

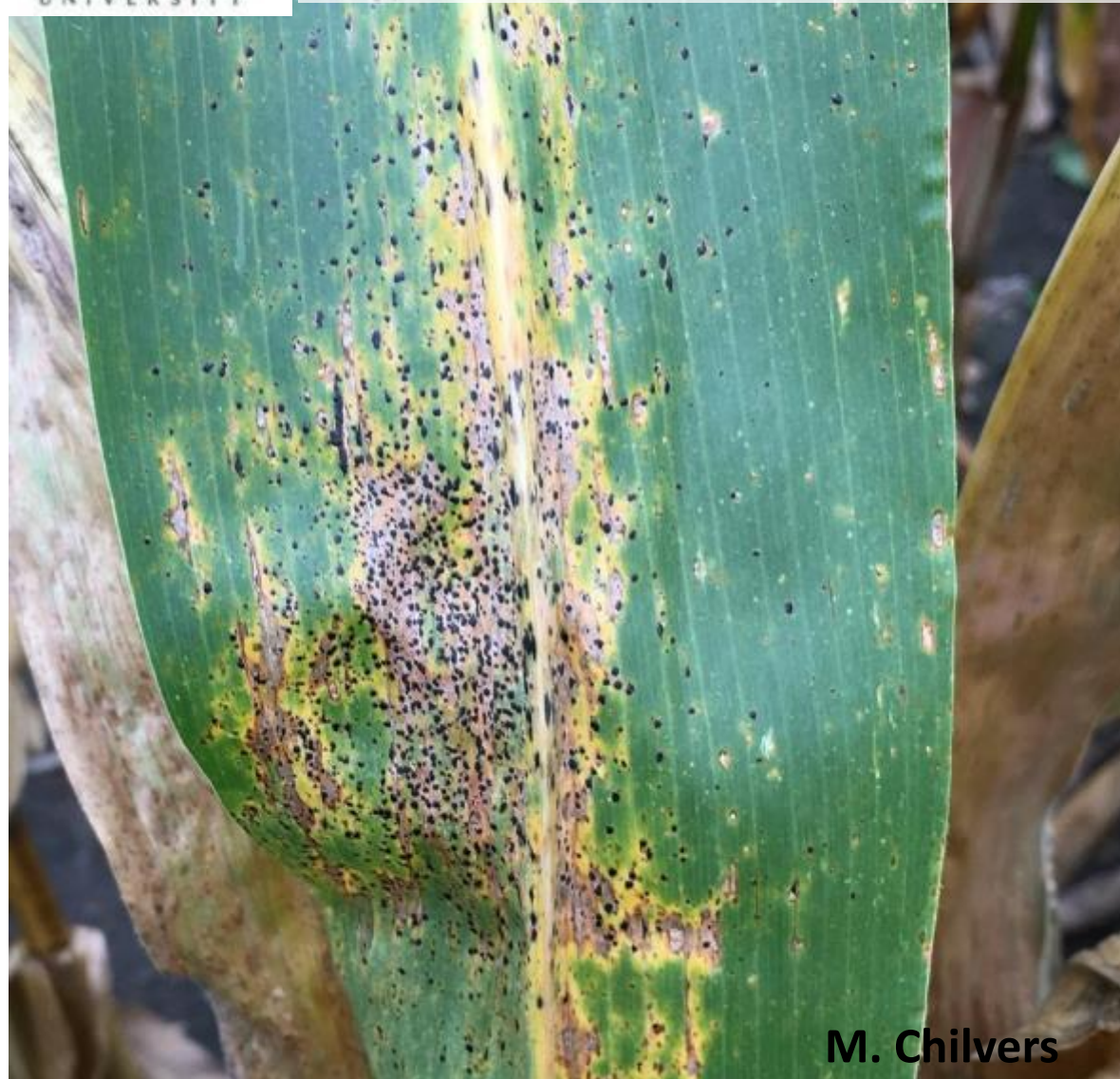


# **Tar Spot – A New Disease of Concern in Irrigated Corn**

**Austin McCoy  
PhD Student  
Michigan State University**



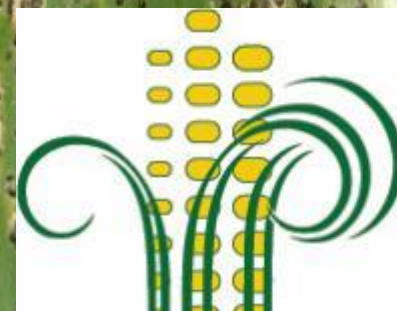
# Tar spot of corn caused by the fungus *Phyllachora maydis*



