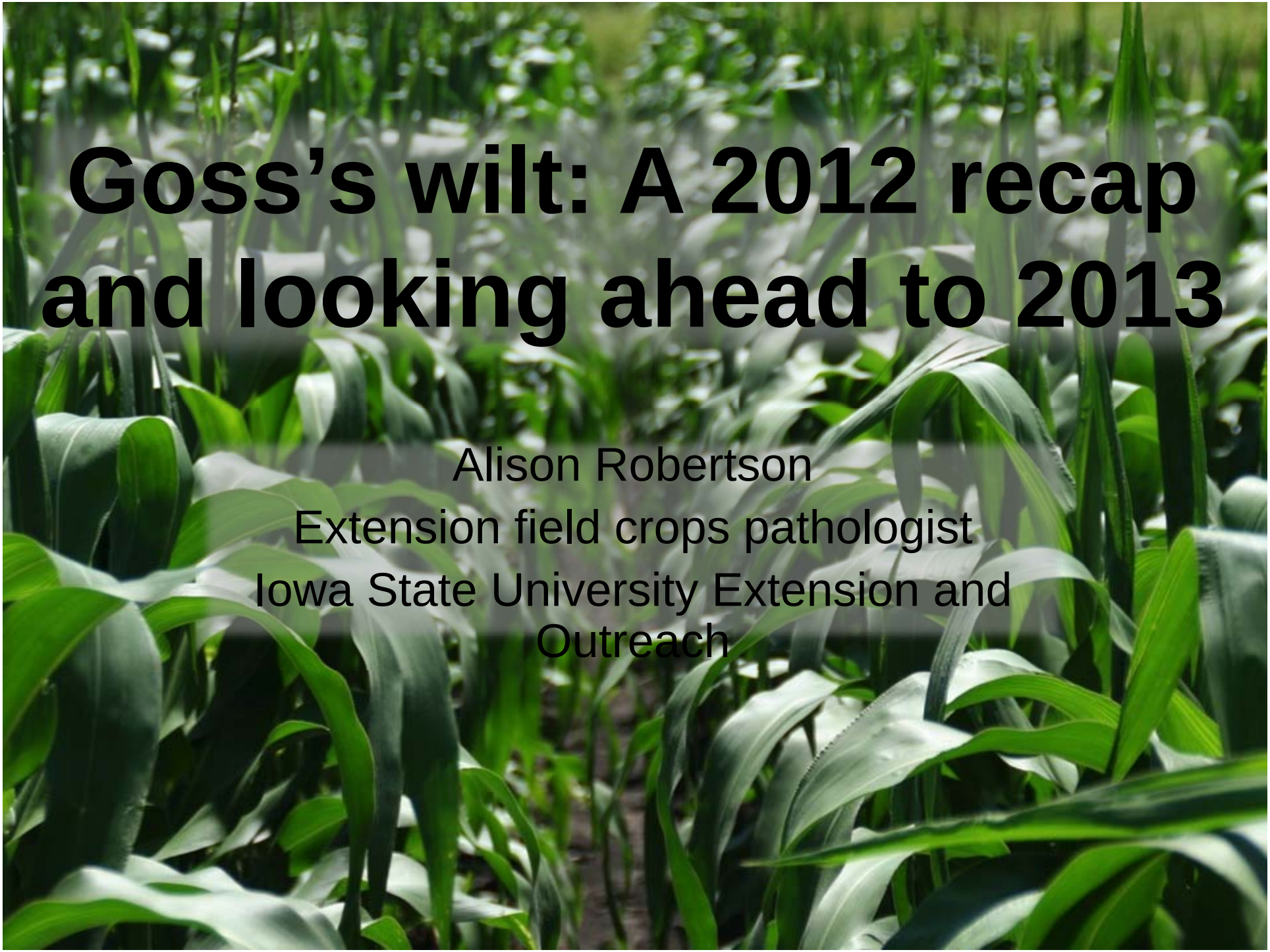


Goss's wilt: A 2012 recap and looking ahead to 2013

Alison Robertson
Extension field crops pathologist
Iowa State University Extension and Outreach

Goss's wilt in 2012

Reported in high risk fields →

- Susceptible hybrid, history of Goss's, surface residue

Low incidence and severity

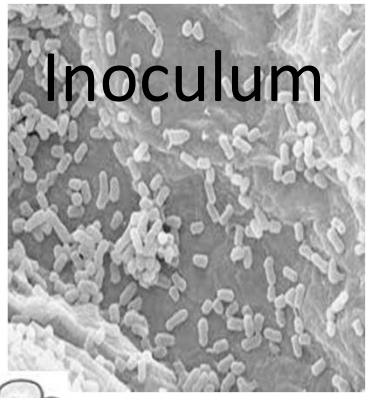
Drought conditions likely not favorable for widespread disease

Little impact on yield and quality in 2012, BUT *still important to manage in 2013*

Ongoing Research

Co-P.I.s
Tamra Jackson & Greg Kruger
University of Nebraska

Goss's wilt



Infection

Dispersal

2011 UNL and ISU Goss's Survey - Results

- 486 surveys returned

- 340 samples (70%)
  tested positive for Cmn

- 8 states represented in survey responses

IA (221)	NE (211)
SD (19)	IN (15)
CO (12)	KS (4)
MN (3)	MO (1)

Funding provided

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Extension and Outreach

USDA United States Department of Agriculture National Institute of Food and Agriculture

North Central IPM Center

Additional data collected

Agronomic Practices

- Crop rotation
- Planting population
- Planting date
- Yield history
- Residue cover
- Tillage
- Irrigation type
- Nutrient application
- Hybrid selection
- Manure application

