

# **Disease and Insect Management**

# **Rhizoctonia**

## **Impact on your Beet**

### **Payment**

- In the Field
- Storage Pile
- Factory

# Rhizoctonia Impact In the Field

- Reduced Tonnage
- Reduced Sugar Content
- Field Abandonment



Rhizoctonia big patches in a field



Rhizoctonia infects individual plants random throughout field



# Crown Rot



**The most common symptom is wilting of the leaves, starting with the oldest leaves. Leaves may or may not become yellow. In some instances, the petioles may develop some blackening where they are attached to the crown.**

# Root Rot



Root rot symptoms may range from scattered brown to black lesions on the root surface to complete rotting of the root. Initially, the disease may occur in a few patches in a field. *If significant inoculum is present*, entire sugar beet fields may be lost to the disease when *conditions are favorable for disease development*.

# Rhizoctonia Field Progression



*Disease progression  
down the row from  
heavy to slight*



# ACSC Growers Field Data

## 5 year summary

	Yield	Sugar %	SLM	Rec Sugar/Ton	Rec Sugar/Acre	\$/Acre
No Quadris Applied	26.5	17.65	1.15	330	8,745	1,282
Quadris Applied	27.3	19.91	1.16	335	9,146	1,360

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Quadris return \$78 per Acre



# Rhizoctonia in the Factory

- Increase in Inverted Sugar
- Decrease in Raw Juice Quality
- Reduction in Slice
- Increased Factory Operation Cost

# Invert Sugar in the Factory

- For every 1 lb of invert, the factory loses at least 1.5 lbs of good sugar to molasses
- Inverted sugar creates more color in the juice purification process
- Elevated color forces the centrifuges to work harder – more factory cost

# ACSC Recommendation

## Rhizoctonia Control

### 1. CROP ROTATION

- ✓ Break up infection cycle and reduce inoculum buildup
- ✓ Rhizoctonia will survive on corn and bean residue

### 2. VARIETY SELECTION

- ✓ Rhizoctonia traits kick in later in the season



# ACSC Recommendation Rhizoctonia Control

## 3. SEED TREATMENT

- ✓ Improves stand establishment, crop vigor, and Yield
- ✓ (Kabina, Systiva, Metlock Suite, Rizolex, Vibrance)

## 4. POST APPLICATION OF QUADRIS

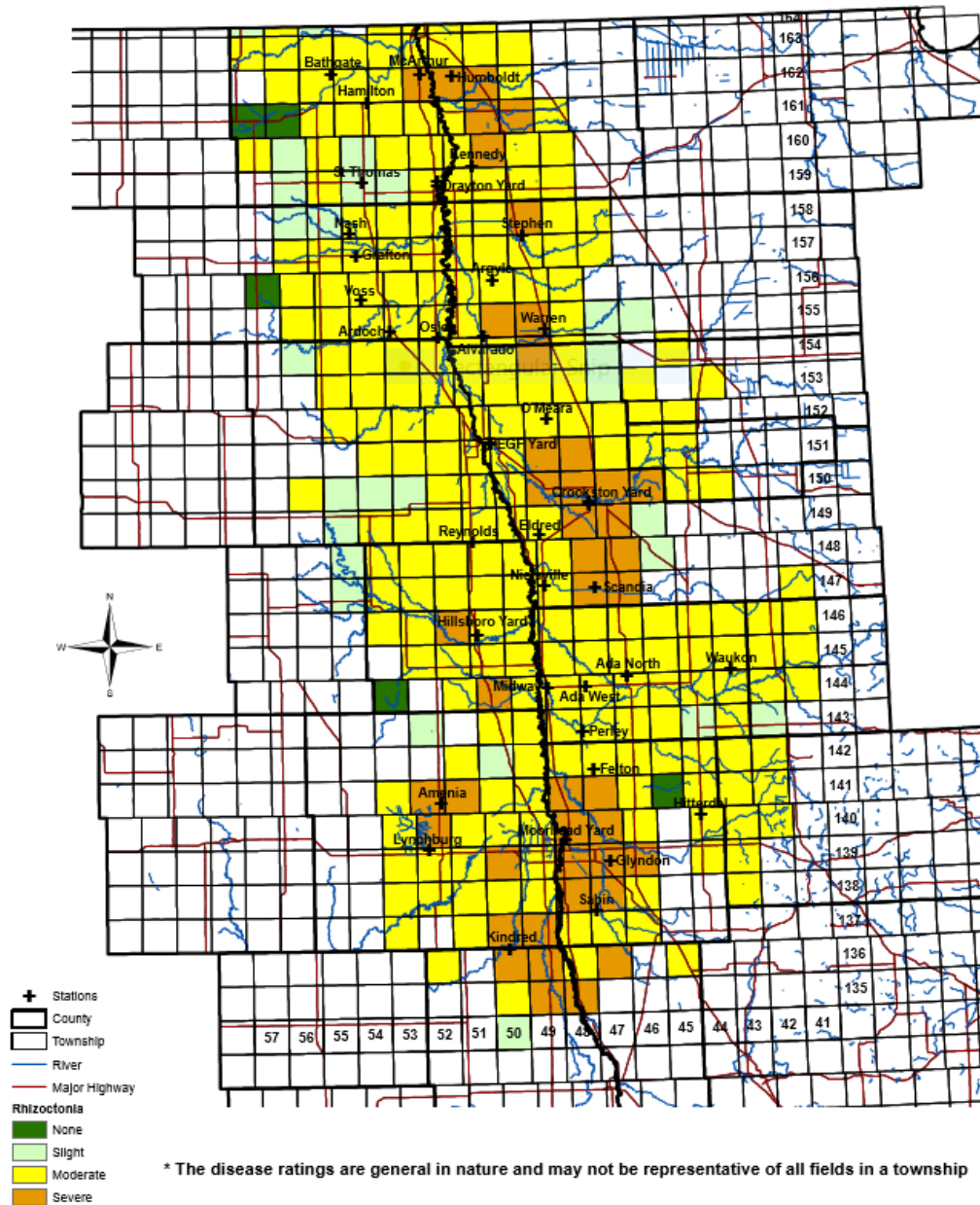
- ✓ (4-5 weeks after planting)
- ✓ Band preferred method, broadcast is still beneficial



# Research for 2017

- We are testing some products that may aid in Rhizoctonia control.
- Currently not enough data to make a recommendation.
- We will report the results of testing next winter.

## 2016 Disease Rating\* Rhizoctonia



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



**Rhizoctonia**

**Questions?**

# Aphanomyces

# Aphanomyces

- Is a Fungus (water mold) that attacks Sugarbeet roots
  - ✓ Seedling Stage
    - Early season
  - ✓ Chronic Stage
    - Late season
- Aphanomyces - was the main causal agent in Disease Destroyed Acreage in 2016 (Rhizoctonia being the secondary infection in many cases).

# Early Season Vs. Late Season

- Lesions develop near soil surface and progress into the blackened root
  - Emergence - June

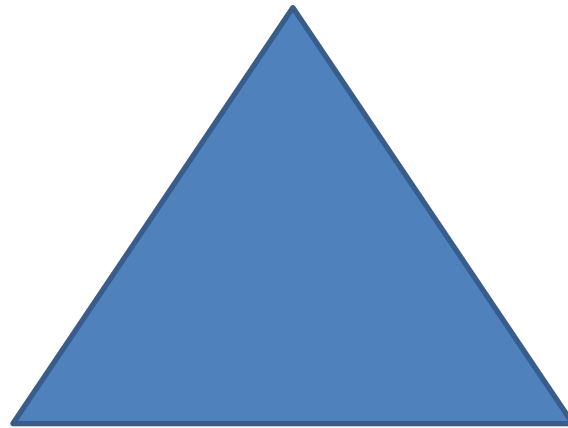
- Lesions form on the taproot and show a water-soaked appearance
  - June - Harvest



# Aphanomyces

- Necessities for developing disease

Host = Sugarbeets



Aphanomyces = Pathogen

Environment = 68-86°F Soil Temp  
Wet Soil Conditions

# VersaLime

- Apply 10 tons/acre
- Apply 1 year prior to sugarbeets for best results
- Spread as evenly as possible
- Incorporate thoroughly with tillage
- Consider an additional 5 tons per acre application on previously Versalime applied acreage
- Contact Ag Staff for assistance with Procedure