M. Chilvers



Steve Koeman



CORN MARKETING PROGRAM

**CMPM**



Michigan 2017, 40 bu/A loss

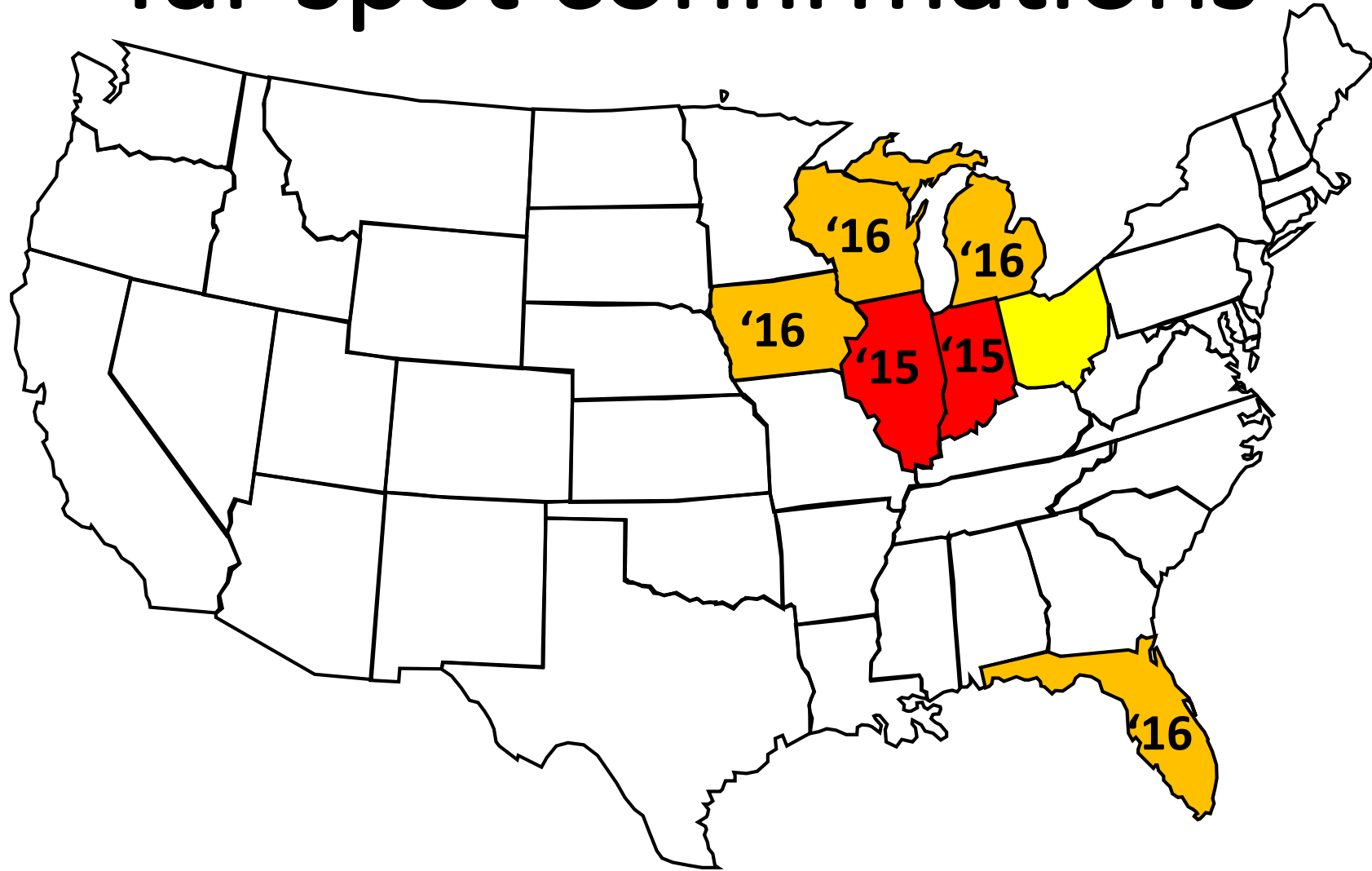


# Tar spot ascomata, asci and ascospores

## *Phyllachora maydis*



# Tar spot confirmations

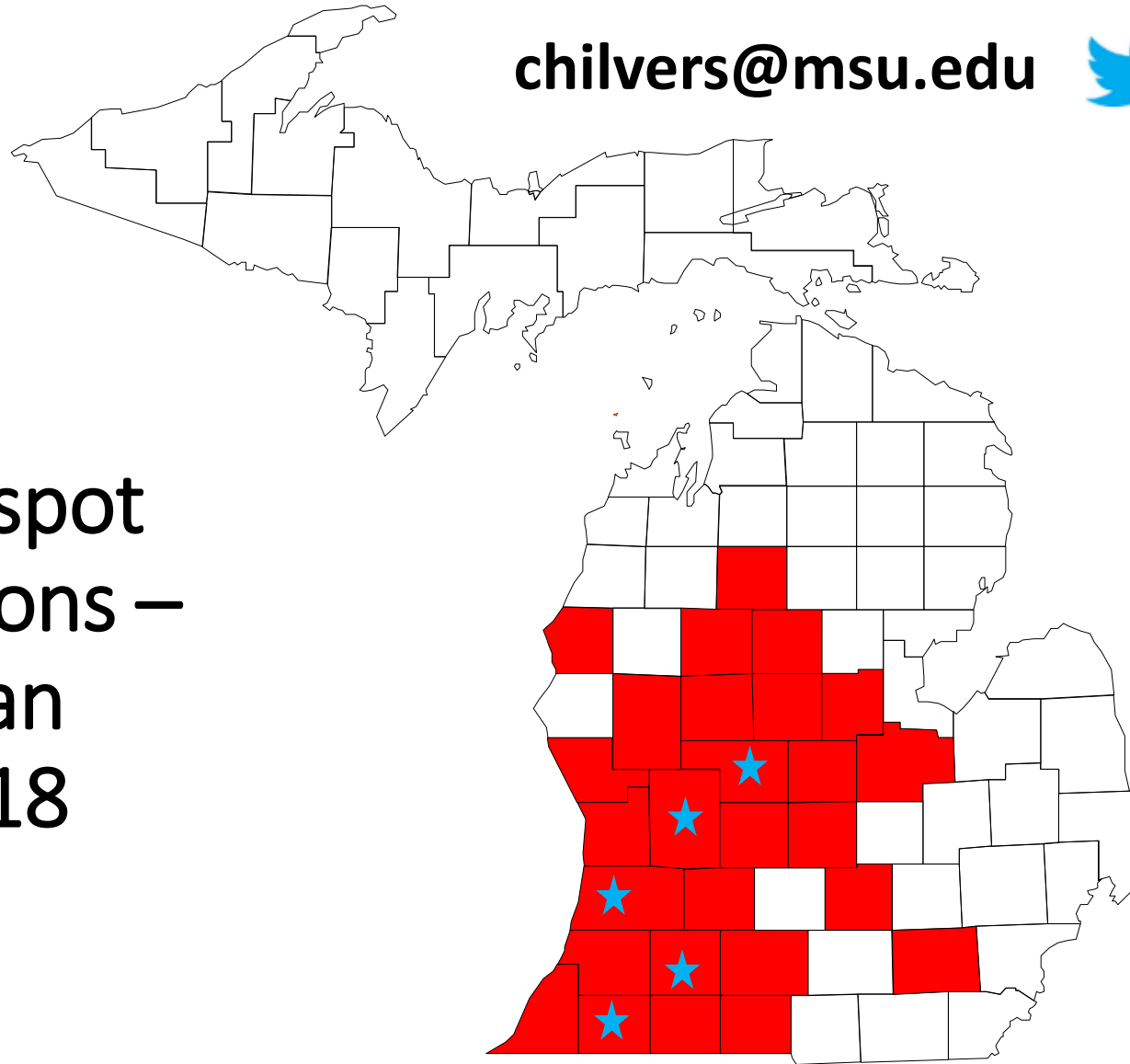


**Did you see tar spot elsewhere? Or experience significant yield loss?