Site Characteristics

- Severe weather
- Disease history
- Longitude
- Latitude
- Growth stage

Pest Pressure and Management

- Weed pressure
- Insect & disease pressure
- Herbicide use
- Fungicide use

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USDA
United States Department of Agriculture
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North Central IPM Center

Top 5 factors affecting Goss's wilt

- Hybrid rating for Goss's wilt
- Planting population
- Planting date
- Residue cover (%)
- Crop rotation

Funding provided

USDA
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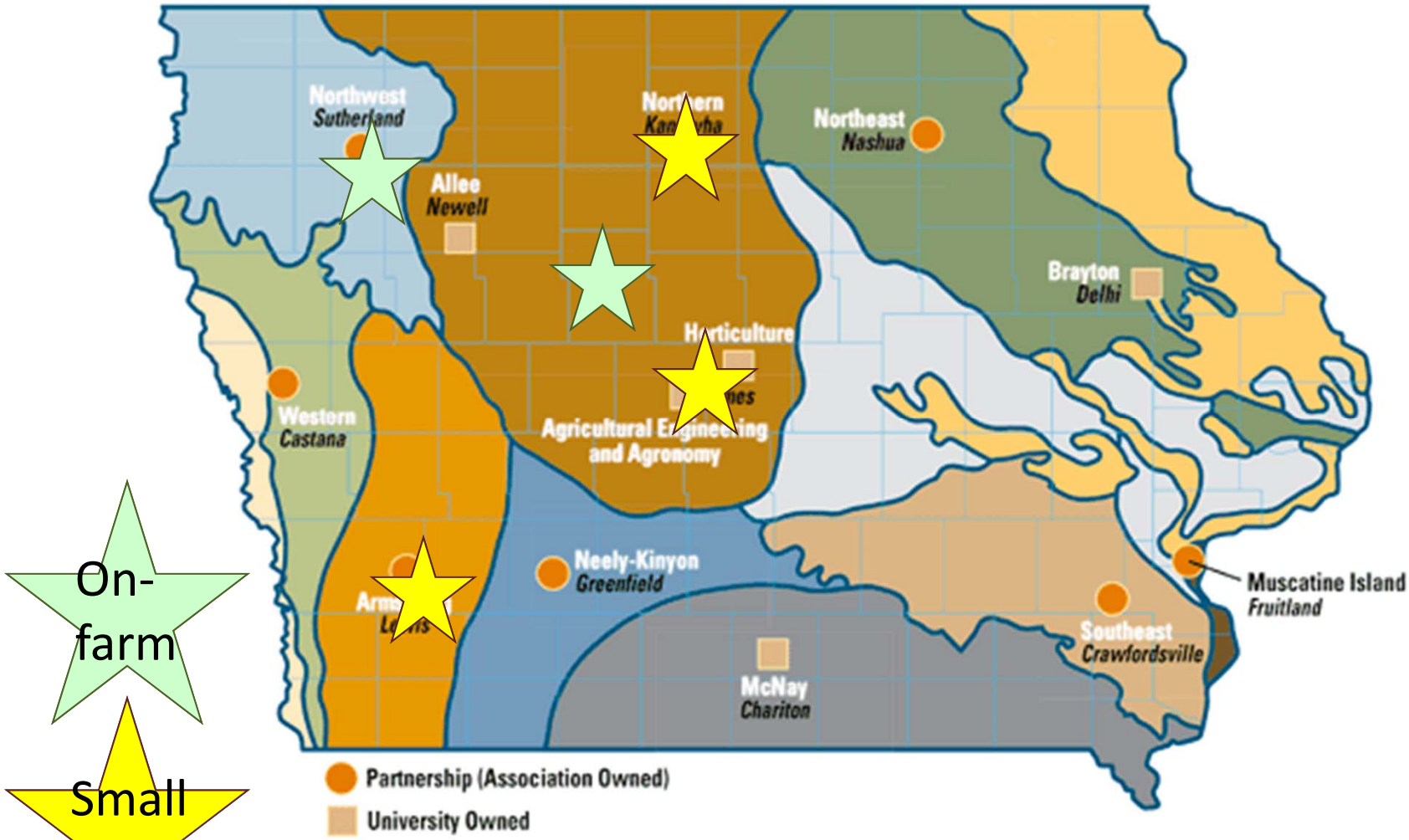
Goss's wilt management trials – Iowa 2012



On-farm

Small plot

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Goss's wilt management trials – Iowa 2012

Treatments

- *Products*
  - Procidic- systemic bactericide+fungicide, 3.5% citric acid
  - Elixor - systemic bactericide+fungicide, 57% ai
  - 42-Phi Cu – foliar copper-based fertilizer
  - Eco-Agra – growth enhancer, 100% plant extracts

- *Timing*
  - V5, R1, V5+R1, R2
  - Various (Ames)

Goss's wilt management trials – Iowa 2012

- All fields (except Kanawha) had Goss's wilt in 2011
- All fields had reduced tillage for 2012
- All fields had a highly susceptible hybrid in 2012

- No inoculations – rely on natural infection

Goss's wilt management trials – Iowa 2012

- Goss's wilt at Ames, Armstrong and Webster County; no disease in northern locations
- Very low incidence (<2% plants) and severity at R5 per treatment → difficult to detect treatment differences
- No effect of treatment on yield (P=0.1) at all locations

