I-F | 3.6 d | 22.1 a | 17.6 ab | 7108 a |
| Quadris I-F | 2.7 e | 21.5 ab | 17.6 ab | 6926 a |
| Vertisan I-F | 2.8 e | 23.6 a | 18.2 a | 7942 a |
| ANOVA p-value | <0.0001 | 0.007 | 0.010 | 0.005 |
| LSD (P = 0.05) | 0.8 | 5.1 | 0.75 | 1785 |

# Site 2: Post treatment harvest results

Windels and Brantner, Univ. of MN NWROC, 2011

| Treatment | RCRR (0-7) | Yield (T/A) | % Sugar | lb recov./A |
|---|---|---|---|---|
| No Quadris | 3.2 | 22.4 | 17.2 | 6932 |
| Quadris | 2.1 | 24.2 | 17.2 | 7490 |

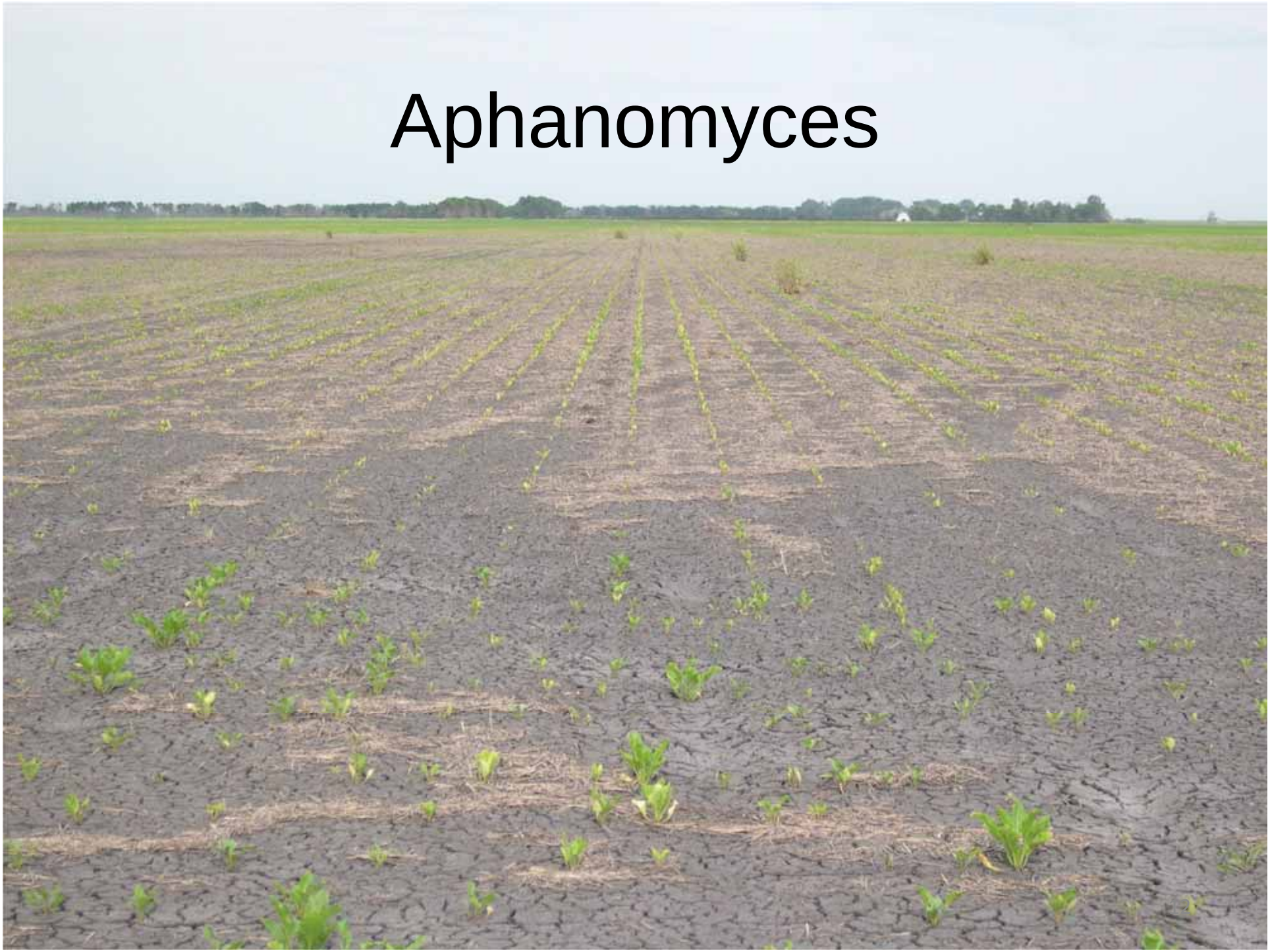
Post-emergence application 14.3 oz/acre in a 7 – inch band

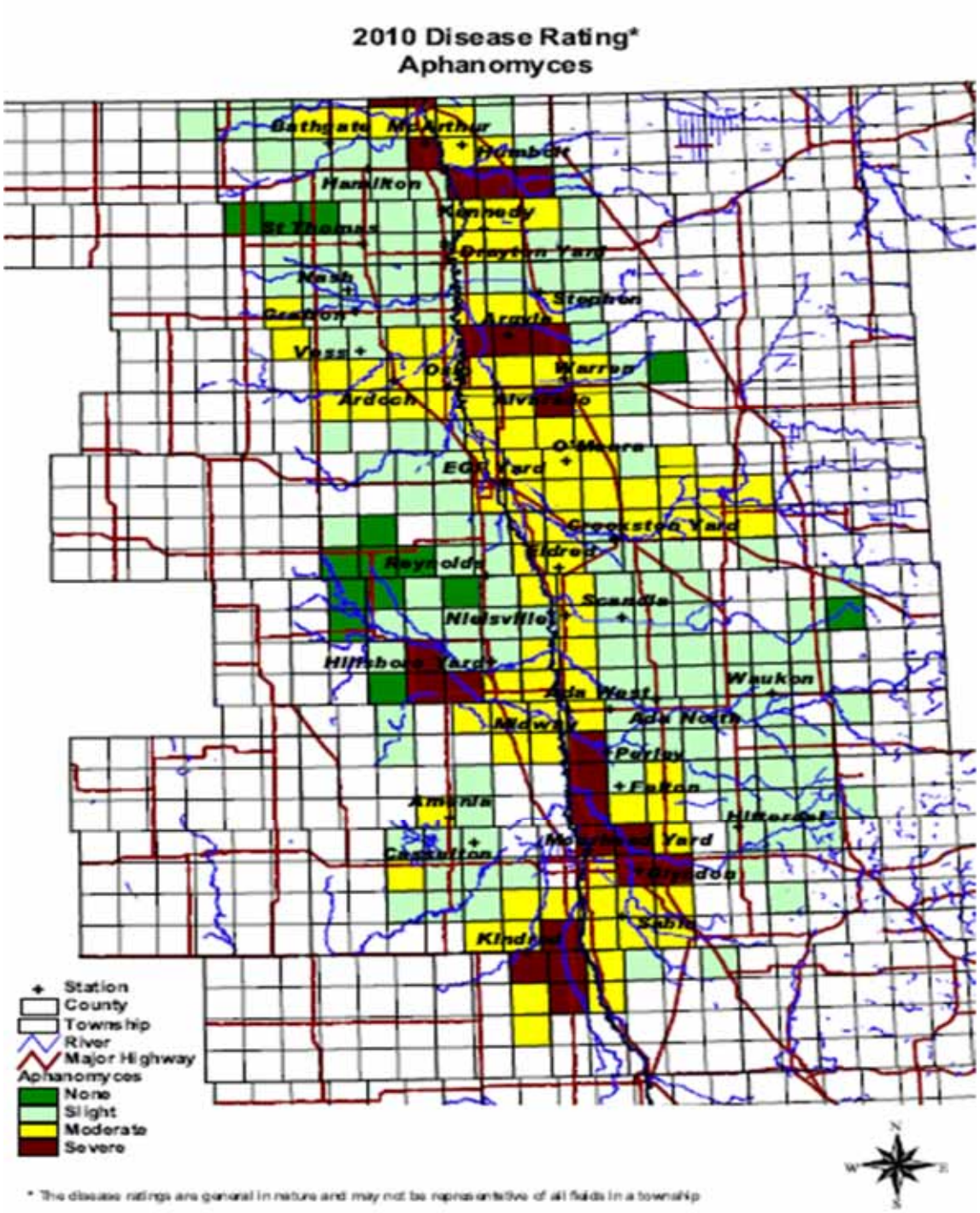
**Quadris application timely = effective**