# Split field comparison

10 tons Lime vs. No Lime

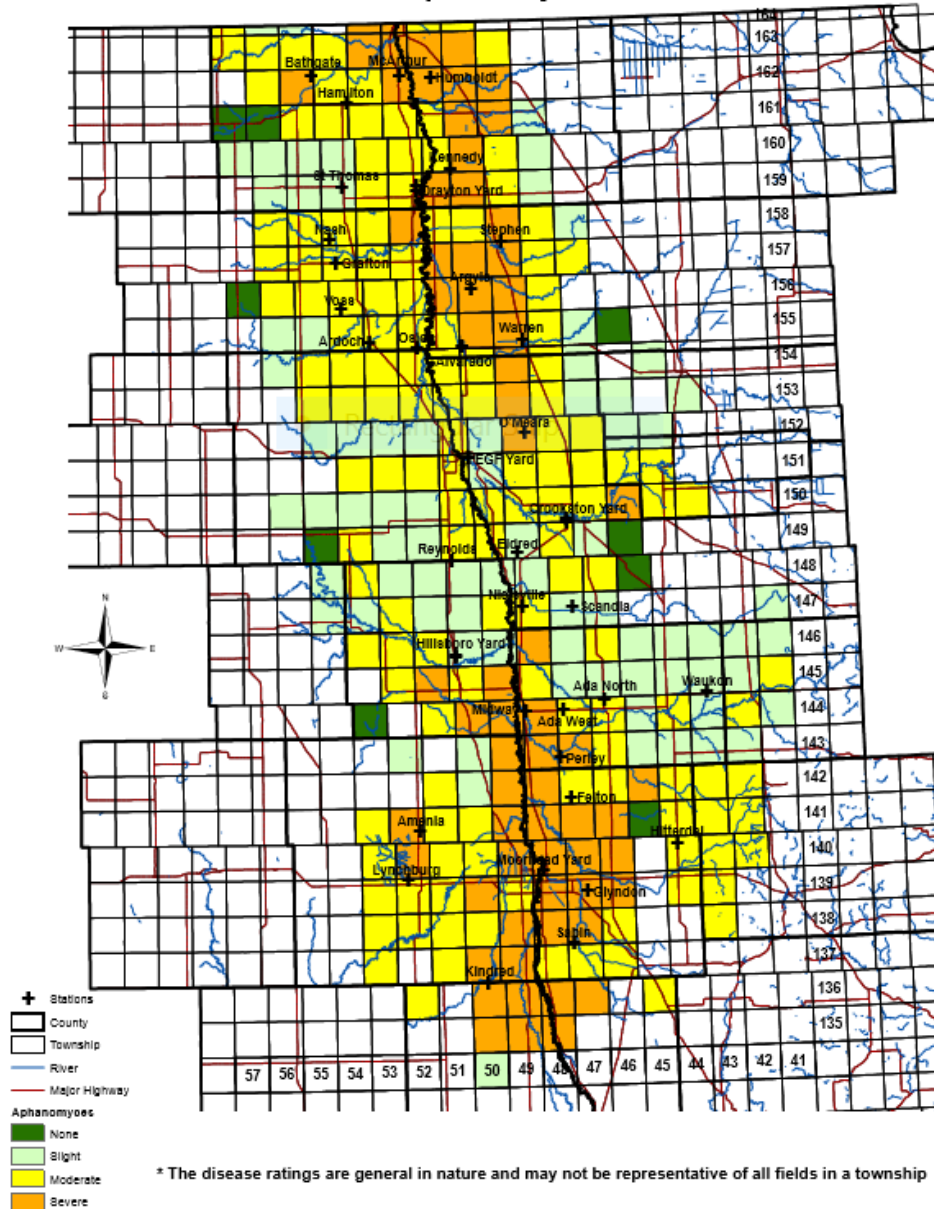


# Management of Aphanomyces

- Variety selection with a (root disease rating of 4.4 or less).
- Apply Tachigaren at 45 grams in moderate to severe Aphanomyces fields
- Tachigaren protects seeds 3-4 weeks
- Benefits of VersaLime have been shown to last 10 or more years by decreasing disease pressure



## 2016 Disease Rating\* Aphanomyces



# **Aphanomyces**

**Questions??**

# Sugarbeet Root Maggot (SBRM)

Adult Fly



Maggot (larval stage)



- Maggots overwinter as larvae, pupate and emerge in spring as flies in previous years beet fields
- Adult flies are monitored in current year beet fields with sticky stakes



AG  
**GOLD**  
STANDARDS

# (SBRM)

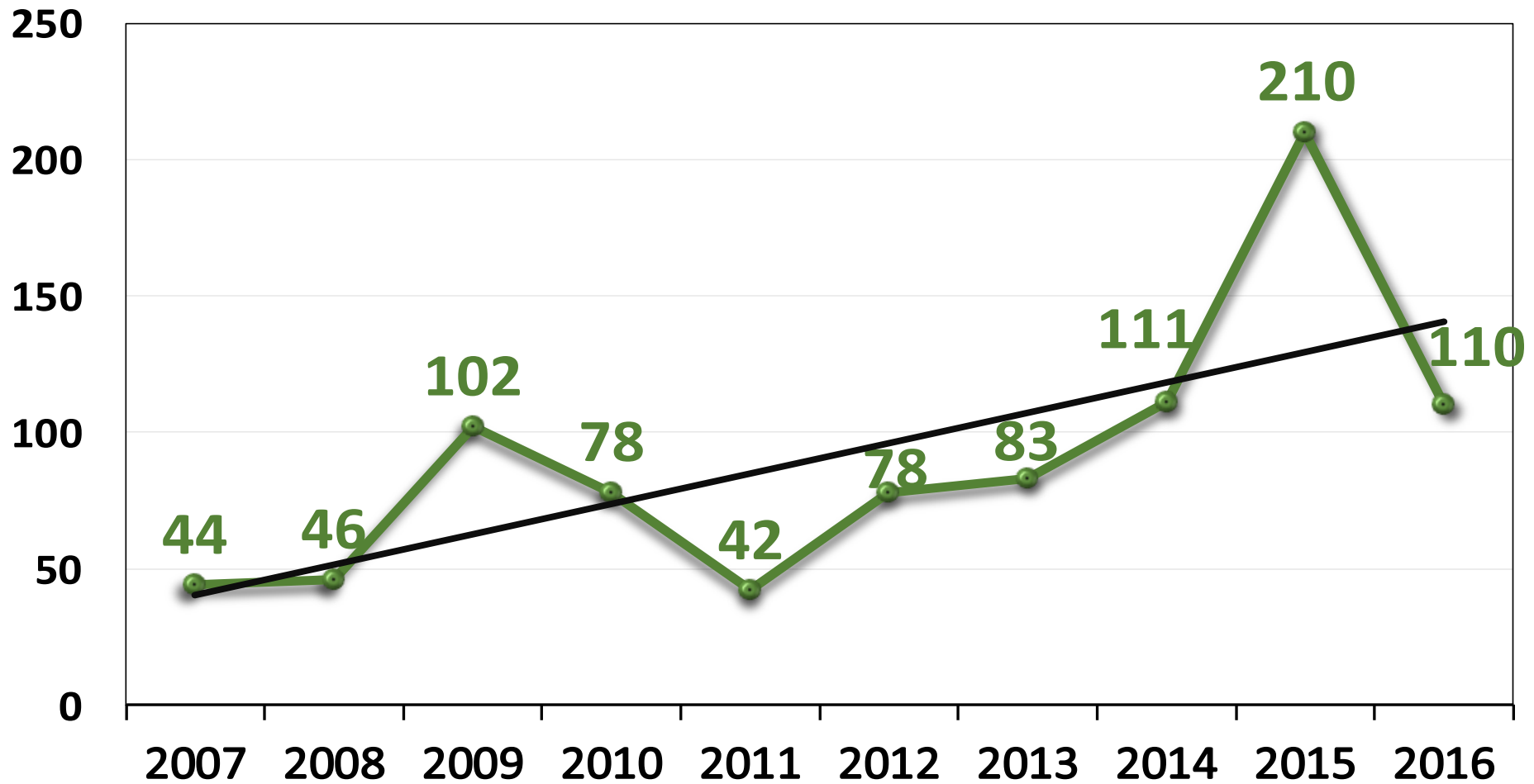
- Peak fly activity can occur anytime after 600 DD's are accumulated, on average, this occurs at 650 DD's
  - This is monitored at each NDAWN site in the RRV
  - NDSU monitors sticky stakes
- It is important to know that warm weather (around 80° F), and calm to low wind conditions are most conducive for fly activity
- Flies will remain fairly inactive in cool, rainy, or windy conditions



# Root maggot control efforts in '15 & '16 helped!

Dr. Mark Boetel (NDSU)