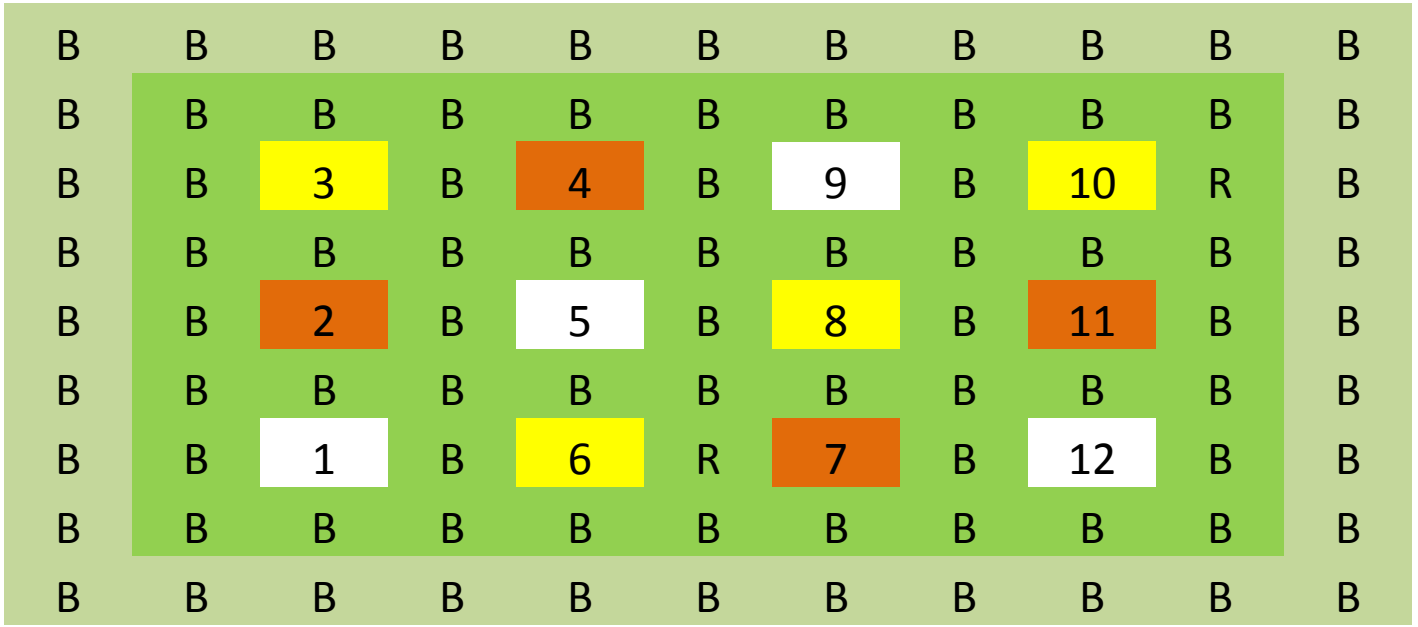
New alternate hosts of Cmn

- Previously only one foxtail was a known host:
  - Green foxtail

- Confirmed three other foxtail species including:
  - Giant foxtail
  - Bristly foxtail
  - Yellow foxtail

Courtesy Tamra Jackson, U. Nebraska

Spread of Goss's wilt from a point source of inoculum within a field



	TREATMENT	Plots
	NON INOCULATED	1, 5, 9, 12
	INOCULATED	3, 6, 8,10
	RESIDUE	2,4,7,11
B	Border (tolerant hybrid)	

50 plants/ plot
8 rows

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Q. How long does Cmn survive in corn residue?

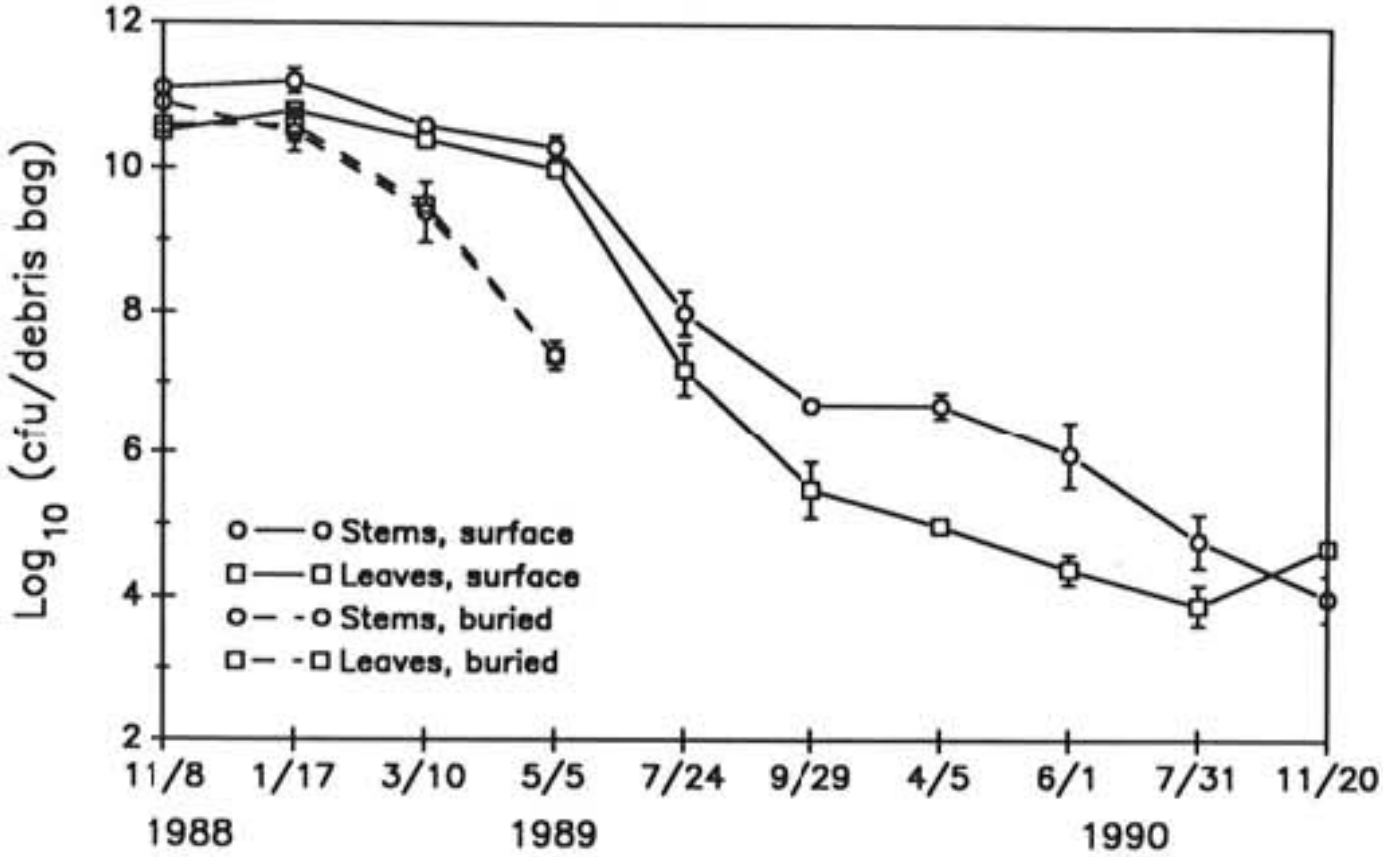
- Goss's wilt bacterium survives for at least 10 months in infested surface crop residue
- Survival is significantly reduced in buried residue