# 2012 ACSC RHIZOCTONIA MANAGEMENT OPTIONS

| American Crystal Sugar Company | Quadris® | Headline® fungicide | Quadris® | Quadris® |
|---|---|---|---|---|
| | **AT-PLANT** | **AT-PLANT** | **POST** | **POST** |
| METHOD | T-BAND (4”) | IN-FURROW | BAND (7-11”) | BROADCAST |
| TIMING | At plant | At plant | Just prior to 65° F 4” soil temp | Just prior to 65° F 4” soil temp |
| RATE | 10 oz/Acre | 6-9 oz/Acre | 10 oz/Acre | 15 oz/Acre |
| TANK-MIXES | None Recommended | Starter Fertilizer | Glyphosate w/ min. surfactant | Glyphosate w/ min. surfactant |
| WATER VOL. | 8 gal/A | >1 gal/A | 10-20 gal/A | 10-20 gal/A |
| NOTES<br>**(see reverse side)** | • T-banding is the safest option for at-plant applications, Do not reduce rate<br>• Applying in-furrow is risky<br>• Less risk with in-furrow if planting late in warm soils<br>• More phytotoxic in cool soils | • Some stand loss may occur, adjust seeding rate accordingly<br>• Slight pressure : 6oz/A<br>• Severe pressure: 9oz/A<br>• Mix with water prior to adding to starter fertilizer<br>• Need good agitation<br>• May separate if left more than 4 hours without agitation<br>• Apply with minimum of 2.5gal/A of carrier | • Do not mix with conventional herbicides/insecticides<br>• Apply Quadris at midpoint between micro-rates<br>• Do not add deposition aids when mixing with glyphosate<br>• Narrower bands are most effective, do not reduce rate | • Do not mix with conventional herbicides/insecticides<br>• Apply Quadris at midpoint between micro-rates<br>• Do not add deposition aids when mixing with glyphosate<br>• This is our least preferred method, but still beneficial |

# Aphanomyces



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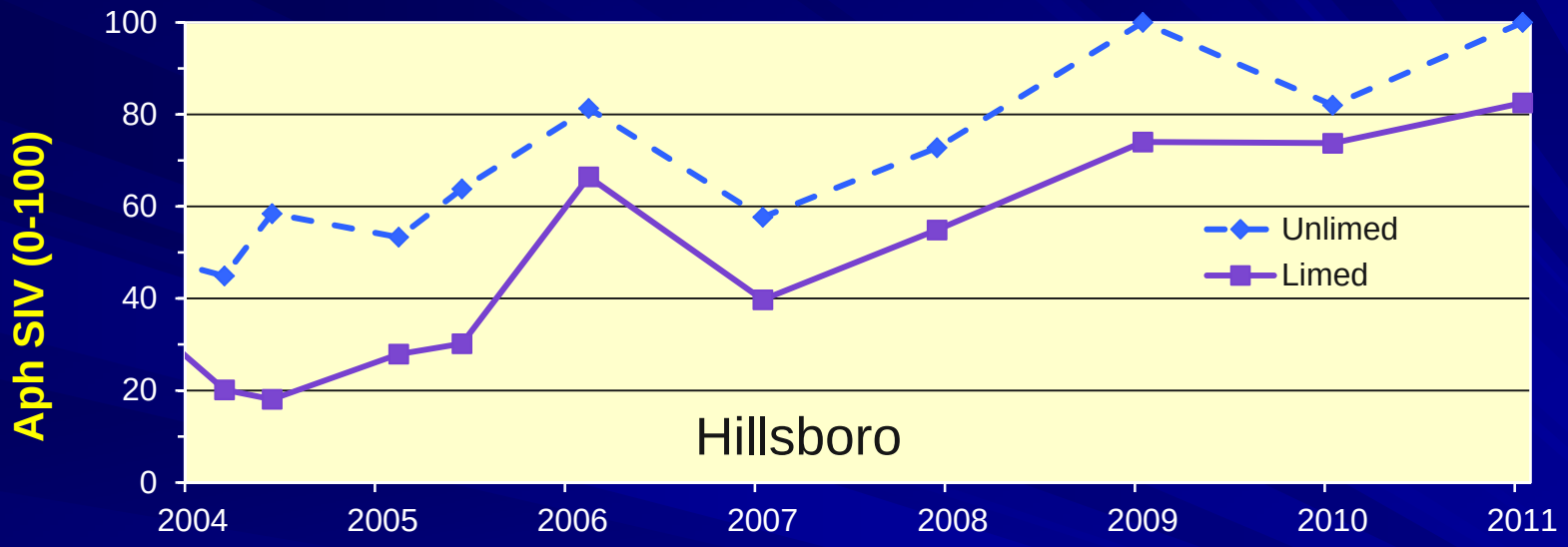
# Aphanomyces

- Select a variety with a rating of 4.4 or less
  - 7 varieties currently for sale with a rating of 4.4 or less
- Use Tachigaren for early season symptoms
  - Provides 3 to 4 weeks of seedling protection
- RRV occurrences tend to be late season infections
- Improve soil structure
  - Surface drainage, tiling or lime application
- Lime application only known treatment to reduce Aphanomyces level in the soil

# Hillsboro Aphanomyces Plot Limed in 2003




SIV values indicate reduced Aphanomyces levels eight consecutive seasons after a Lime application

C. Windels J. Brantner A. Sims and C. Bradley Univ. of MN, NWROC

# Hillsboro: Moderate Aph Disease 2011

C. Windels J. Brantner A. Sims and C. Bradley, Univ. of MN, NWROC

| Lime rate | Stand (100 ft row) | | Aph | Yield | Lb Rec | Gross revenue |
|---|---|---|---|---|---|---|
| (T/A) | 5 WAP | Harvest | RRR[y] | (T/A) | sucrose/A | ($/A) |
| 0 | 175 | 146 | 3.4 | 15.5 | 5167 | 903 |
| 5 | 175 | 151 | 2.9 | 18.1 | 6210 | 1116 |
| 10 | 198 | 182 | 2.3 | 18.0 | 6410 | 1191 |
| 20 | 191 | 171 | 2.6 | 17.5 | 6116 | 1118 |
| 30 | 182 | 165 | 2.6 | 19.8 | 6680 | 1180 |
| Linear[z] | NS | NS | * | ** | ** | * |

[y] Aph root rot rating= 0-7 scale, 0= healthy, 7 = root completely rotted and foliage dead