## Flies Per Trap in RRV: 2007 – 2016

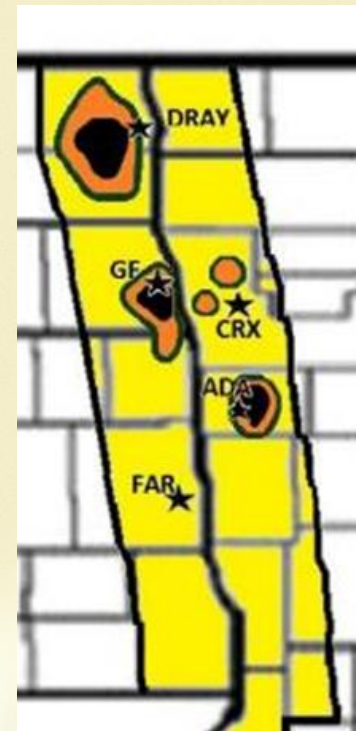


# Comparing 2015-2016

2015 SBRM MAP



2016 SBRM MAP



AG  
**GOLD**  
STANDARDS

# 2017 Root Maggot Forecast\*

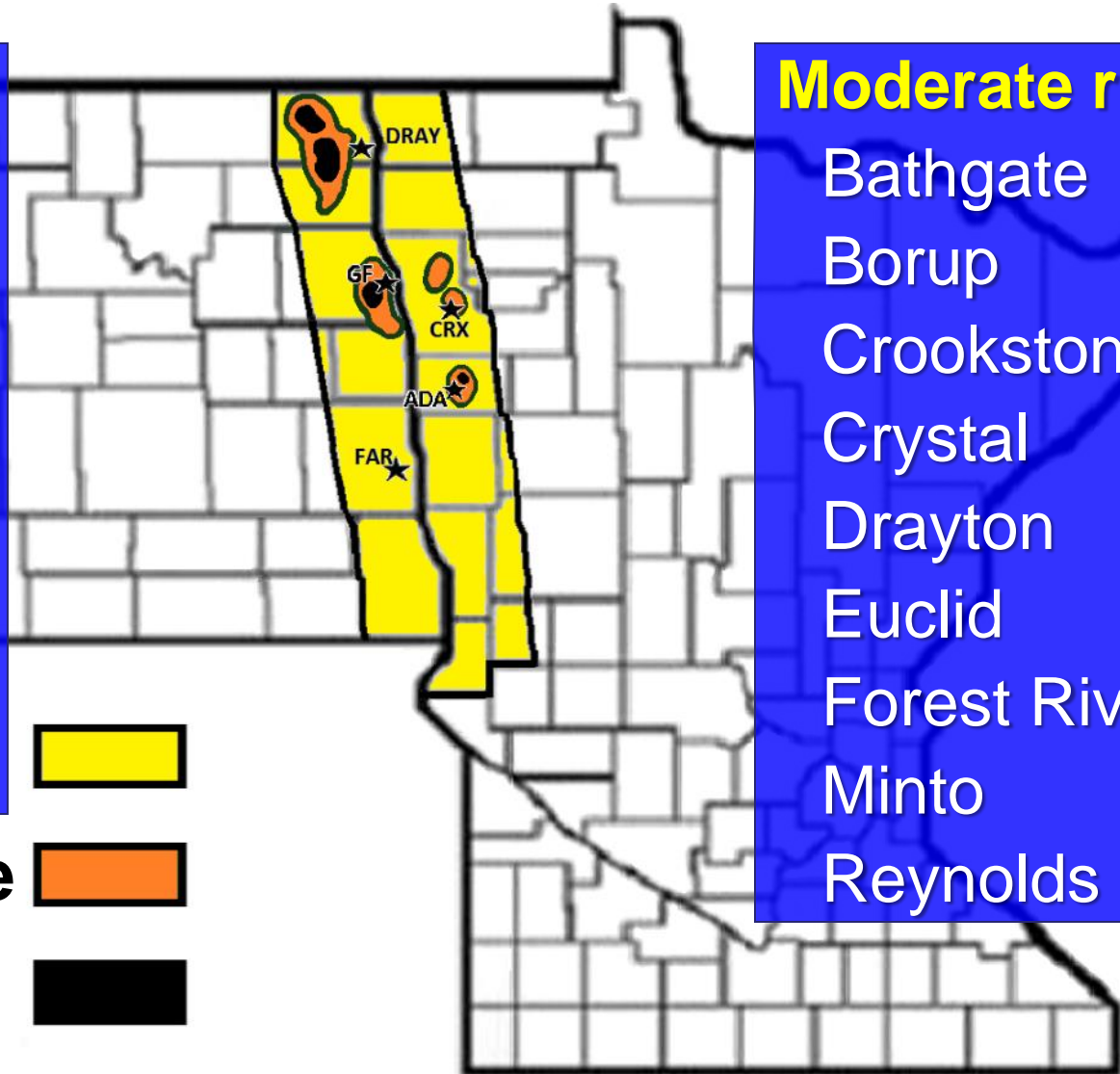
Dr. Mark Boetel (NDSU)

## High risk:

Ada  
Allendale  
Auburn  
Cavalier  
Grand Forks  
Merrifield  
St. Thomas  
Thompson

## Moderate risk:

Bathgate  
Borup  
Crookston  
Crystal  
Drayton  
Euclid  
Forest River  
Minto  
Reynolds



\* Based on fly counts & *root maggot feeding injury* ratings



# Economic Risk Based on SBRM Fly Trap Counts on Sticky Stakes

Daily Capture (Flies per stake)	Cumulative Capture (Flies per stake)	Risk Level	Suggested Management Tactic
0-25	0-50	Low	Monitor fields closely
26-50	51-100	Slight	A post emergence insecticide may be needed if an at-plant insecticide was used at a low rate or no at-plant material was applied
51-75	100-150	Moderate	A post emergence insecticide is probably justified even if an at-plant insecticide was applied at a moderate or high rate. (A granular insecticide can be used if applied 7 or more days before expected peak fly activity. Use a liquid insecticide if within 4 days of peak fly.
76-100	151-200	Elevated	Apply post emergence Lorsban 4E (Chlorpyrifos) broadcast @ 1 pint/ac. IMMEDIATELY! Repeat if fly counts resurge, <b><u>minimum of 10 days in between</u></b>
101-150	201-300	High	Apply post emergence Lorsban 4E (Chlorpyrifos) broadcast @ 2 pint/ac. IMMEDIATELY! Repeat if fly counts resurge, <b><u>minimum of 10 days in between</u></b>
151+	301+	Extreme	Apply post emergence Lorsban 4E (Chlorpyrifos) broadcast @ 2 pint/ac. IMMEDIATELY! Repeat if fly counts resurge, <b><u>minimum of 10 days in between</u></b>





# Root Maggot Control Recommendations 2017

- **Moderate Risk area**

- **Counter 20G @ 7.5#** at-plant (preferred)
  - Or Poncho Beta/NipsIt/Cruiser Maxx at-plant (least preferred)
- Planned post emerge **Lorsban 4E (Chlorpyrifos) @ 1pt/a Broadcast**
  - At or just prior to peak fly

- **High Risk area**

- **Counter 20G @ 8.9#** at plant
- Planned post emerge **Lorsban 4E (Chlorpyrifos) @ 2pts/a Broadcast**
  - At or just prior to peak fly



# Root Maggot Control Recommendations 2017

- **Lorsban 4E (Chlorpyrifos)** – Minimum of 10 days between application if used 2 times
- **Mustang Maxx or Asana XL** - can be used as 2<sup>nd</sup> or 3<sup>rd</sup> applications if flies resurge before 10 day Minimum is met for Lorsban (Chlorpyrifos)
- **Lorsban 4E (Chlorpyrifos)** – can be mixed with Glyphosate
- Do **NOT** mix Lorsban Advanced with Glyphosate



# Root Maggot- Summary

- Average population has declined in 2016, but there is an increase in number of areas affected
  - Proper management control measures are working!
- Aggressive control is a must in areas of high risk and rising populations
- Counter 20G: better root protection & yield than any seed treatment (in high pressure)
- POST: Seed treatments or low rates of at-plant granules are not sufficient w/out a post insecticide
- POST: control tools may be key to success