**

**chilvers@msu.edu**



**@MartinChilvers1**

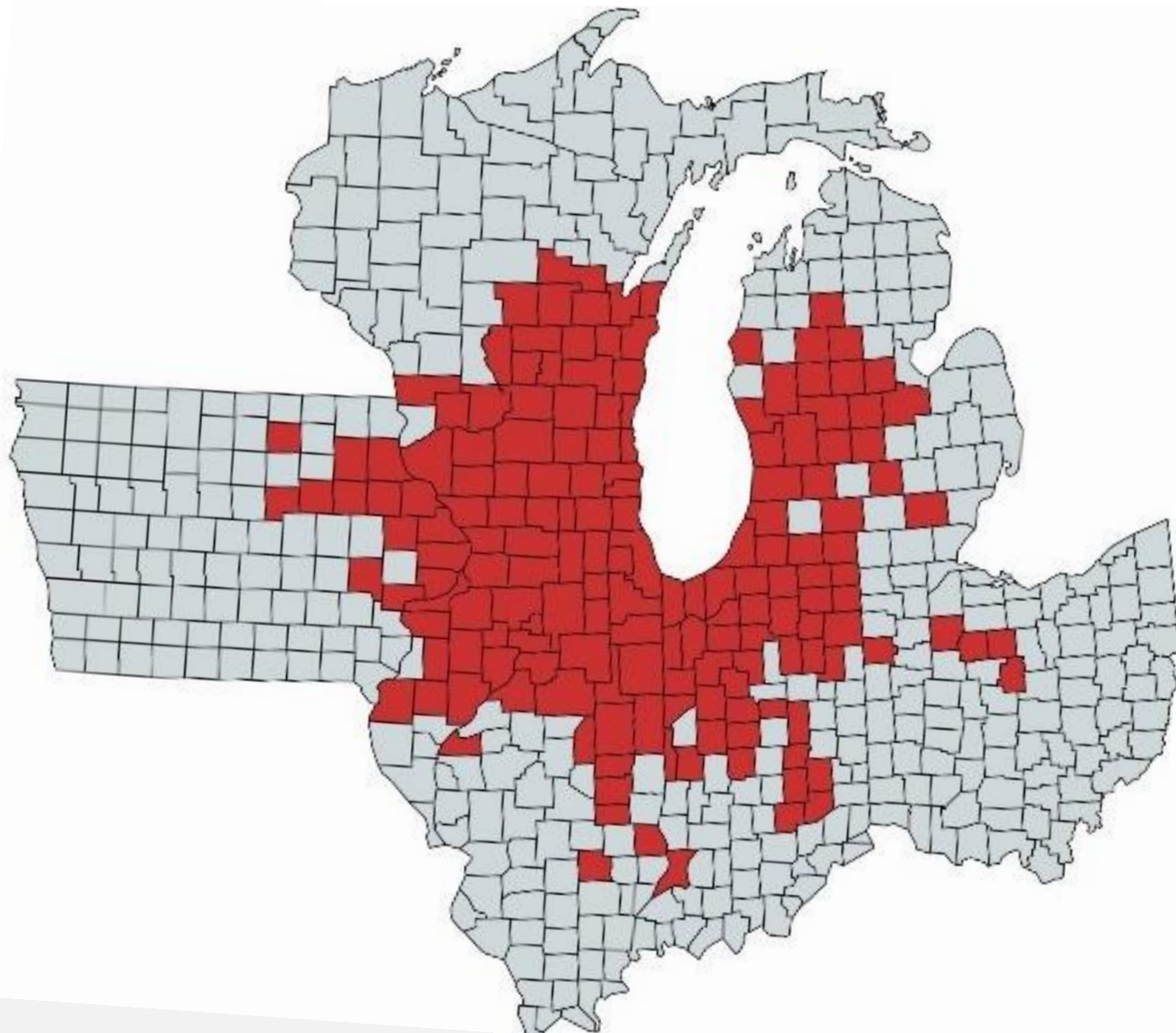


**2018 Tar spot  
confirmations –  
Michigan  
11/15/18**

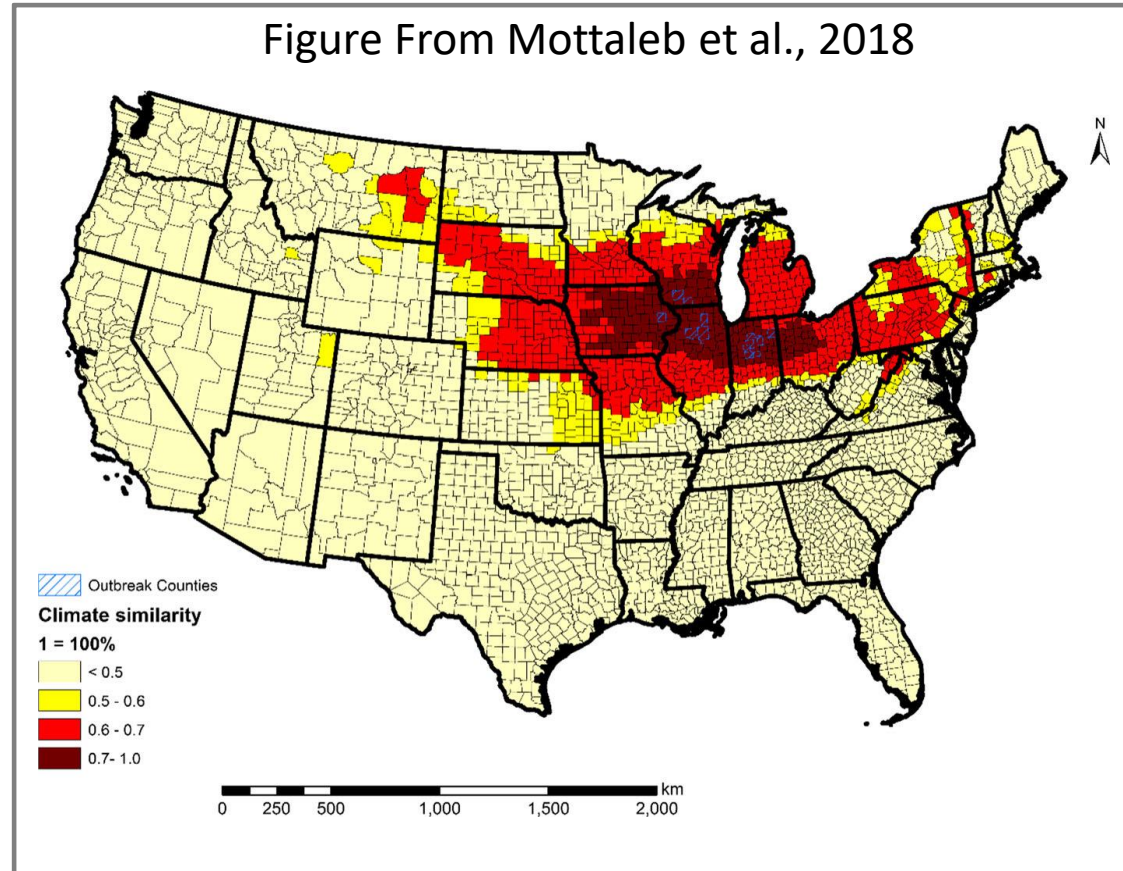
**★ 50 bu/A losses reported (possibly greater)**



# Tar spot confirmations



# What do we know?



**Fig. 4** Maize-producing counties vulnerable to tar spot complex (TSC) calculated based on climate similarity indices using historic climatic data from the counties where TSC has been detected. Source: developed by authors

## Hock et al. 1995

- Monthly average temp of 63 F – 72 F
- Average RH greater than 75%
- Average of 7h/night of leaf wetness
- 10-20 foggy days per month
- Monthly rainfall total of at least 5.9 inches