[z] Significant at *P=0.05,* ** = Significant at *P=0.01*, NS = Not significant

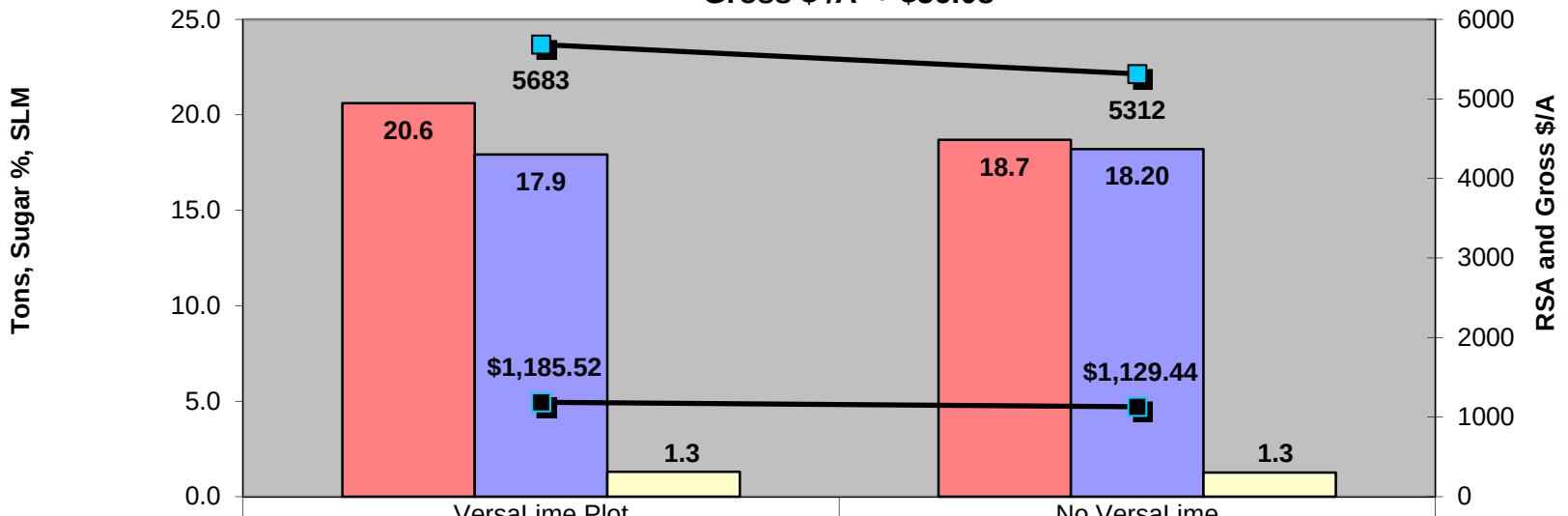
* One 10 ton Lime app. (8 years ago) increased tonnage 2.5 ton

# 2011 VersaLime Plots

## Average of Three Sites in Drayton District

**VersaLime: Yield +1.9 Sugar -0.3% SLM 0% RST -7.0 RSA +369**

**Gross $ /A + $56.08**




| | VersaLime Plot | No VersaLime |
|---|---|---|
| Tons | 20.6 | 18.7 |
| Sugar % | 17.9 | 18.20 |
| SLM | 1.3 | 1.3 |
| Gross $/A | $1,185.52 | $1,129.44 |
| RSA | 5683 | 5312 |

# Spent Lime Effects on Potato – 2011

## UM Potato/Lime Research – Dr. Smith, NWROC

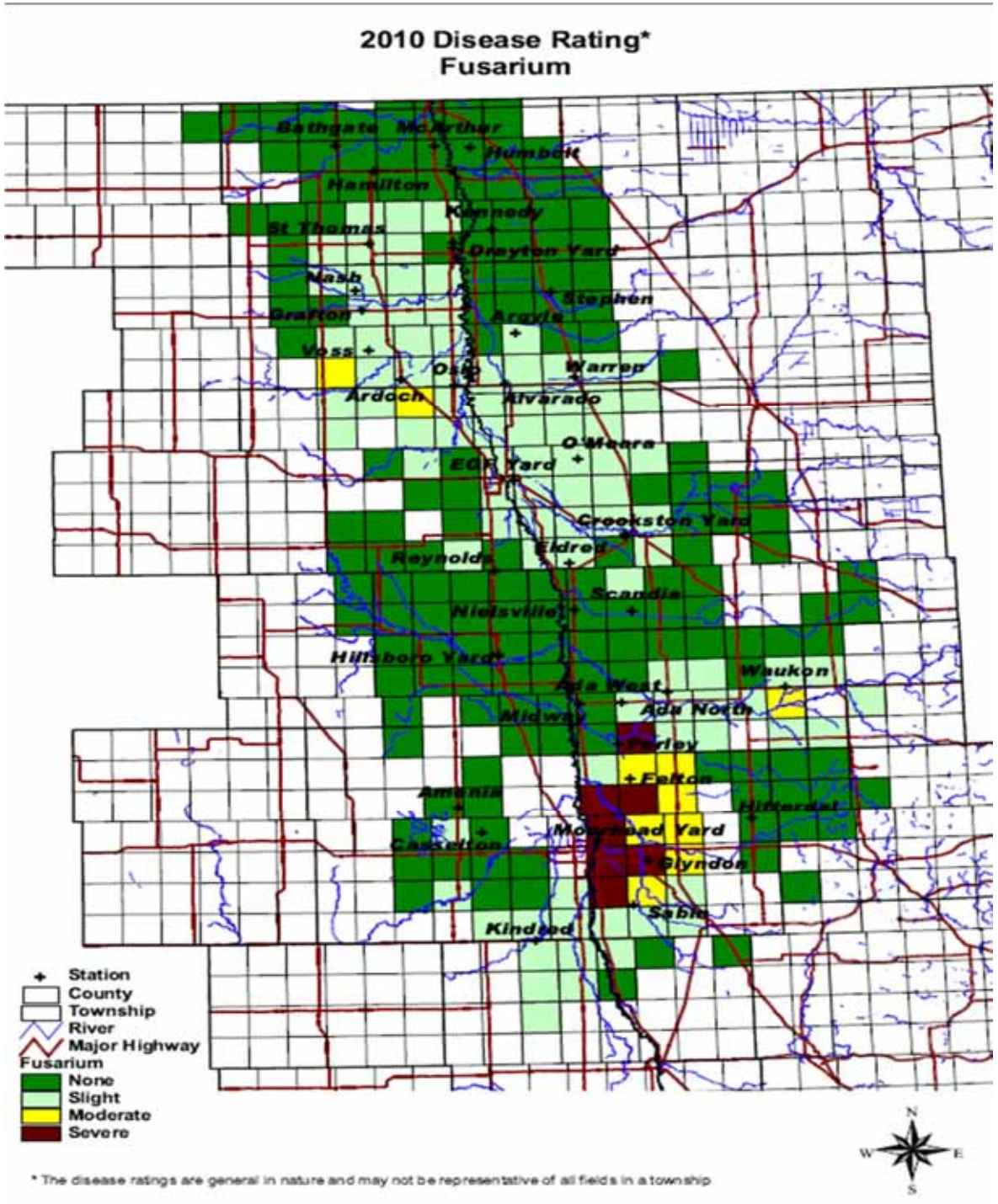
| Treatment | Yield (Cwt/A) |
|---|---|
| **10 ton + 95 lb P2O5/A** | **439** |
| **5 ton + 95 lb P2O5/A** | **436** |
| **10 ton lime** | **434** |
| **Check + 95 lb P2O5/A** | **433** |
| **20 ton lime** | **431** |
| **5 ton lime** | **423** |
| **Check** | **390** |
| **LSD (0.05)** | **24.55** |