	Goss's Disease Index		
	0"	4"	8"
Leaves	80	0	0
Stalks	75	30	40
Cobs	63	5	0
Pure culture	0	0	0

(Schuster, 1975)

Can *Cmn* survive longer?

Survival *C. m.* subsp. *michiganensis* on tomato

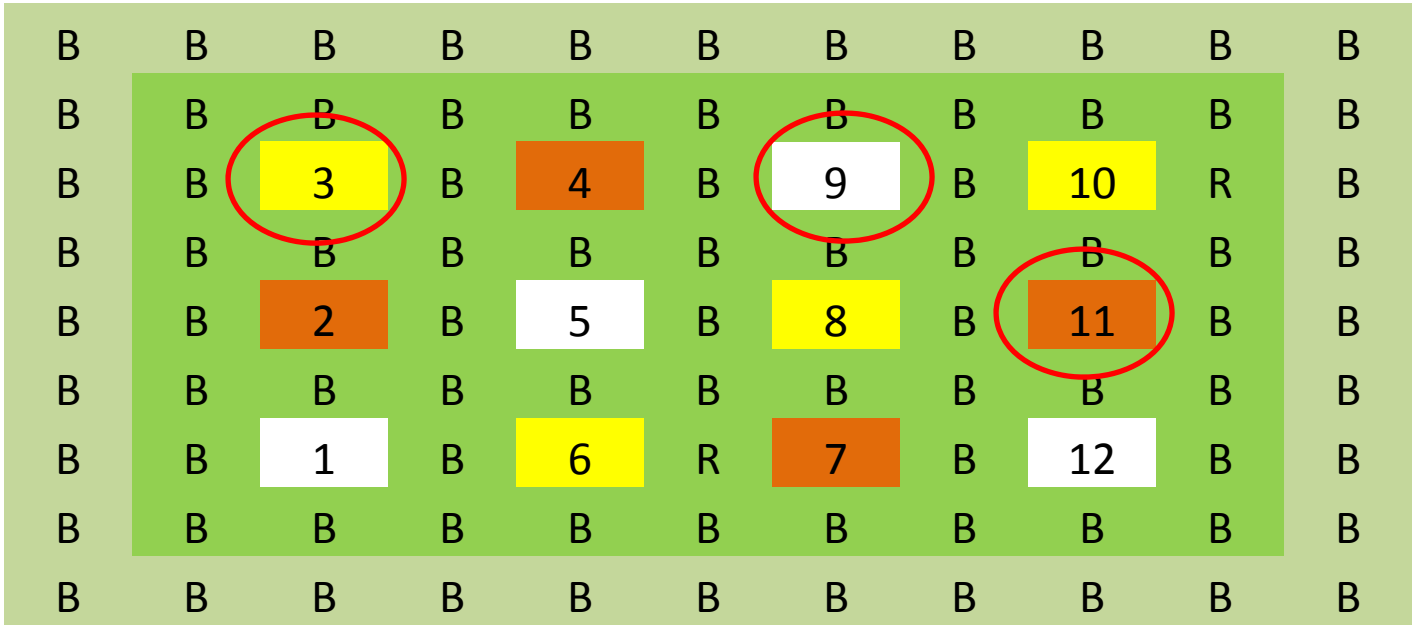


Buried infested residue: ~7 months

Surface infested residue: 2 years

Gleason et al., 1991

Spread of Goss's wilt from a point source of inoculum within a field



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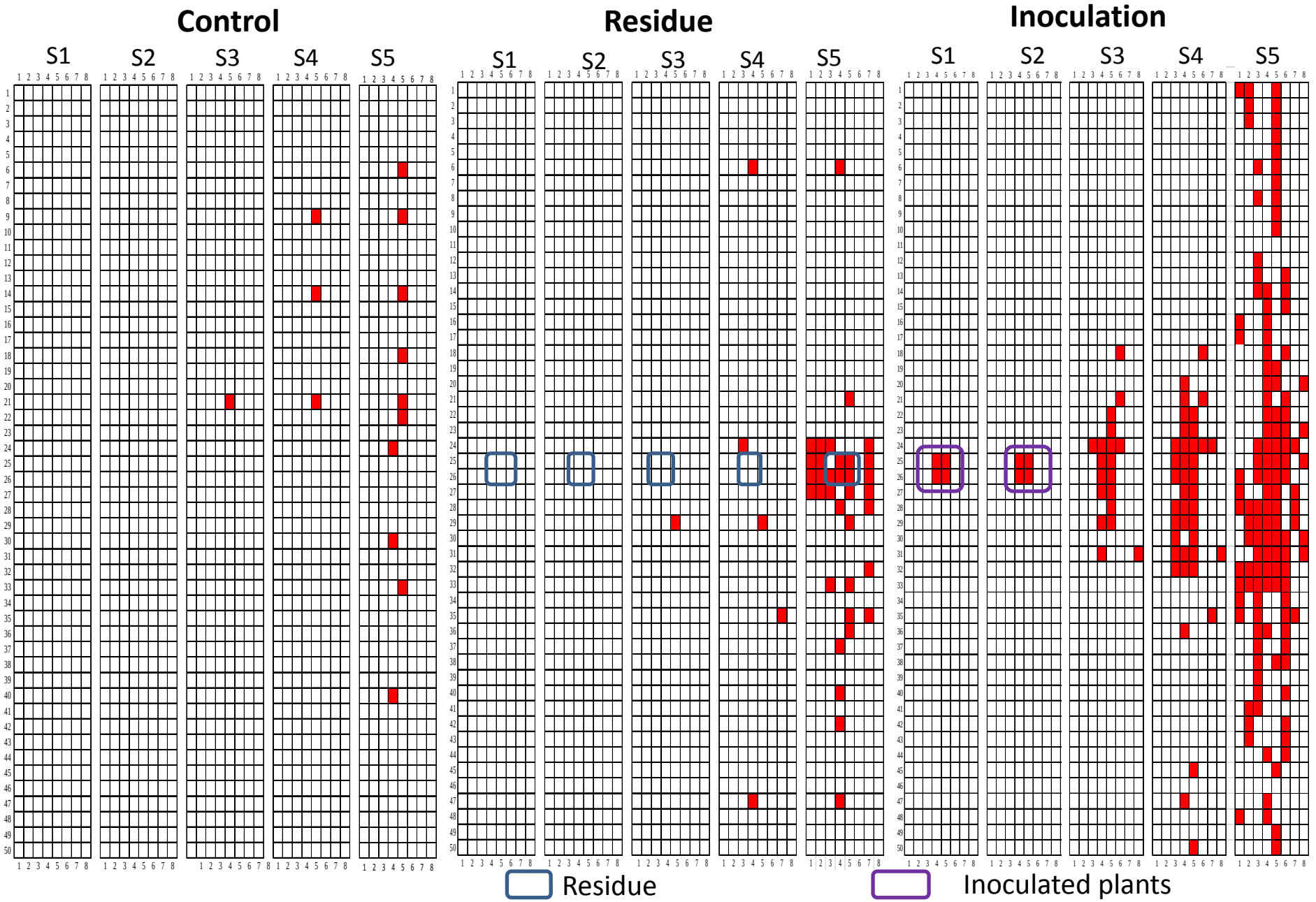
Goss's wilt symptomatic plants



Ordinary runs analysis to determine pattern of disease spread in a field

	Plot	Incidence (%)	Z value*	Pattern
Control	1	0.50	3.02	Random
Residue	2	8.70	-7.37**	Clustered
Inoculated	3	32.25	-11.49**	Clustered
Residue	4	9.75	-7.97**	Clustered
Control	5	0.25	7.16	Random
Inoculated	6	12.25	-9.23**	Clustered
Residue	7	6.25	-6.19**	Clustered
Inoculated	8	9.25	-14.58**	Clustered
Control	9	2.50	-1.05	Random
Inoculated	10	12.5	-11.71**	Clustered
Residue	11	5.25	-2.69**	Clustered
Control	12	0.25	7.16	Random