# Tar spot progression (2 week)

Aug 24, 2018



Sep 7, 2018



Disease first observed July 8, 2018

# Fungicide trial (image Sep 7)

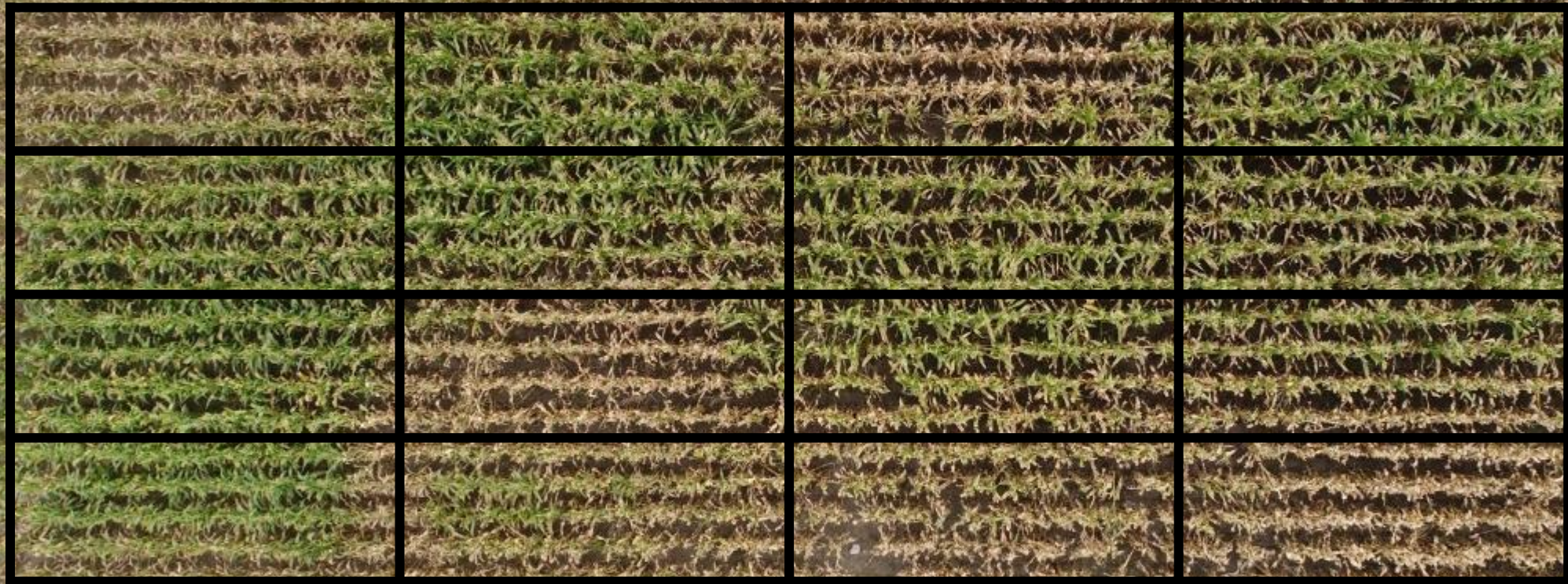


# Fungicide trial (image Sep 7)

**Fungicides applied on Aug 10 at R3:**

- **QoI/Strobilurins FRAC 11 [Headline 2.09 SC 12fl oz/A]**