Planted: May 26,2011
Variety: Red Norland
Fungicides: Echo 5x starting July 22 for blight control
Harvested: September 16, 2011

# Aphanomyces and VersaLime

- VersaLime improves soil structure allowing for better water movement in RRV soils
- VersaLime has no detrimental effects on other rotational crops
  - Improved yields seen on all crops
- The use of resistant varieties and VersaLime can help reduce disease and improve yield on sugar beets

# Fusarium


2010 Disease Rating*
Fusarium
Bathgate
McArthur
Humbolt
Hamilton
Kennedy
St Thomas
Drayton Yard
Nash
Grafton
Stephen
Argyle
Voss
Warren
Ardoch
Alvarado
O'Meara
Crookston Yard
Eldred
Reynolds
Scandia
Nielsville
Hillsboro Yard
Waukon
Ada West
Ada North
Midway
Felton
Hitterdal
Moorhead Yard
Glyndon
Sabin
Kindred
Station
County
Township
River
Major Highway
Fusarium
None
Slight
Moderate
Severe
N
W
E
S
* The disease ratings are general in nature and may not be representative of all fields in a township

# Fusarium

- Likes wet, poorly structured soils
- Long lived in the soil
- Optimum soil temp above 75 F
- Can be confused with Verticillium Wilt

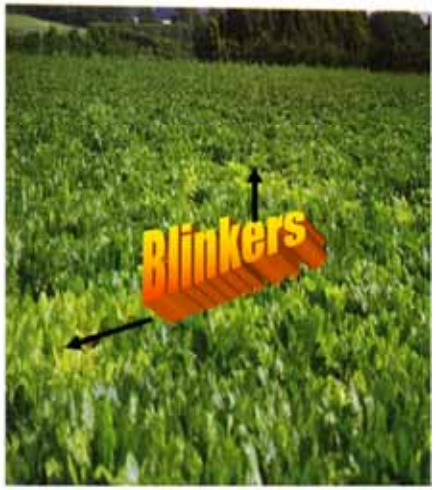
# Fusarium Management With Disease Resistant Varieties

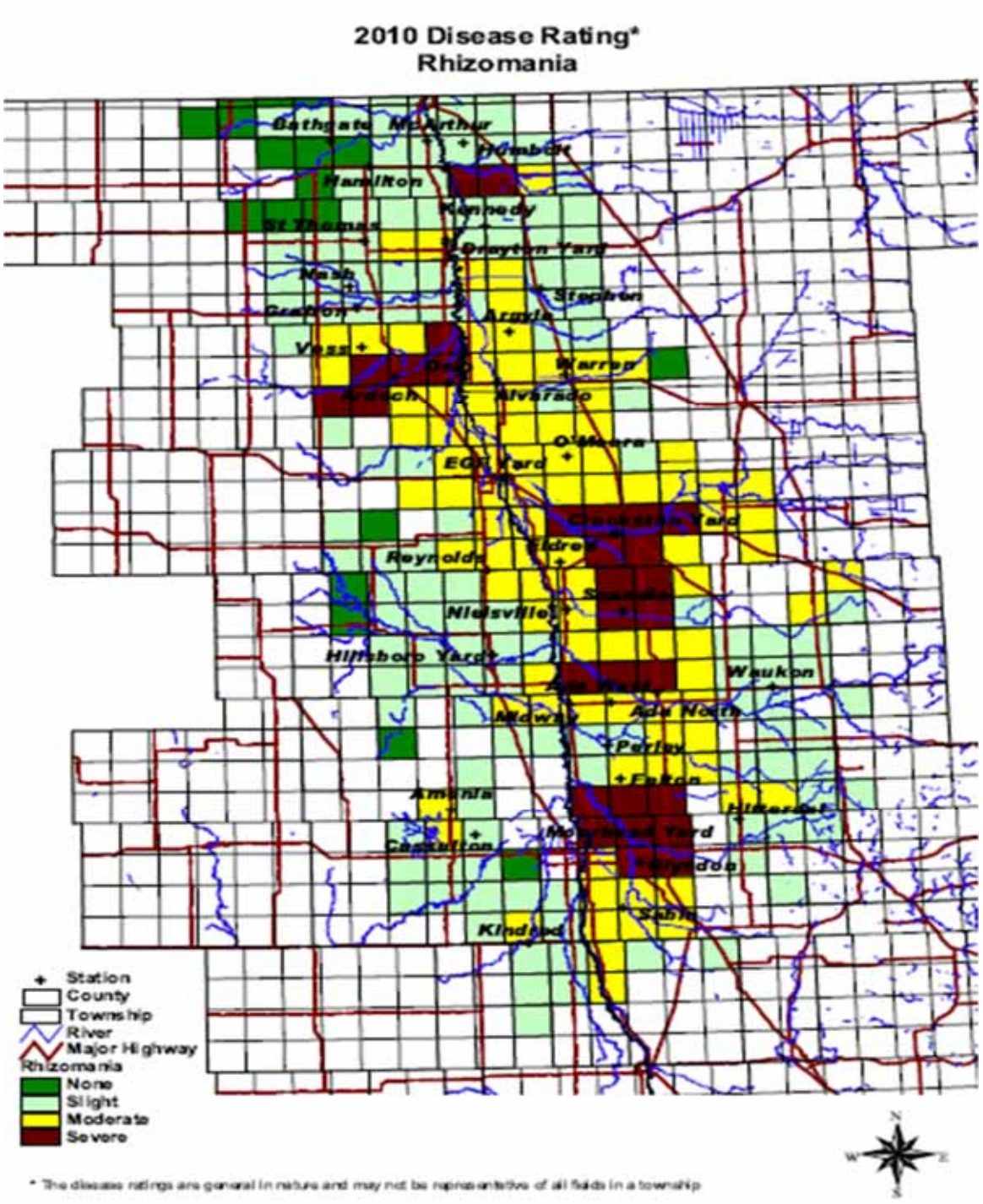
- **Disease root rating of 3.0 or less.**
- **Crystal** - 658RR, 539RR, R761, R434
- **Beta** - 89RR50, 89RR30, 1125R
- **Disease root rating between 3.0 and 4.0**
- **Crystal** - 879RR, 093RR
- **Beta** - 80RR52, 80RR32, 80RR12, 89RR31, 89RR83, 88RR41, 87RR38

# Rhizomania

## RHIZOMANIA
### Identification – Detection

- Virus carried by a fungus
- Large number of small lateral roots
- Root may be small with dark veins or rot
- Leaves bright in color and extend upright
- The infection blocks water and nutrients uptake