# ROOT MAGGOT

# QUESTIONS?

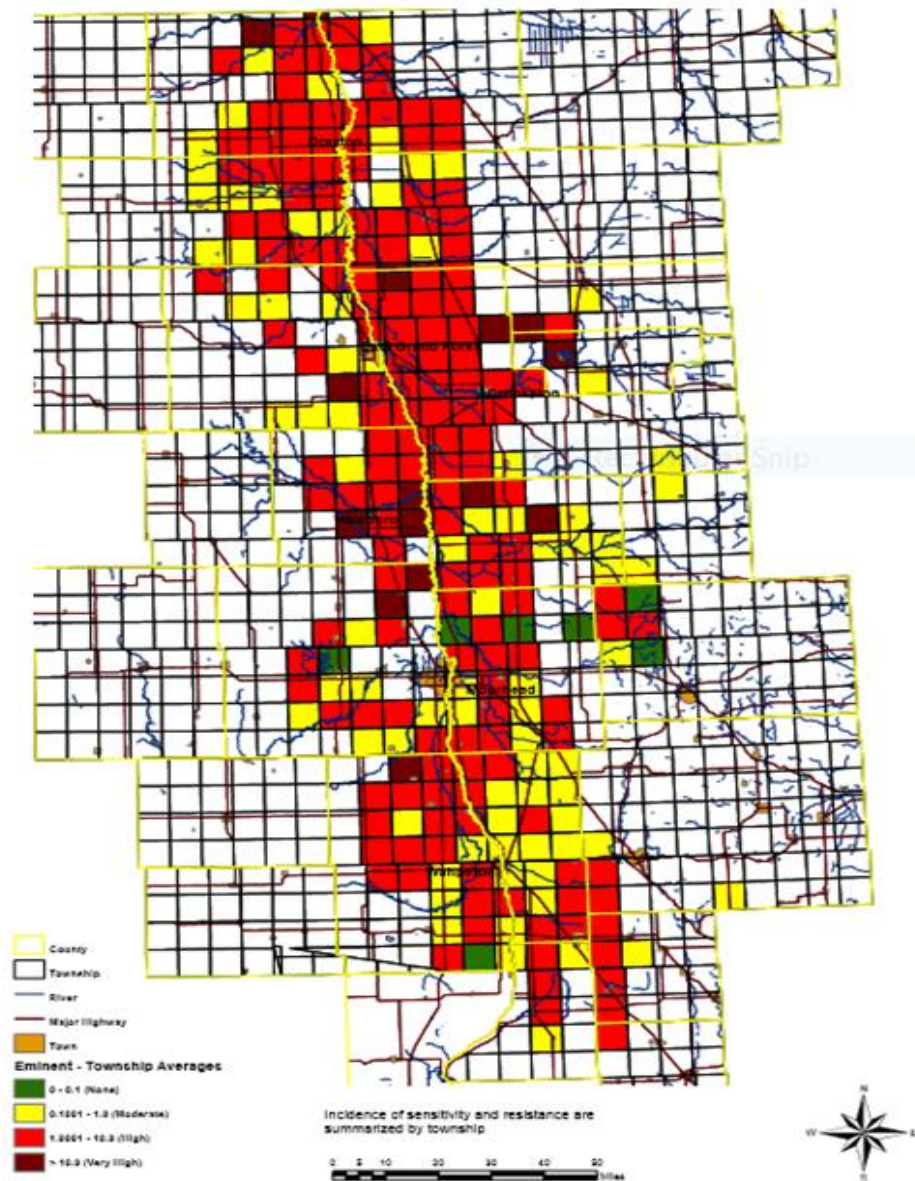


# **CERCOSPORA LEAFSPOT (CLS) MANAGEMENT**

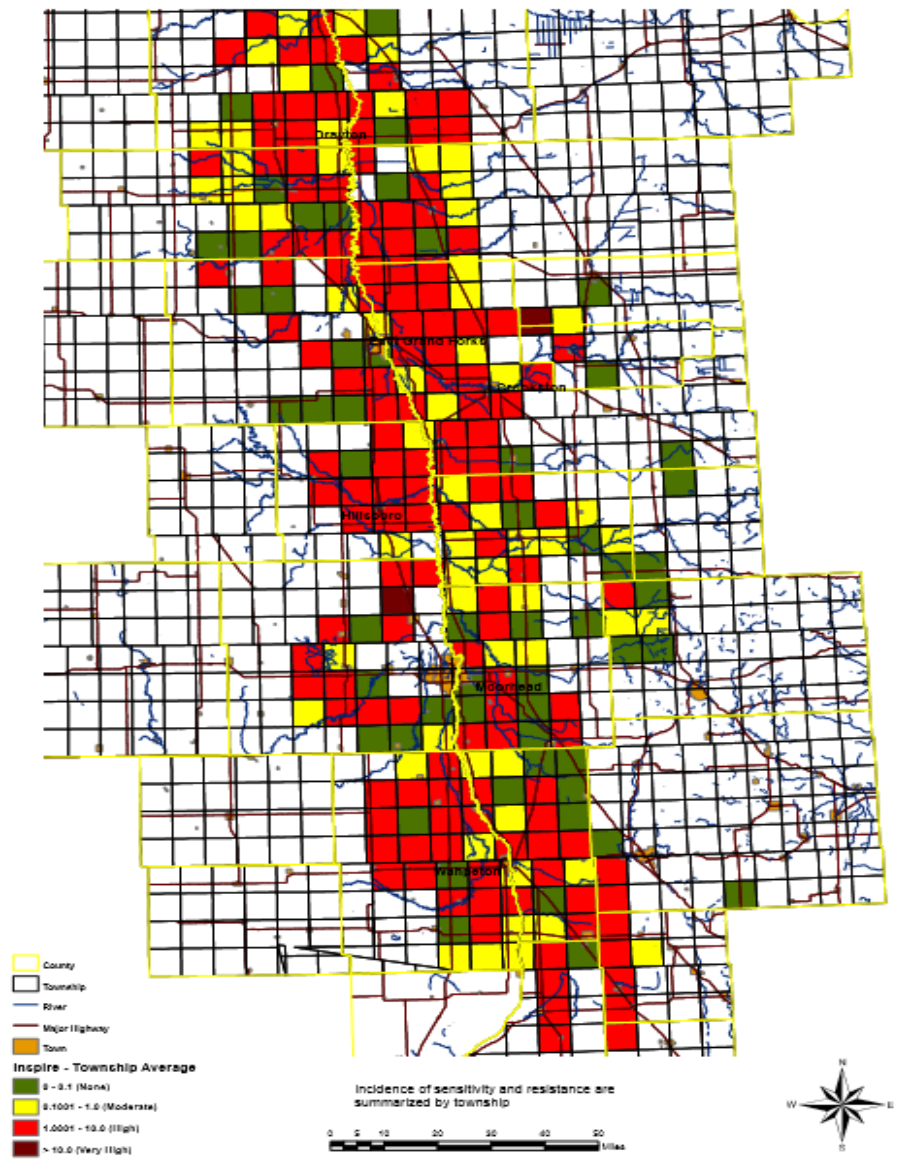


# Cercospora Sensitivity/Resistance - 2016 For Eminent EC-50

1