- **DMI/Triazoles FRAC 3 [Proline 480 SC, 5.7 fl oz/A]**
- **Premix QoI & DMI FRAC 11 & 3 [Delaro 325 SC, 11 fl oz/A]**

# Fungicide trial – sprayed @ R3 (Aug 10, photo Sep 7, 2018)



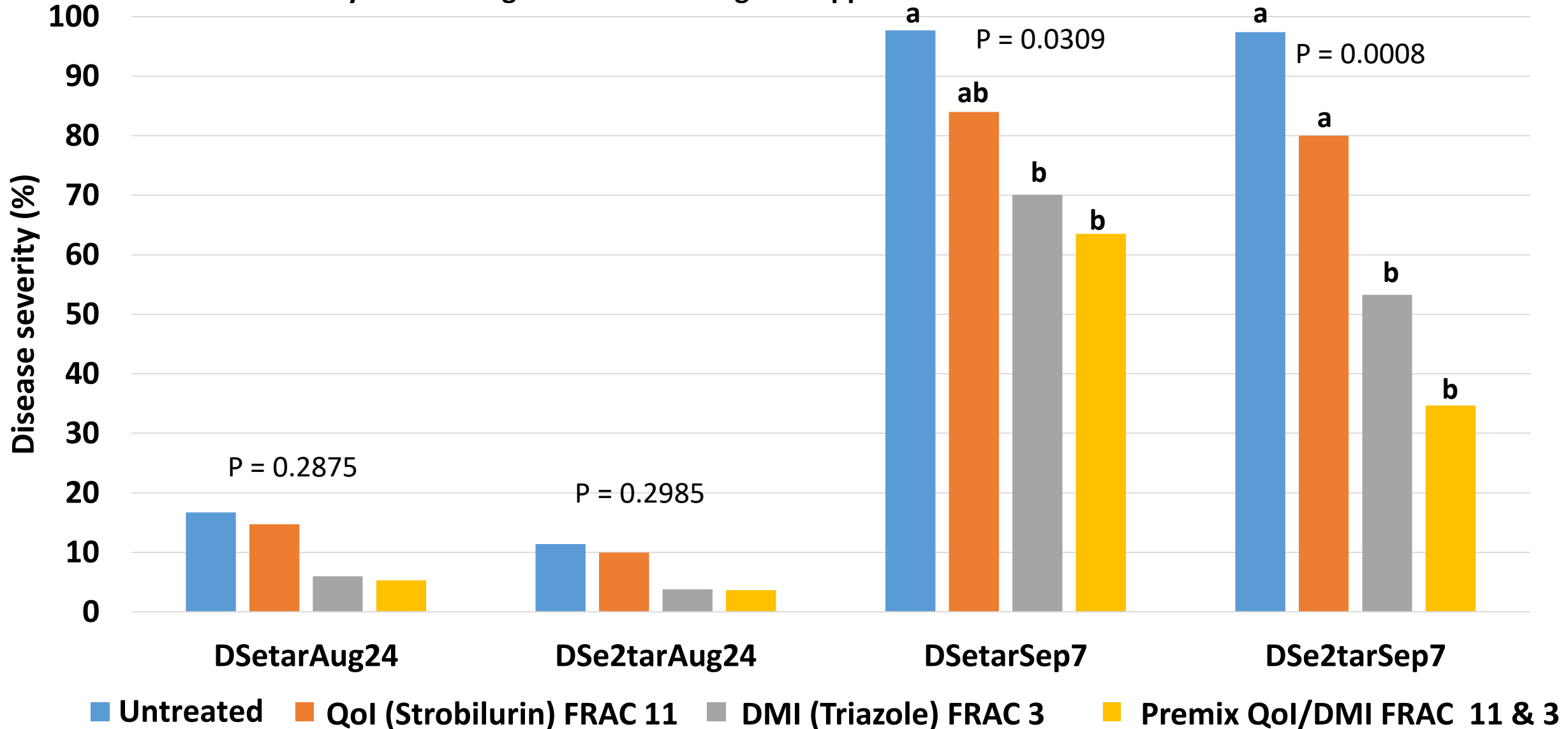
# Fungicide trial – sprayed @ R3 (Aug 10, photo Sep 7, 2018)