*** Large negative values indicate clustering with ordinary runs.**

Random if Z >-1.64 Clustered if Z <- 1.64

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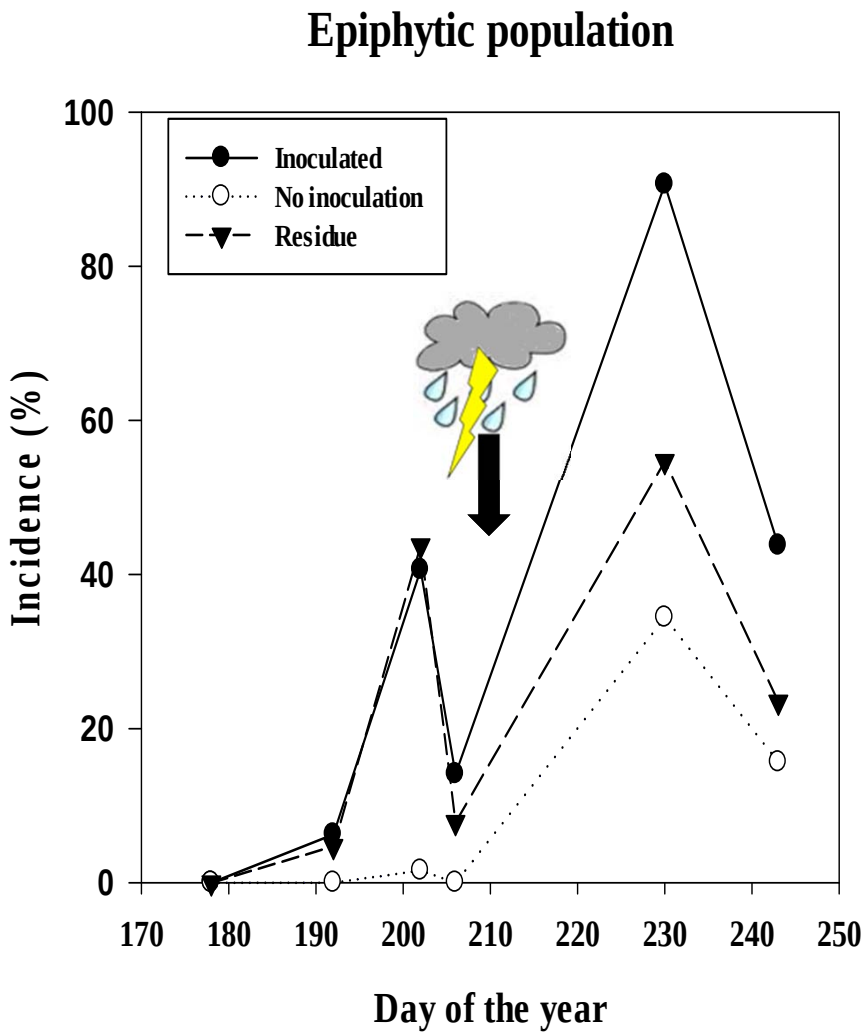
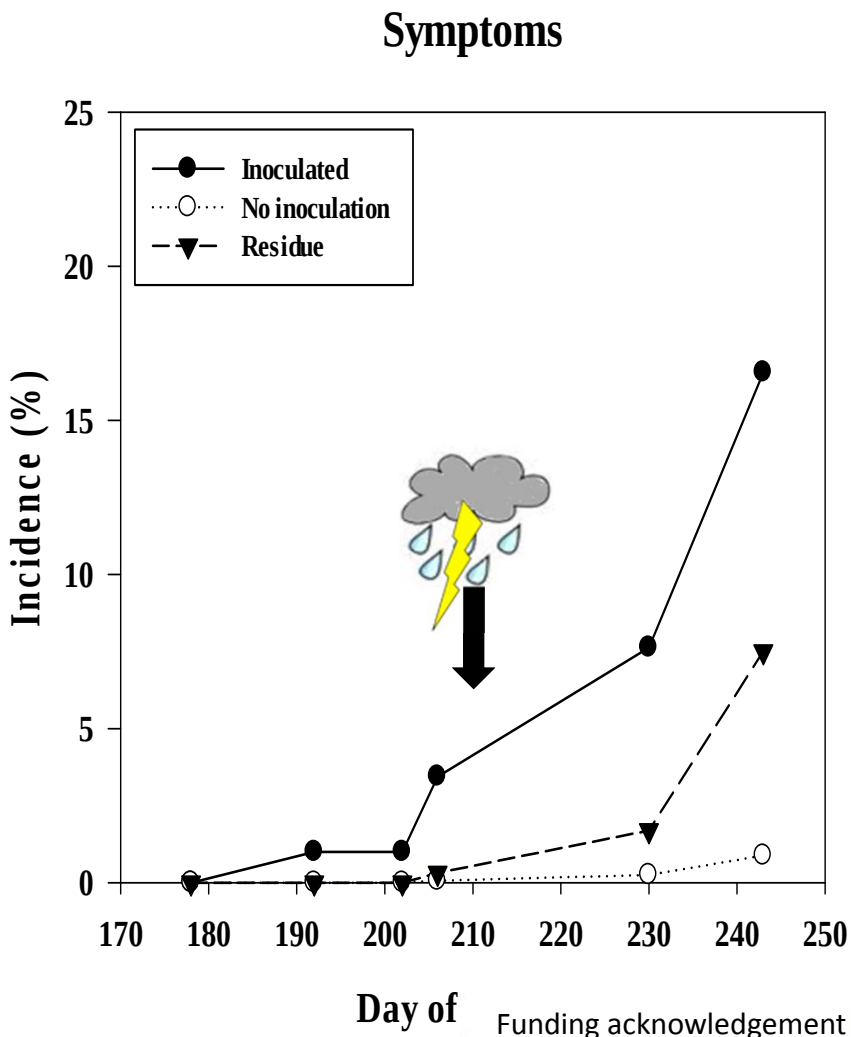
Population of *Cmn* and mean incidence of Goss's wilt in plots inoculated at a point source