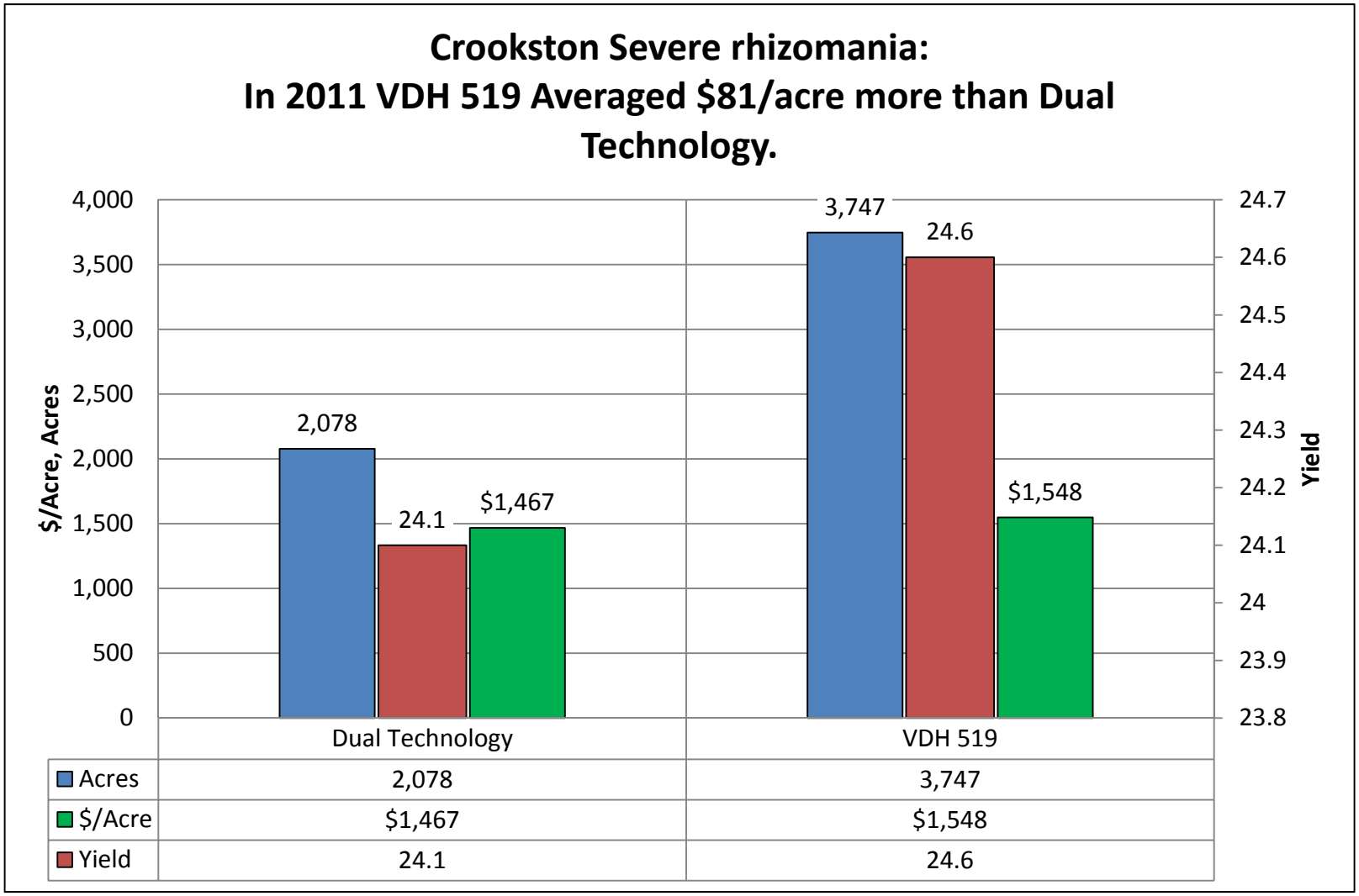





2010 Disease Rating*
Rhizomania
Bathgate
McArthur
Humbolt
Hamilton
Kennedy
St Thomas
Grayton Yard
Nash
Stephen
Beaton
Argyle
Voss
Warren
Alvarado
O'Meara
EGH Yard
Reynolds
Eldred
Niagsville
Hillsboro Yard
Waukon
Ada North
Perley
Fulton
Hillcrest
Maryland Yard
Castleton
Kindred
Station
County
Township
River
Major Highway
Rhizomania
None
Slight
Moderate
Severe
* The disease ratings are general in nature and may not be representative of all fields in a township

# 2010 Rhizomania
## “Blinkers”

# Rhizomania Root Symptoms

# Dual Technology



# Dual Technology Varieties

- SESVanderhave – 48607TT, H48716TT, 48717TT, H48810TT, H36711RR, H36811RR, H36812RR, H36916RR
- Hilleshog – 4012RR, 4022RR, 4094RR
- BetaSeed – BTS 80RR32, BTS 89RR50, BTS80RR52, BTS 88RR41, BTS 89RR83, BTS 88RR83
- Crystal – 879RR, R761, 091RR, 093RR, 095RR
- Seedex – Deuce, UplanderRR, UsherRR, VictorRR

# Cercospora Management

# History of Tolerance/Resistance to Fungicides in the RRV

- Benlate, Mertec and Topsin M – 1981
  - Cercospora control with these products continues to be subpar as stand alone fungicides
- Triphenyltin Hydroxide (Tin products) – 1998
  - Tin products were not recommended after Eminent and other fungicides came to market
  - Tolerance to the Tin products has diminished
- Eminent – 2006 & 2010
  - Tolerance to Eminent in the Minn-Dak growing region flourished in 2006
  - After just one year out of the Minn-Dak market, tolerance subsided
  - Increased levels of tolerance were noticed in Moorhead district grower fields and research trials in 2010
- Headline – 2011
  - The Cercospora fungus has begun mutating and is, in some cases, fully resistant to Headline in areas of Michigan

# Resistance Management

| Strobilurins | Sterol Inhibitors (Triazoles) | EBDC | Benzimidazole | TPTH |
|---|---|---|---|---|
| Headline | Eminent | Penncozeb | Topsin M | Super Tin |
| Gem | Inspire XT | Manzate | | AgriTin |
| Quadris | Proline | | | |

- Good resistance management starts with a rotation between classes of fungicides.
  - Never use fungicides from the same class of chemistry back-to-back.
- Tank mixing of various classes is a good resistance management tool
- Use sufficient water amounts (20 gal by ground and 5-7 gal by air)

# Cercospora Control and Resistance Management

- Tank mixes and rotation of fungicide classes are the best resistance management tools

# NWROC Study – 2011

## Courtesy Dr. Larry Smith

| **Treatment** | **RSA** (lb/A) | **KWS** (1-9) | **Gross Return** ($/A) |
|---|---|---|---|
| Inspire XT + TPTH | 10,670 | 3.1 | $1,921 |
| Inspire XT | 9,625 | 4.6 | $1,652 |
| Combination Difference | 1,045 | 1.5 | $269 |

# NWROC Study – 2011

## Courtesy Dr. Larry Smith

| **Treatment** | **RSA** (lb/A) | **KWS** (1-9) | **Gross Return** ($/A) |
|---|---|---|---|
| Proline + Induce + TPTH | 10,829 | 3.9 | $1,966 |
| Proline + Induce | 9,536 | 5 | $1,643 |
| Combination Difference | 1,293 | 1.1 | $323 |

# NWROC Study – 2011

## Courtesy Dr. Larry Smith

| **Treatment** | **RSA** (lb/A) | **KWS** (1-9) | **Gross Return** ($/A) |
|---|---|---|---|
| Eminent + TPTH | 10,165 | 4.3 | $1,748 |
| Eminent | 8,587 | 6.8 | $1,465 |
| Combination Difference | 1,578 | 2.5 | $283 |

# Cercospora Control and Resistance Management

- Tank mixes and rotation of fungicide classes are the best resistance management tools