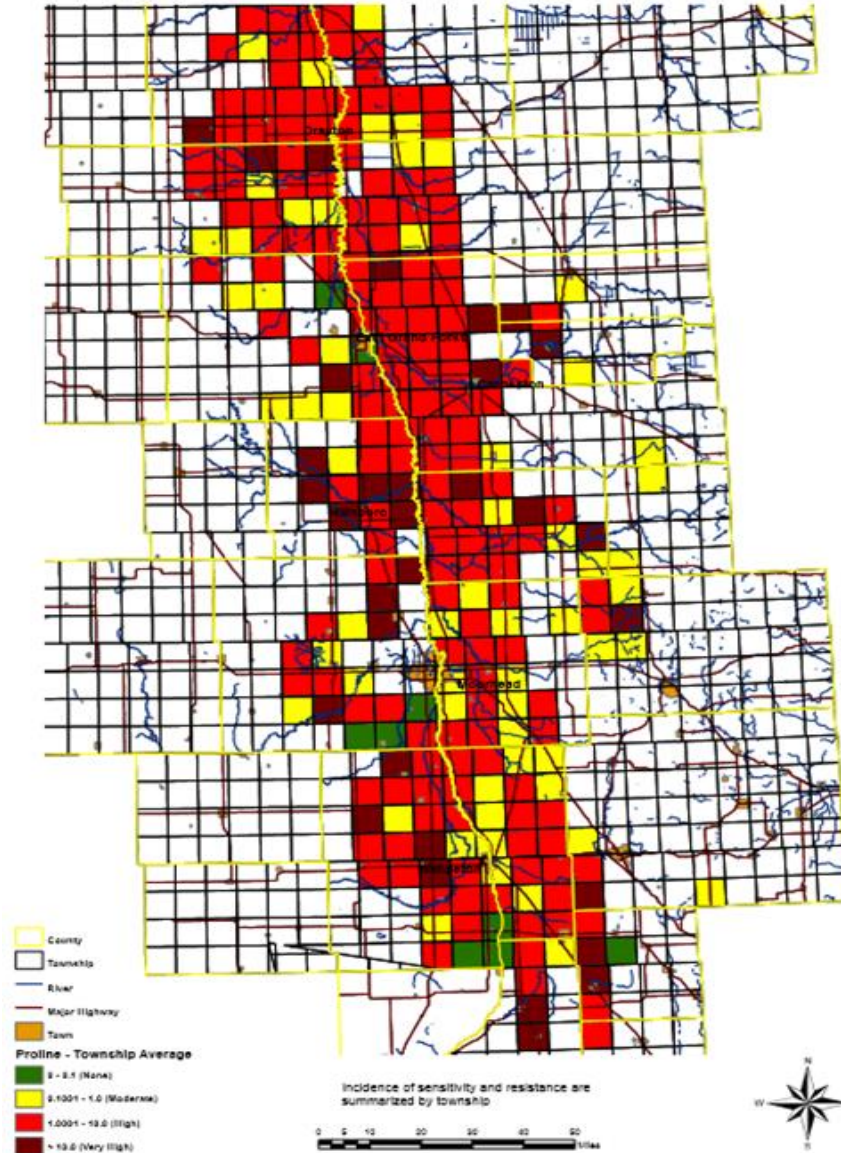


Cercospora Sensitivity/Resistance - 2016  
For Inspire EC-50



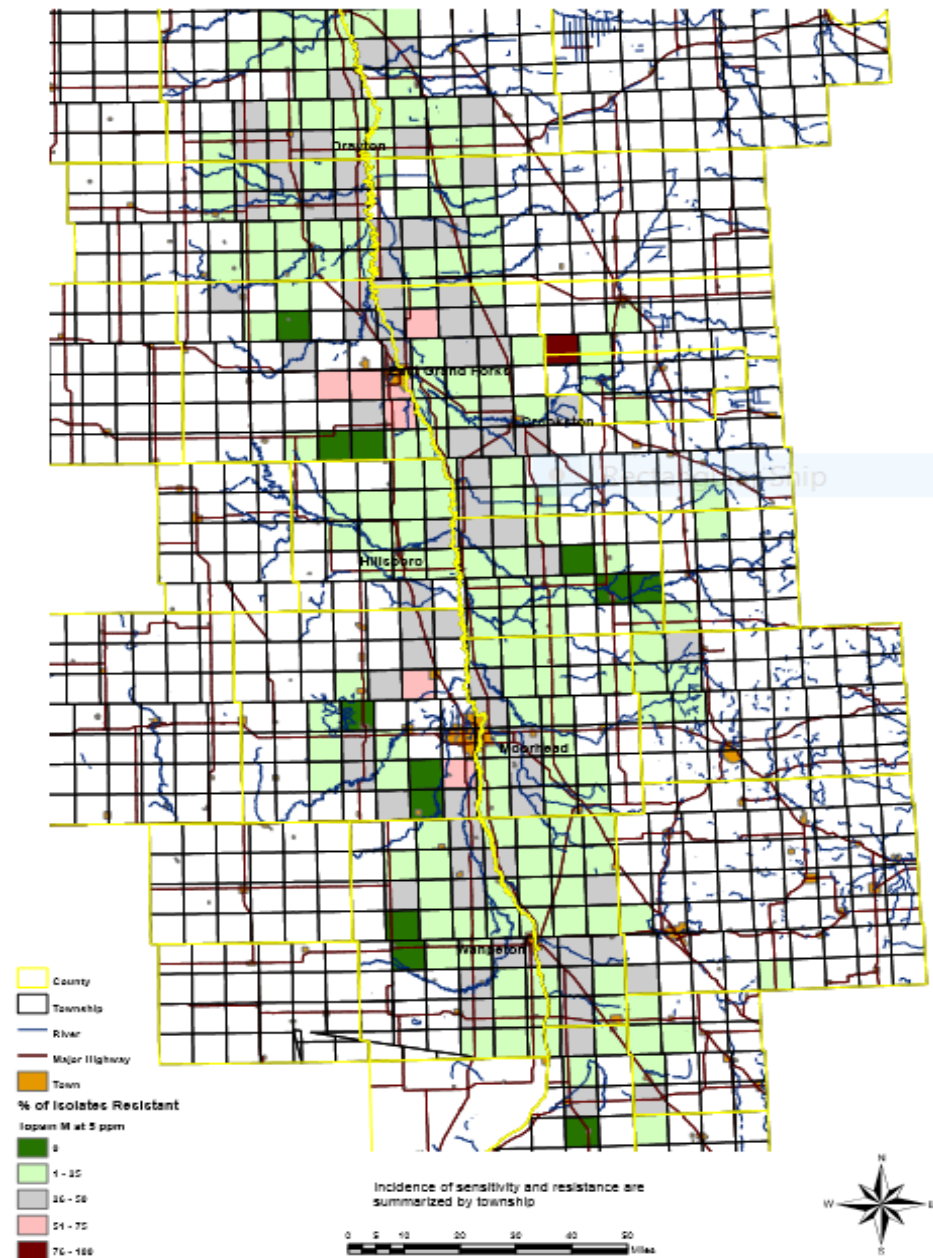
# Cercospora Sensitivity/Resistance - 2016 For Proline EC-50