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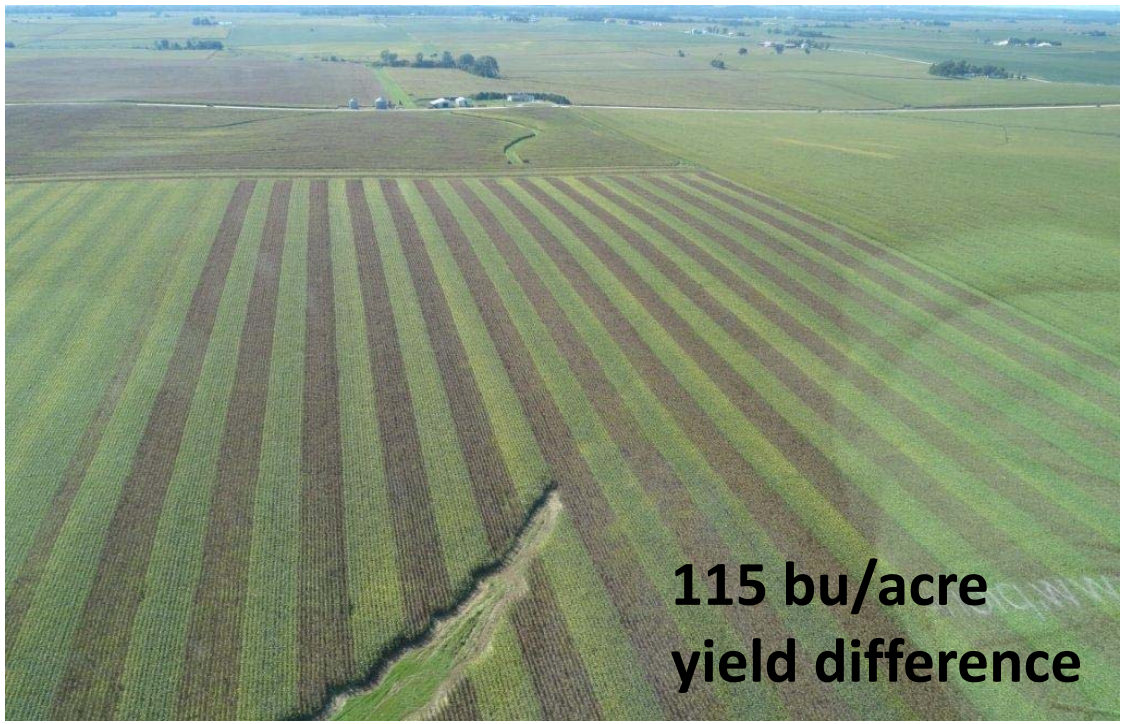
Goss's wilt in 2013

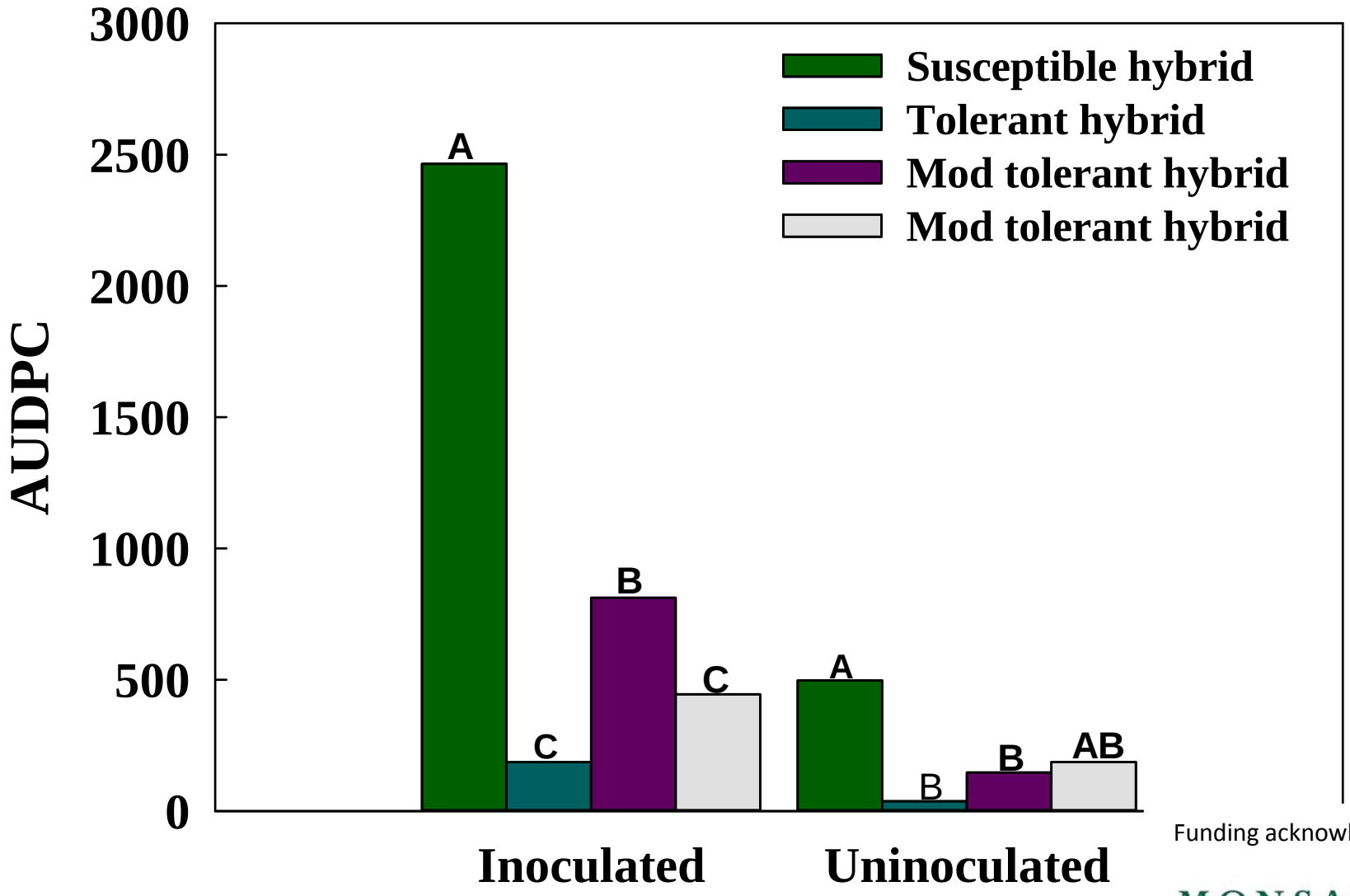
Resistant hybrid

Rotation

Residue management



Comparison of hybrids with a variable tolerance to Cmn inoculated and uninoculated