- Target a three spray program for best returns

# Fungicide Use and Profitability

**Number of Fungicide Applications - 5-Year Average (2007-2011)**

| Number of Applications | Harvested Acres | Yield | Percent Sugar | Percent SLM | Recoverable Sugar per Ton | Recoverable Sugar per Acre | Revenue per Ton | Revenue per Acre |
|---|---|---|---|---|---|---|---|---|
| 1 | 387,760.9 | 22.7 | 17.19 | 1.11 | 322 | 7,309 | $ 54.01 | $1,226.03 |
| 2 | 1,037,496.0 | 24.5 | 17.84 | 1.12 | 334 | 8,183 | $ 57.58 | $1,410.71 |
| 3 | 454,423.6 | 24.9 | 17.97 | 1.11 | 337 | 8,391 | $ 58.47 | $1,455.90 |

**Number of Fungicide Applications - Crop Year 2011 (Rep Fields)**

| Number of Applications | Harvested Acres | Yield | Percent Sugar | Percent SLM | Recoverable Sugar per Ton | Recoverable Sugar per Acre | Revenue per Ton | Revenue per Acre |
|---|---|---|---|---|---|---|---|---|
| 1 | 36,058.0 | 21.4 | 17.94 | 1.30 | 333 | 7,126 | $ 58.05 | $1,240.77 |
| 2 | 168,811.1 | 21.3 | 18.05 | 1.31 | 335 | 7,136 | $ 58.85 | $1,255.48 |
| 3 | 161,674.4 | 22.4 | 18.19 | 1.23 | 339 | 7,594 | $ 60.30 | $1,352.65 |

# Recommendations

- Initiate your Cercospora Leaf Spot program when CLS has first been identified and confirmed in your area

- The Ag staff will notify growers by text message, internet and/or post card when CLS is first identified in the district

# 3-Spray Program

- 1st application in late July or early August
  - TPTH (Super Tin/Agritin) + Topsin
- 2nd application 14 days after initial application
  - TPTH + one of the triazoles (Inspire XT, Proline or Eminent)
- 3rd application in late August (usually after August 25th)
  - Headline
    - If you have Headline resistance in nearby fields from 2011 Headline application should be tank mixed with TPTH or Mancozeb
- Tank mix partners should be no less then 75% of the stand alone, full rate recommendation

# 2-Spray Program

- Only consider a 2 spray option when weather conditions and/or growing conditions favor a later start

- 1st application in mid-August
  - TPTH + triazole or
  - TPTH + Topsin (Cercospora tolerance to Topsin develops quickly, so triazole is preferred)

- 2nd application in late August
  - Headline
    - If you have Headline resistance in nearby fields from 2011 Headline application should be tank mixed with TPTH or Mancozeb

# 1-Spray Program

- Not recommended
- If growers choose this option, then a **tank mix is strongly encouraged**
- Apply in late August
  - Headline (full rate) + TPTH or
  - Headline (full rate) + one of the triazoles

# Cercospora Sensitivity/Resistance - 2011
# For Headline EC-50

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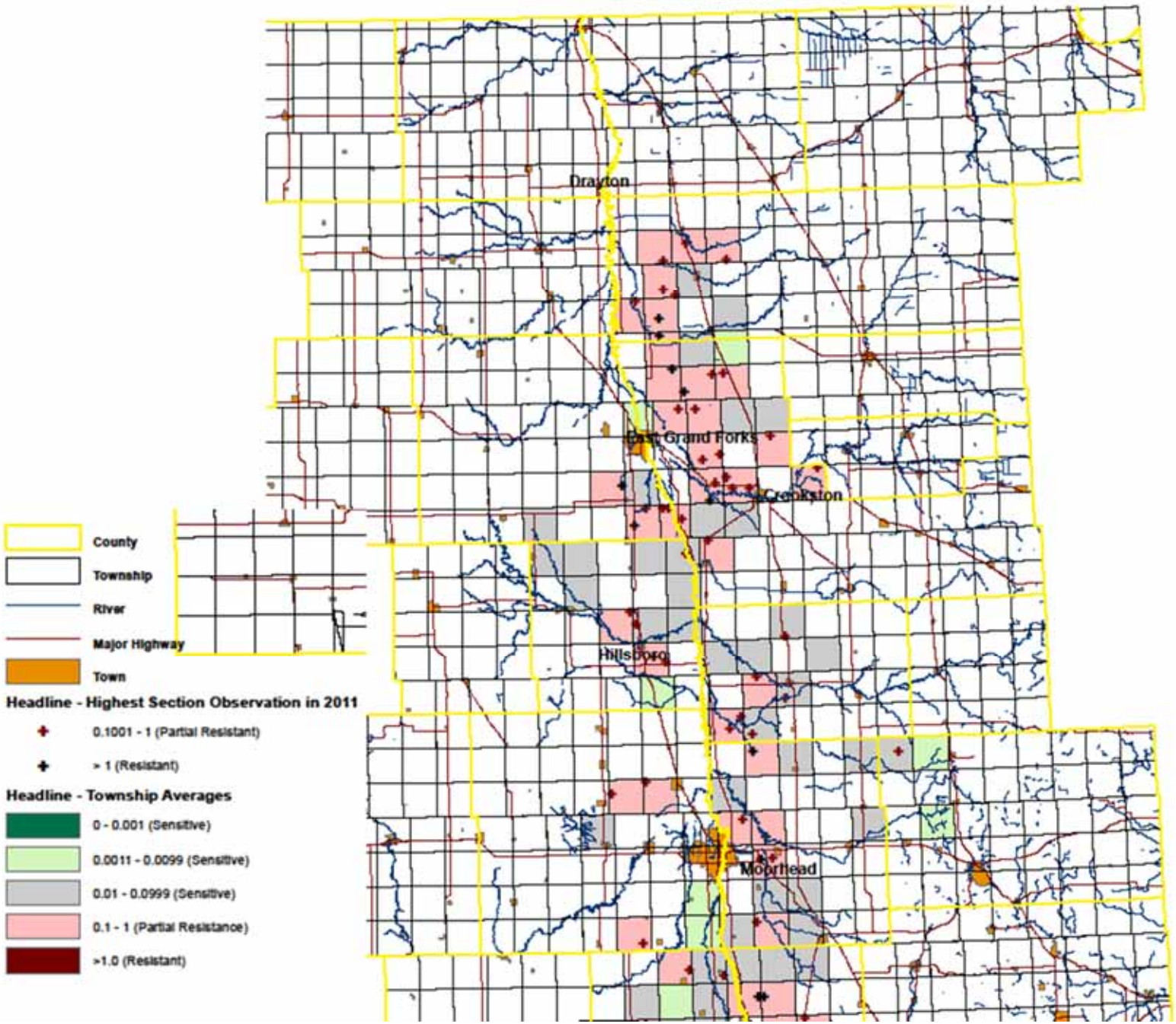


# Sugarbeet Root Maggot Management

# First Application Control Practices

- Counter is the recommended product to be used in heavy SBRM areas

| Insecticide | Recommended rates (product/ac) for expected population levels | | | Timing Options |
|---|---|---|---|---|
| | Low | Moderate | High | |
| Counter 20G RUP | 4.5 lb. | 7.5 lb. | 8.9 lb. | Planting-time or Post |
| Counter 15G RUP | 5.9 lb. | 10.0 lb. | 11.9 lb. | Planting-time or Post |
| PB, Cruiser, NipsIt | Seed Applied | *NR | *NR | Planting time |
| Lorsban 15G RUP | 6.7 lb. | 10.0 lb. | 13.4 lb. | Planting-time or Post |
| Temik 15G RUP | 6.7 lb. | 10.0 lb. | 14.0 lb. | Planting-time & Post |