1



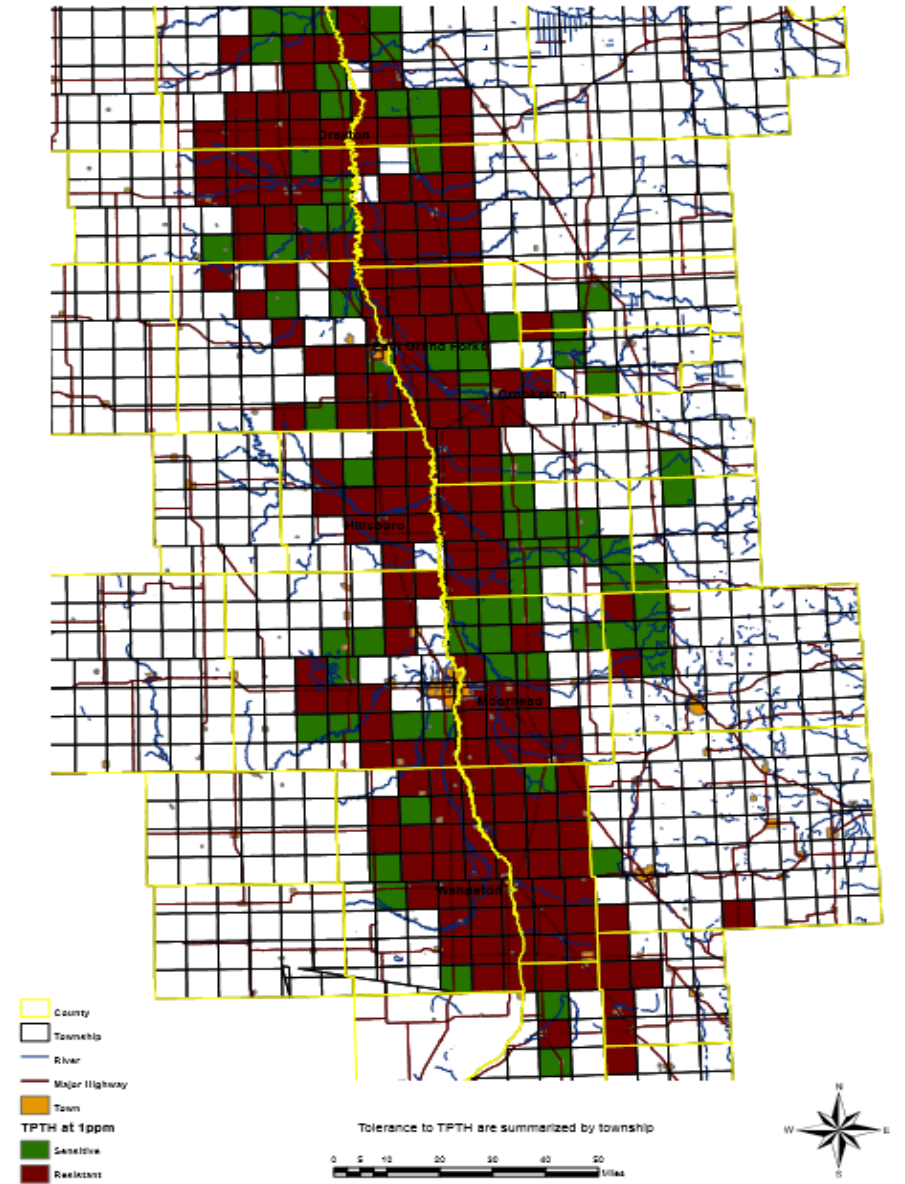


Cercospora Sensitivity/Resistance - 2016  
For Topsin M at 5 PPM



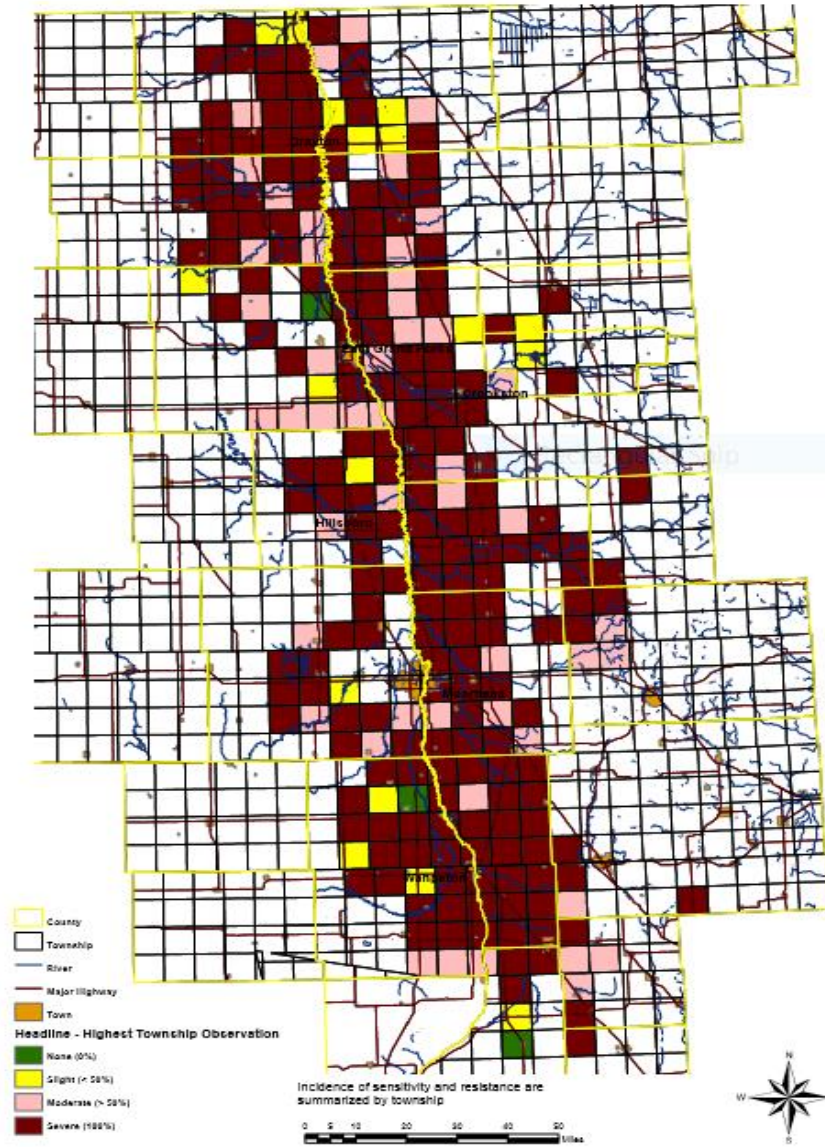
Cercospora Tolerance - 2016  
For TPTH at 1 PPM

1



Cercospora Sensitivity/Resistance - 2016  
For Headline

6



# Future of CLS Management

- No new chemistry in pipeline - None
- Background work on possible additive for improved CLS control, fast-track, yet a few years away
- Section 18 being sought for Chlorothalonil
- Section 24c being sought for TPTH (Tin)
- **Critical** - Timing, coverage, PSI and Tank-mixes











# CLS Conditions

- Warm, humid, rainy weather
- Spores germinate & infect leaves through stomata (natural openings) days 77-95°F, nights above 60°F, & high relative humidity 90-95%, or via free leaf moisture
- Infection reduced/inhibited < 59°F or when leaves are wet for < 11 hours
- 68-79°F, relative humidity of 90-100% (spores do not form < 50°F)
- Leaf spots develop 5 to 21 days after infection, depending on: amount of inoculum, temp, & duration of wet period.
- Leaf spots typically occur first on lower, older leaves & progresses to younger leaves

# Cercospora Daily Infection Values (DIV)

Found on:

- Crystal Agronomy App
- NDAWN
- Crystalsugar.com

Fargo						
Date	Daily Infection Value 	Two-Day Total Infection Value 	Daily Infection Risk	14-Day Accum Infection Values 	21-Day Accum Infection Values 	Season Total Infection Values 
2016-06-29	0	0	Slight	4	10	10
2016-06-30	0	0	Slight	4	10	10
2016-07-01	0	0	Slight	4	10	10
2016-07-02	0	0	Slight	1	10	10
2016-07-03	0	0	Slight	0	10	10
2016-07-04	0	0	Slight	0	10	10
2016-07-05	3	3	Slight	3	13	13
2016-07-06	0	3	Slight	3	7	13
2016-07-07	2	2	Slight	5	9	15
2016-07-08	1	3	Slight	6	10	16
2016-07-09	0	1	Slight	6	7	16
2016-07-10	2	2	Slight	8	8	18
2016-07-11	3	5	Moderate	11	11	21
2016-07-12	4	7	Severe	15	15	25
Fargo						
Date	Daily Infection Value 	Two-Day Total Infection Value 	Daily Infection Risk	14-Day Accum Infection Values 	21-Day Accum Infection Values 	Season Total Infection Values 
2016-07-13	0	4	Moderate	15	15	25
2016-07-14	1	1	Slight	16	16	26
2016-07-15	0	1	Slight	16	16	26
2016-07-16	0	0	Slight	16	16	26
2016-07-17	3	3	Slight	19	19	29
2016-07-18	0	3	Slight	19	19	29
2016-07-19	0	0	Slight	16	19	29
2016-07-20	3	3	Slight	19	22	32
2016-07-21	4	7	Severe	21	26	36
2016-07-22	1	5	Moderate	21	27	37
2016-07-23	0	1	Slight	21	27	37
2016-07-24	3	3	Slight	22	30	40
2016-07-25	0	3	Slight	19	30	40
2016-07-26	0	0	Slight	15	27	40

# Variety Cercospora Ratings

- CLS Rating  $< 4.40$  – Best resistance; monitor for disease development
- CLS Rating  $4.41 - 4.80$  – Moderate resistance; monitor for disease development
- CLS Rating  $> 4.80$  – Low disease resistance, Cercospora likely to show up in these varieties. Monitor closely