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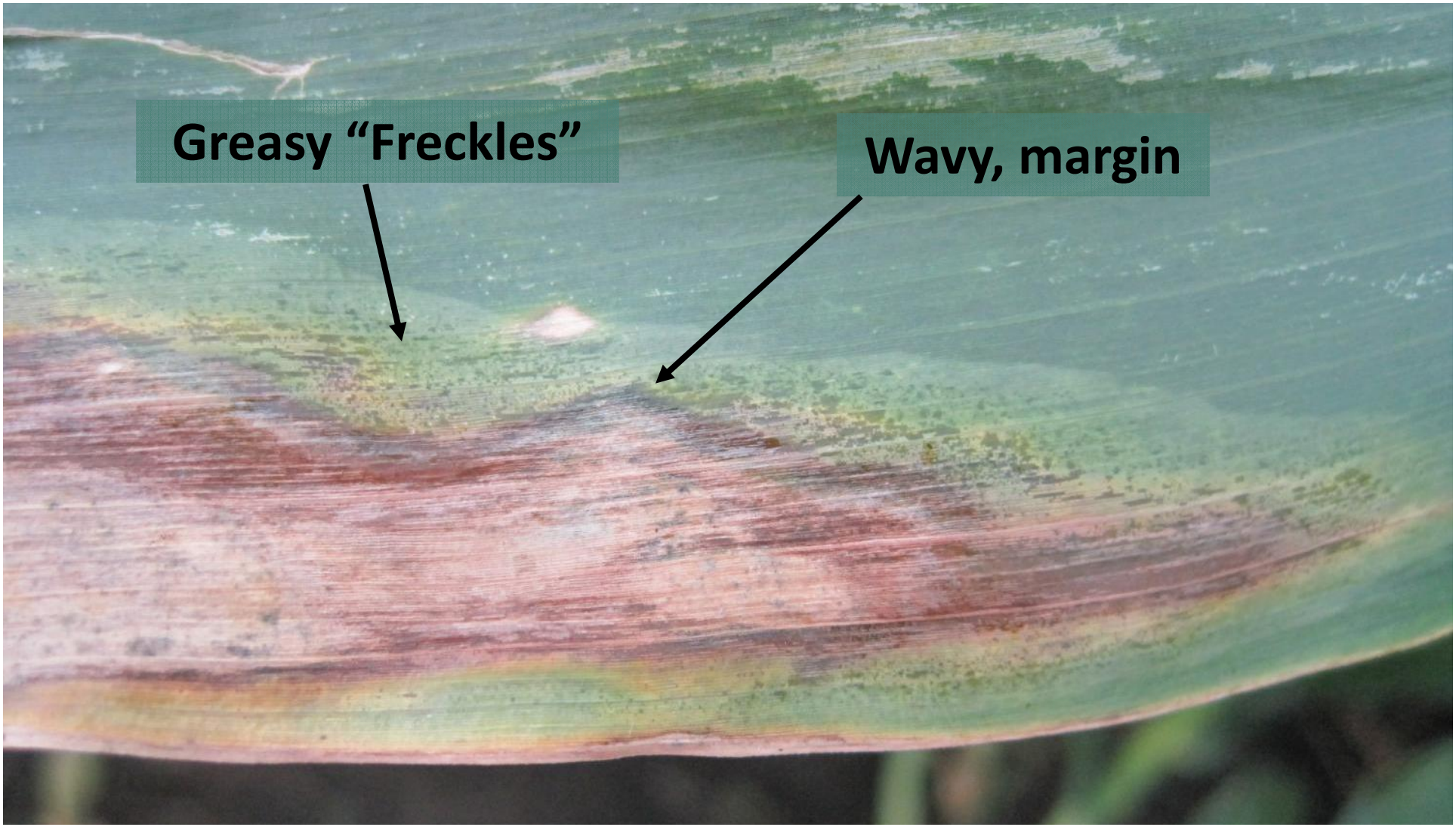
Goss's wilt symptoms

Goss's wilt symptoms

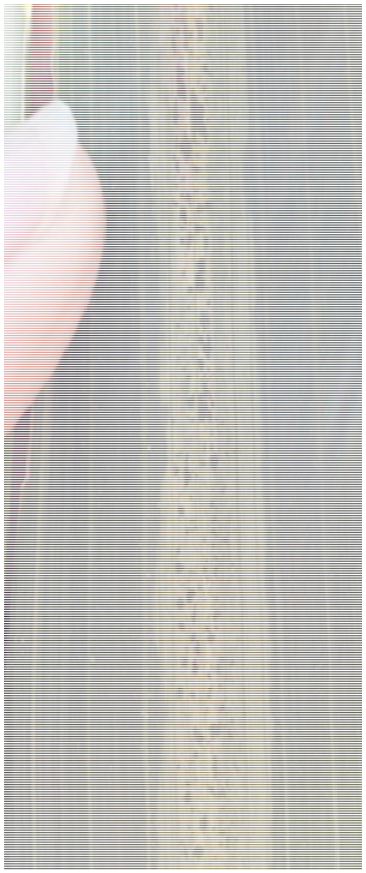
Goss's wilt symptoms



Goss's wilt symptoms

Saprophytic fungi

Freckles



Thanks for your attention

What other questions do you have?

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