RUP – Restricted Use Pesticide

*NR – Not Recommended without a 2nd application of an insecticide

# Counter 20G Replacing 15G

- **Same active ingredient as 15G formulation**
- **20G is 75% of the 15G rate = less time re-filling planters**
- **Conversion table for calibration:**

| Target Rate lb (AI) / ac | OLD Counter 15G | | ***NEW*** **Counter 20G** | |
|---|---|---|---|---|
| | lb. product/ac | oz. per 1000 row ft | lb. product/ac | oz. per 1000 row ft |
| 0.9 | 6 | 4 | 4.5 | 3 |
| 1.05 | 7 | 4.7 | 5.25 | 3.5 |
| 1.2 | 8 | 5.4 | 6 | 4 |
| 1.5 | 10 | 6.7 | 7.5 | 5 |
| 1.8 | 11.9 | 8 | 8.9 | 6 |

# Postemergence Maggot Control

## Auburn, ND 2009

Check

Counter 10 lb

Poncho Beta

Counter 10 lb +
Lorsban 4E 1 pt/ac

Poncho Beta +
Lorsban 4E 1 pt/ac

# Seed Treatments vs. Counter

## Maggot Control - St. Thomas, ND 2007

Check

Counter 10 lb

Cruiser

NipsIt

Poncho Beta

# SBRM Control
# No Poncho, Cruiser or NipsIt

- Option 1 - Counter at planting followed by a post application of Thimet 10 to 14 days before peak fly

- Option 2 - Counter at planting followed by two 1 pint applications of Lorsban 4E
  - One app 4 days prior to peak fly and 1 app at peak fly

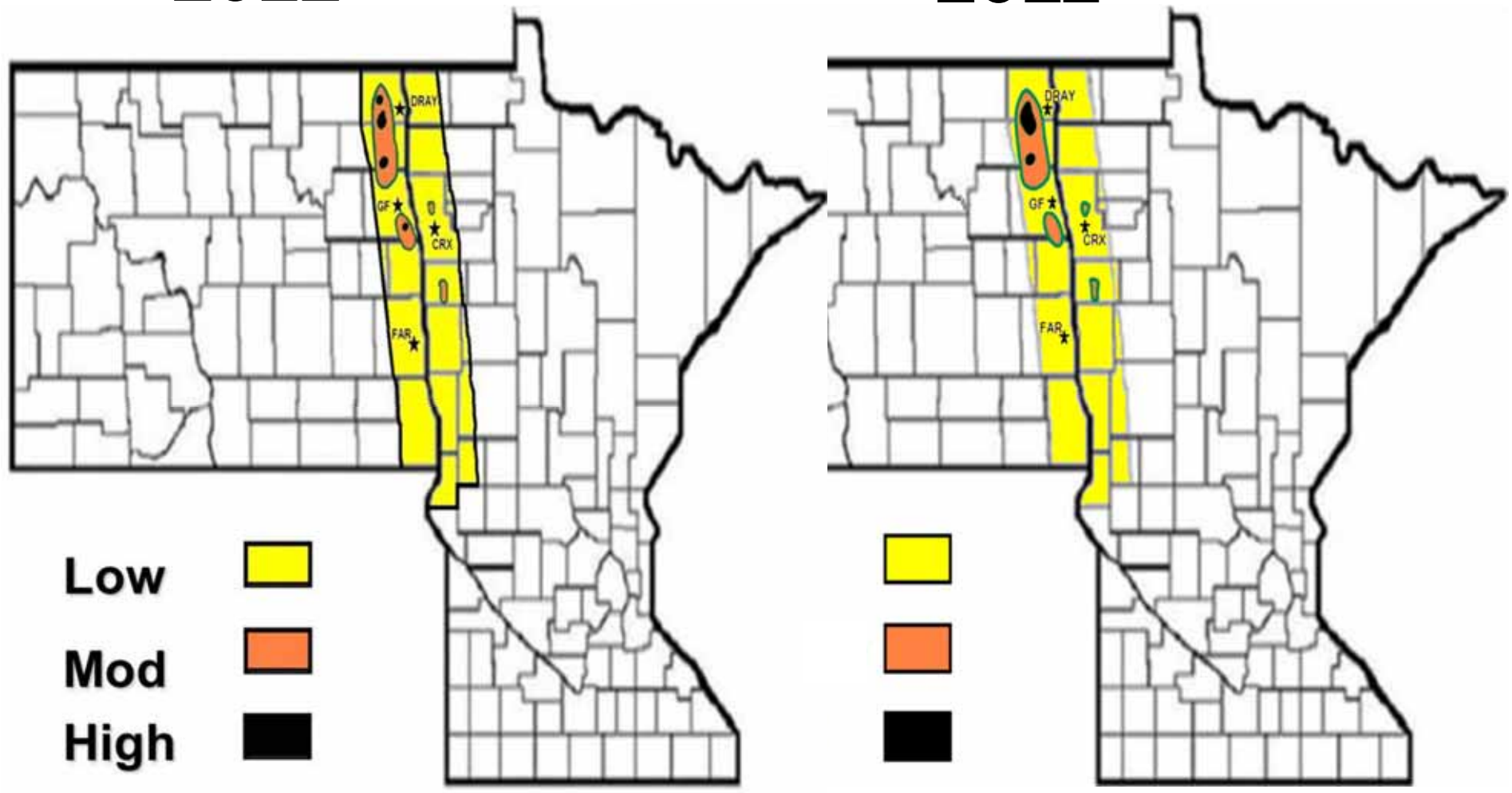
- Option 3 - Mustang at planting followed by post application of Thimet
  - Only if no insecticide boxes available on planter and no seed treatment used

# SBRM Control
# With Poncho, Cruiser or NipsIt

- Option 1 – Seed Treatment at planting followed by post application of Thimet 10 to 14 days before peak fly (best application in high pressure areas)
- Option 2 – Seed Treatment at planting followed by two 1 pint applications of Lorsban 4E
  - One app 4 days prior to peak fly and one app at peak fly
- Option 3 – Seed Treatment at plant followed by one 2 pint application of Lorsban 4E at peak fly
- Fly counts are posted on the ASCS Web Site