# 2017 Official Variety Trials Sort on CLS Ratings

Performance Data of RR Varieties Approved for 2017 Season - Sorted by CERCOSPORA																															
Variety	Yrs Com	Rev/Ton ++			Rev/Acre ++			Rec/Ton		Rec/Acre		Sugar		Yield		Molasses		Emerg		Bolter / Ac		CR		Aph Root		Rhizoc		Fusarium		Rzm	
		16	2 Yr	2Y%	16	2 Yr	2Y%	16	2 Yr	16	2 Yr	16	2 Yr	16	2 Yr	16	2 Yr	16	2 Yr	16	2 Yr	16	2 Yr	16	2 Yr	16	2 Yr				
# locations		9	19		9	19		9	19	9	19	9	19	9	19	9	19	9	19	9	19	3	6	2	3	4	8	2	4		
SX Winchester RR	NC	2	52.60	54.31	105	1831	1706	98	321	322	11143	10121	16.99	17.12	34.7	31.4	0.97	1.03	68	68	0	0	3.97	3.82	3.9	3.5	4.6	4.5	4.1	4.0	Rzm
SV RR353	NC	5	51.47	52.75	102	1954	1812	104	317	317	12040	10906	16.86	16.91	38.0	34.3	0.99	1.02	71	73	0	0	4.20	3.96	4.5	3.3	4.4	4.2	5.5	5.2	Hi
BTS 8363	NC	2	49.25	50.46	98	1937	1835	105	310	310	12163	11262	16.53	16.57	39.2	36.3	1.03	1.08	74	74	0	0	4.33	4.08	4.9	4.3	4.3	4.2	3.1	3.0	Hi
BTS 8512	NC	5	51.09	52.80	102	1917	1815	104	316	317	11840	10919	16.87	17.00	37.5	34.4	1.08	1.13	75	74	0	0	4.04	4.08	4.2	4.0	4.4	4.4	2.7	2.7	Hi
Hilleshög 4302RR	NC	3	51.63	53.22	103	1801	1713	98	317	318	11070	10251	16.90	17.00	34.9	32.1	1.03	1.08	65	65	0	0	4.13	4.13	4.6	4.3	3.7	3.7	5.1	4.6	Rzm
Hilleshög 9517RR	NC	2	52.97	54.10	105	1786	1634	94	322	321	10842	9715	17.20	17.25	33.7	30.2	1.11	1.19	68	68	0	0	4.26	4.14	3.8	3.5	4.2	3.9	2.7	2.8	Hi
SV RR241	1	52.23	53.20	103	1929	1784	102	319	318	11774	10670	16.96	16.97	36.8	33.4	0.99	1.02	74	72	0	0	4.53	4.18	4.6	3.8	4.4	4.2	5.5	--	Rzm	
BTS 80RR52	5	51.45	52.83	102	1960	1831	105	317	317	12074	11016	16.96	17.04	38.1	34.7	1.12	1.18	71	71	0	0	4.28	4.20	4.1	3.7	4.4	4.2	2.8	2.8	Hi	
Crystal 573RR	NC	52.77	54.40	105	1970	1863	107	321	323	11985	11052	17.15	17.24	37.2	34.2	1.06	1.09	73	75	0	0	4.35	4.25	4.1	3.9	4.5	4.4	3.5	3.3	Hi	
SV RR336	2	46.49	49.06	95	1710	1619	93	301	305	11084	10116	16.14	16.38	36.9	33.2	1.09	1.11	70	70	0	0	4.62	4.28	3.7	3.2	4.7	4.5	2.6	3.0	Rzm	
Hilleshög 4094RR	7	47.84	49.03	95	1717	1611	92	305	305	10960	10033	16.46	16.51	35.9	32.8	1.19	1.24	70	71	0	0	4.30	4.30	4.4	4.5	3.9	3.7	4.7	4.2	Rzm	
SV RR244TT	1	51.69	52.71	102	1877	1782	102	318	317	11514	10706	16.92	16.94	36.2	33.7	1.05	1.09	65	67	0	9	4.46	4.31	5.0	4.6	4.5	4.3	4.1	4.0	Hi	
Maribo 109	1	56.34	57.74	112	1889	1729	99	332	333	11151	9995	17.63	17.75	33.5	29.9	1.01	1.07	68	68	9	5	4.14	4.35	4.3	3.3	3.7	3.7	4.5	4.0	Hi	
SX Canyon RR(844TT)	1	51.62	52.42	101	1926	1803	103	317	316	11817	10858	16.87	16.86	37.2	34.3	1.00	1.05	70	70	0	5	4.76	4.39	4.3	3.9	4.4	4.3	5.3	4.6	Hi	
Crystal 574RR	NC	48.68	50.44	98	2070	1935	111	308	310	13055	11883	16.50	16.61	42.3	38.3	1.11	1.13	78	76	0	0	4.51	4.41	3.7	3.3	4.5	4.3	1.8	1.9	Hi	
Crystal 247RR	3	50.72	52.60	102	2014	1913	110	315	317	12486	11528	16.77	16.91	39.7	36.4	1.05	1.09	68	70	0	2	4.65	4.42	4.8	4.9	4.3	4.3	2.8	2.7	Hi	
Seedex RR0858	NC	52.56	54.74	106	1916	1796	103	321	324	11682	10631	17.03	17.22	36.4	32.8	0.98	1.00	73	73	0	0	4.74	4.45	4.4	3.9	4.5	4.4	5.4	5.3	Hi	
BTS 8500	NC	48.95	50.80	98	1966	1852	106	309	311	12395	11354	16.54	16.67	40.1	36.5	1.09	1.13	75	74	0	5	4.54	4.50	4.2	3.9	4.4	4.3	1.9	2.2	Hi	
BTS 8572	NC	53.35	55.24	107	1913	1816	104	323	325	11584	10716	17.21	17.36	35.8	32.9	1.03	1.07	77	77	0	0	4.41	4.50	4.5	4.3	4.5	4.2	2.2	2.4	Hi	
Crystal 467RR	NC	46.62	49.38	96	1845	1805	103	301	306	11920	11213	16.20	16.47	39.7	36.6	1.16	1.17	71	69	0	0	4.69	4.51	4.0	3.8	4.3	4.1	1.8	2.1	Hi	
Crystal 355RR	1	53.17	54.02	104	1947	1786	102	322	321	11796	10620	17.24	17.26	36.6	33.0	1.12	1.19	78	76	0	9	4.60	4.52	4.5	3.9	4.0	NE	2.7	NE	Hi	
Crystal 575RR	NC	49.36	51.05	99	1909	1834	105	310	312	11970	11193	16.71	16.80	38.5	35.9	1.21	1.22	70	71	0	0	4.53	4.53	4.8	4.4	4.3	4.3	3.0	2.9	Hi	
Crystal 576RR	NC	49.27	51.30	99	1830	1742	100	310	312	11488	10618	16.66	16.83	37.0	34.0	1.18	1.21	75	74	0	0	4.54	4.55	4.0	3.6	4.0	3.8	2.0	2.2	Hi	
BTS 8337	2	54.08	56.77	110	1877	1817	104	325	330	11284	10564	17.37	17.60	34.7	32.0	1.11	1.12	68	72	0	2	4.62	4.56	3.3	2.9	4.1	4.0	4.0	3.9	Hi	
SV RR351	NC	50.31	52.72	102	1971	1796	103	313	317	12250	10833	16.70	16.95	39.0	34.2	1.02	1.07	71	66	0	5	4.50	4.56	4.4	4.0	4.2	NE	4.8	NE	Hi	
Hilleshög HIL9707	NC	47.91	50.79	98	1739	1646	94	305	311	11064	10087	16.37	16.66	36.3	32.5	1.12	1.13	61	64	0	0	4.53	4.56	4.0	3.8	4.4	4.3	4.9	4.3	Hi	
BTS 8524	NC	48.08	49.47	96	1954	1848	106	306	306	12416	11437	16.43	16.49	40.6	37.2	1.15	1.17	78	76	0	0	4.74	4.57	3.9	3.6	4.2	4.2	3.4	3.1	Hi	
Crystal 572RR	NC	53.74	55.51	107	1982	1853	106	325	326	11967	10916	17.27	17.41	36.9	33.5	1.03	1.08	76	76	0	0	4.57	4.61	4.7	4.5	4.2	4.0	1.8	2.1	Hi	
SX Cruze RR(846)	1	46.05	48.79	94	1712	1677	96	300	304	11122	10471	16.07	16.35	37.1	34.4	1.09	1.13	72	68	0	5	4.65	4.61	3.4	3.8	4.7	4.4	2.8	NE	Rzm	
Crystal 101RR	5	48.13	50.54	98	1849	1734	99	306	310	11759	10667	16.54	16.78	38.4	34.4	1.23	1.28	69	67	0	0	4.59	4.62	3.4	3.4	4.8	4.7	2.4	2.5	Hi	
BTS 83CN	2	49.95	51.73	100	1843	1766	101	312	314	11501	10725	16.64	16.77	36.8	34.2	1.04	1.08	72	72	0	0	4.65	4.65	4.3	4.1	4.2	4.0	2.7	2.7	Hi	
Crystal 246RR	3	47.83	49.99	97	1845	1774	102	305	308	11745	10946	16.35	16.53	38.4	35.5	1.08	1.12	76	74	0	2	4.81	4.65	4.8	4.9	4.3	4.3	3.1	3.1	Hi	
SV RR333	1	51.91	53.34	103	1950	1863	107	318	319	11940	11143	16.94	17.03	37.5	34.9	1.02	1.07	69	70	0	0	4.85	4.69	4.7	4.1	4.4	4.3	4.8	NE	Hi	
SX Terrain RR(848)	1	51.88	52.81	102	1818	1751	100	318	317	11132	10515	16.92	16.94	34.9	33.1	1.01	1.07	67	66	0	0	4.67	4.73	4.9	4.3	4.5	4.3	4.7	4.5	Hi	
Maribo MA305	NC	48.54	49.99	97	1773	1703	98	308	308	11223	10496	16.39	16.45	36.4	34.0	1.02	1.03	64	67	0	0	4.72	4.74	4.4	4.6	4.4	4.1	5.9	5.5	Rzm	
BTS 82RR33	3	49.60	51.80	100	1877	1825	104	311	314	11748	11065	16.61	16.81	37.7	35.2	1.07	1.11	73	71	0	2	5.05	4.82	5.4	5.5	4.0	4.1	2.8	2.7	Hi	
Hilleshög HIL9711	NC	48.93	51.19	99	1866	1774	102	309	312	11753	10821	16.49	16.69	38.0	34.6	1.04	1.07	71	72	0	0	4.60	4.83	4.3	3.7	4.5	4.3	4.6	4.2	Hi	
BTS 82RR28	3	49.11	50.93	99	1888	1794	103	309	311	11879	10979	16.65	16.81	38.4	35.2	1.18	1.24	67	67	0	0	4.81	4.85	4.2	4.2	4.4	4.2	2.0	2.3	Hi	
Crystal 093RR	5	52.16	54.45	105	1942	1842	105	319	322	11867	10925	17.07	17.26	37.1	33.9	1.12	1.15	73	73	0	16	4.95	4.86	4.3	4.1	4.4	4.2	3.4	3.3	Hi	
Crystal 986RR	5	52.06	53.75	104	1895	1771	101	319	320	11588	10558	16.93	17.05	36.3	32.9	0.99	1.05	75	72	0	0	4.75	4.86	4.4	4.1	4.4	4.2	4.9	4.4	Rzm	
Hilleshög HIL9708	NC	50.07	52.96	102	1857	1775	102	312	318	11576	10665	16.67	16.98	37.0	33.5	1.04	1.07	78	76	0	0	4.74	4.89	4.8	4.8	4.3	4.2	4.3	4.0	Hi	
Crystal 578RR	NC	51.31	53.16	103	2017	1907	109	317	319	12413	11425	16.87	17.02	39.1	35.8	1.03	1.07	76	75	0	0	4.87	4.90	4.4	4.5	4.3	4.2	2.0	2.2	Hi	
Seedex RR0856	NC	50.97	53.52	104	2039	1935	111	315	320	12599	11575	16.82	17.07	39.9	36.2	1.05	1.07	72	72	0	0	4.44	4.91	4.4	4.5	4.5	4.3	4.9	4.9	Hi	
Maribo MA502	NC	47.16	49.98	97	1825	1754	100	303	308	11709	10825	16.34	16.64	38.7	35.1	1.22															