# Root Maggot Risk* for 2012

**2012** **2011**

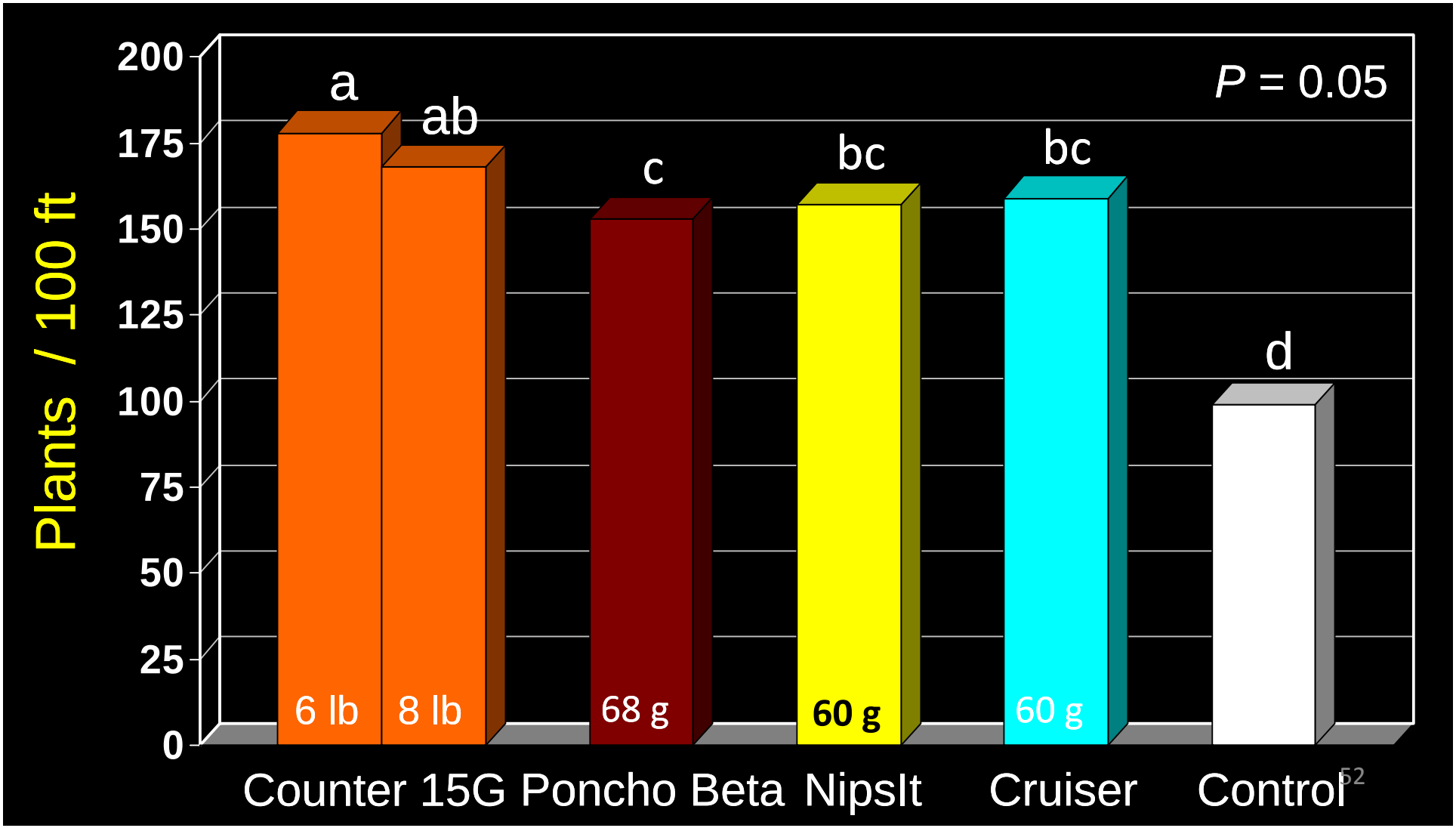



***Based on fly counts & root damage ratings**

# Springtail Control

## *Surviving Plants* (2006-2008)

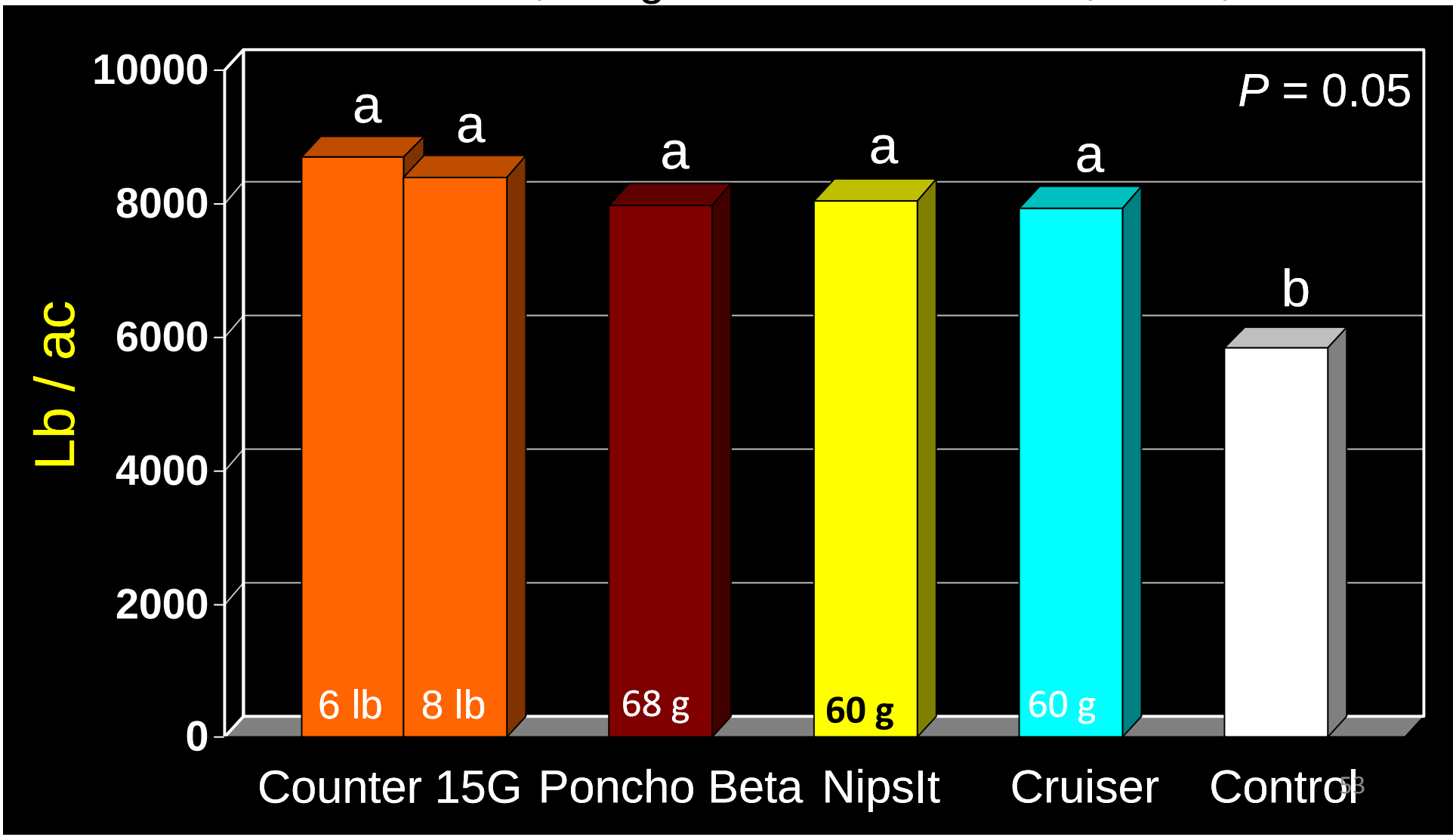
Boetel, Dragseth and Schroeder, 2010, NDSU



# Springtail Control

## *Sucrose Yield* (2006-2008)

Boetel, Dragseth and Schroeder, 2010, NDSU



# Springtail Control

- No insecticide is labeled for springtail control in sugarbeet
- Springtail insect pressure continues to increase
- Counter has the most consistent control
- Poncho Beta, NipsIt and Cruiser provide fair control

# Take Home Message

- Rhizoctonia
  - Select variety with score of < 3.82 and band apply Quadris at 4-6 leaf stage or 65° F soil temp
  - Err on the early side
- Aphanomyces
  - Select variety with score of < 4.4 and consider Versa Lime application
- Rhizomania
  - Use a dual technology variety
- Fusarium
  - Select variety with score of < 3.0

# Take Home Message

- Cercospora
  - Tank mixing Fungicides will provide greatest return on your investment
- Root Maggots and Springtails
  - Counter at plant is your most reliable and cost effective choice

# Questions