# Factors That Can't be Ignored

- Use right products
- Apply proper rate
- Application timing critical
- Monitor weather
- Use right application method

# Products

- Best resistance management is necessary to maintain our limited arsenal of fungicides
- Know the level of resistance in your area – review 2016 tolerance maps
- Be aware when using fungicides where tolerant strains of *Cercospora* are high or resistance is known in your area
- Know the PHI of the fungicides you use

# Rates

- Use only the recommended full rate of the fungicides you choose
- Tank Mixes: Always use full rates of all tank mix partners

# Timing

- Planting date effect
- Spend time in your fields
- Monitor Daily Infection Values (internet & App)
- Know your farm history
- Begin fungicide applications when disease is first identified in your area
- Do not stretch application intervals – Stay on schedule

# Weather

- DIVs
- Local events
- Dew on canopy
- Fog
- “Air conditioner nights”

# Application Method

- Use correct spray volume (20 gpa)
- Use correct pressure (100 psi)
- Use correct nozzles (hollow cone), boom height & speed
- Ground applications of fungicides have been observed to give better control across entire fields
- Aerial applications can be made when a spray is necessary and ground rigs can't get in a field

# Know Extent of Problem

- Field sampling
- Careful lab analysis
- The PCR test for Headline is very accurate
- Map sample results
- Change spray program strategies

# Rotate Modes of Action

STROBILURIN	TRIAZOLE	TINS (TPTH)	BENZIMIDAZOLE	EBDC	COPPER
Headline	Minerva	Supertin	Topsin M	Several	Several
Priaxor	Proline	Agritin	Thiophanate Methyl 85		
Gem	Inspire XT				

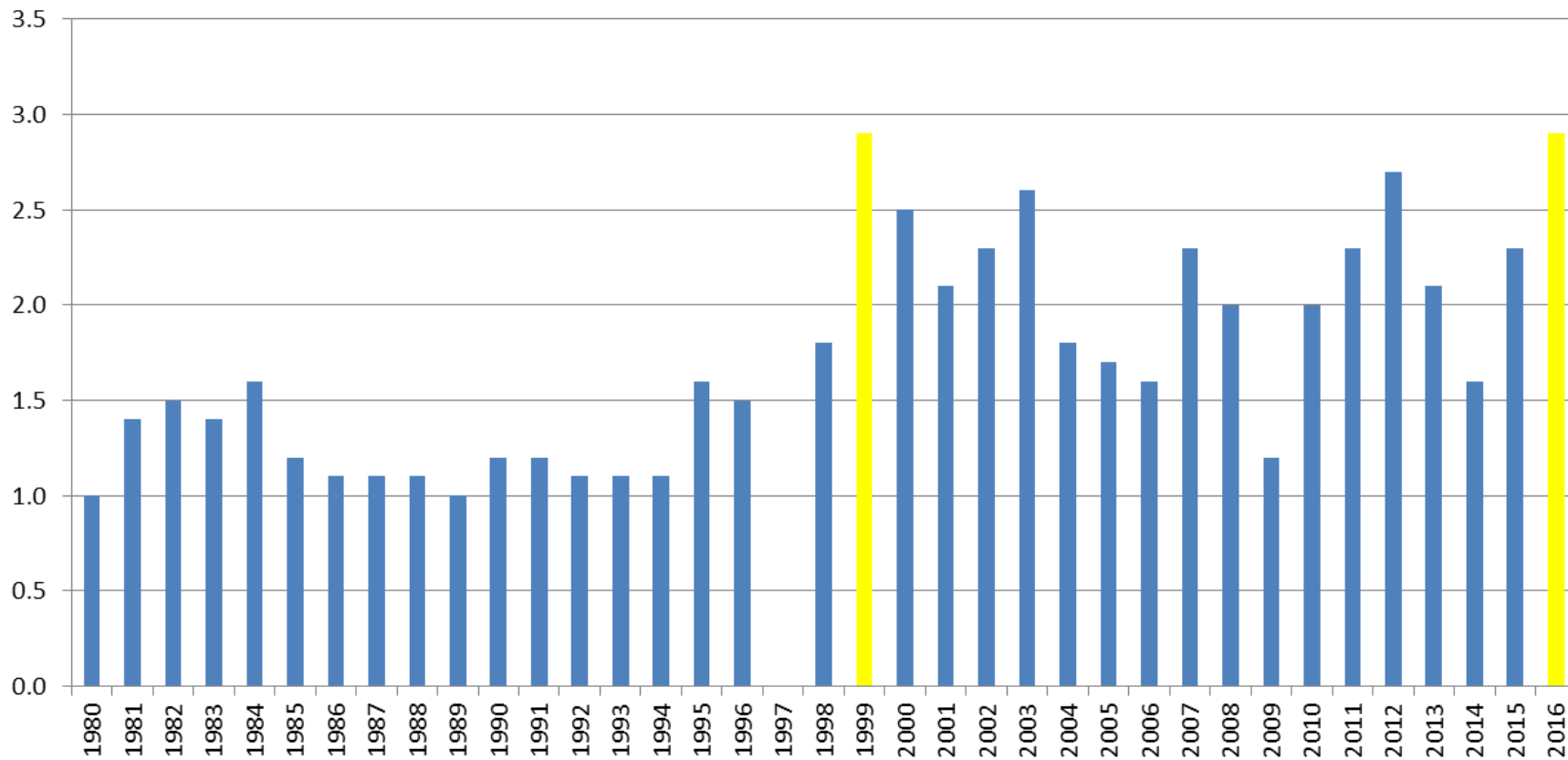
- Good resistance management starts with rotating different modes of action
- Never use fungicides from same mode of action back-to-back
- Use multiple modes of action in each spray
- Use full rates of all tank mix partners, all the time
- Use sufficient water amounts (20 gpa) and 100 PSI



# Tank Mixing Fungicides

- Always start with a tank that is  $\frac{1}{2}$  full of water
- Good, aggressive agitation is critical to maintain a good spray solution
- Know your products and add accordingly
- Always empty and clean your tank, lines, and strainers at the end of the day use

## ACSC Average Number of Fungicide Applications



# Summary

- Plant tolerant varieties
- Scout fields diligently
- Monitor the weather – models are not perfect
- Start on time with the right product
- Use correct spray volume & pressure

# Summary

- Full label rate of all products in a tank mix are best for resistance management
- Use correct nozzles, boom height & speed
- Ground versus aerial – both can work well
- Remember: Conditions that favor excellent sugarbeet growth also favor extreme CLS development
- Contact your Agriculturist for further information

# Questions?