|                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|
| Control         | DMI (Proline)   | Control         | Premix (Delaro) |
| QoI (Headline)  | Premix (Delaro) | DMI (Proline)   | QoI (Headline)  |
| DMI (Proline)   | Control         | Premix (Delaro) | DMI (Proline)   |
| Premix (Delaro) | QoI (Headline)  | QoI (Headline)  | Control         |

# Tar spot disease severity: Ear leaf and + 2



Disease severity <3% on Aug 10 at time of fungicide application



**Untreated**



**Premix (FRAC 3&11)**

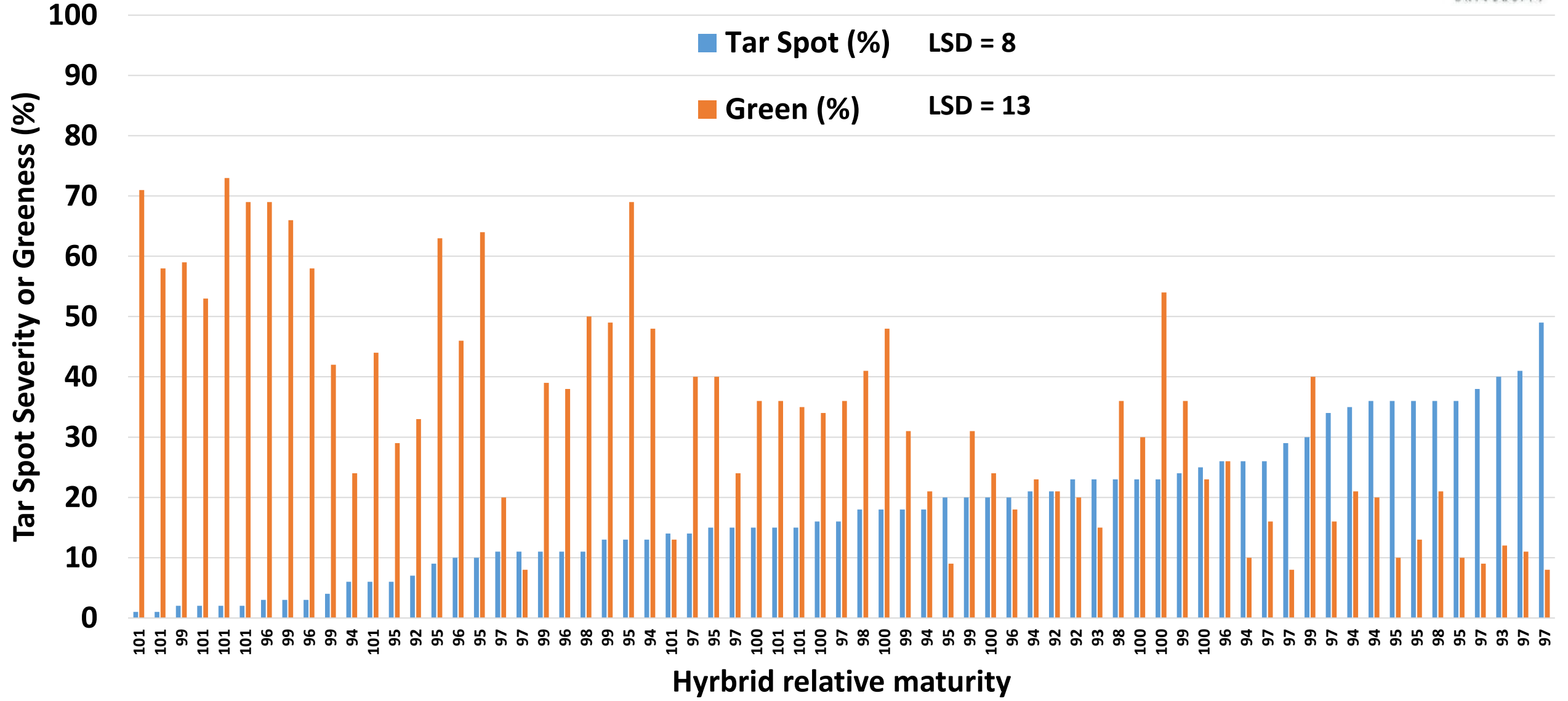


# Hyrbid resistance/susceptibility





# Early maturity group resistance/susceptibility Allegan Co., MI

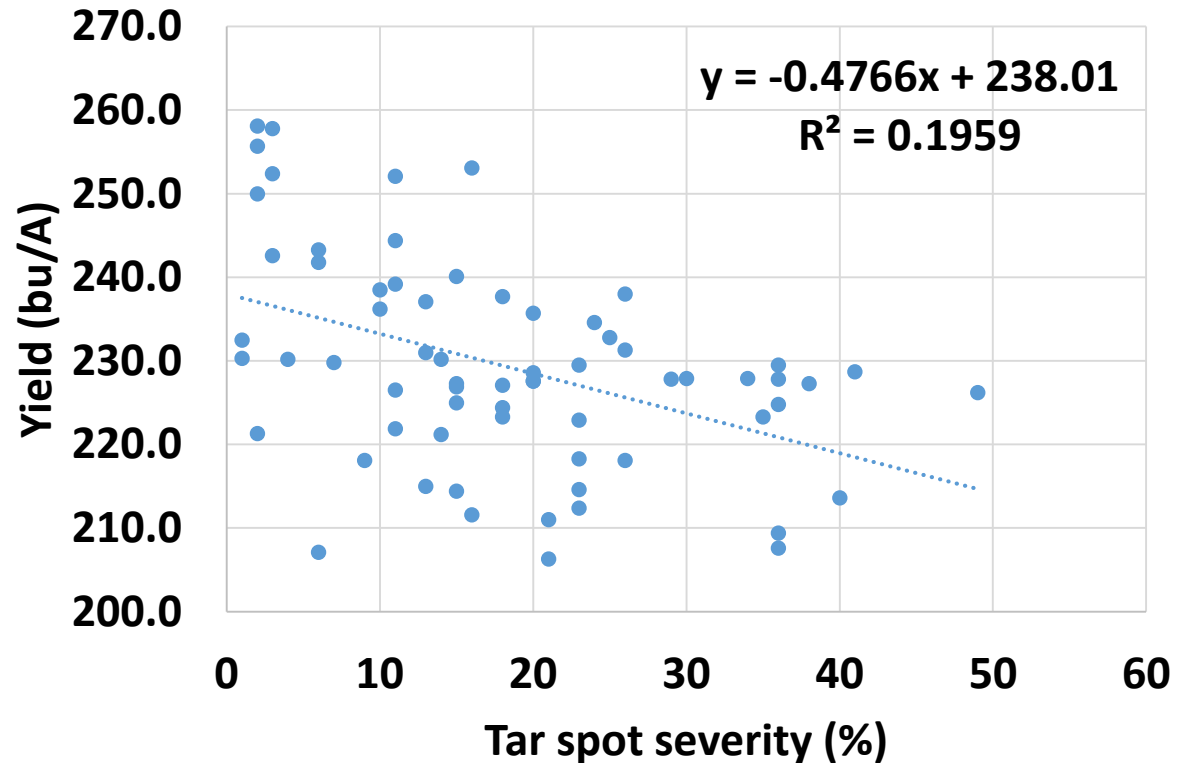


MSU Corn performance trials

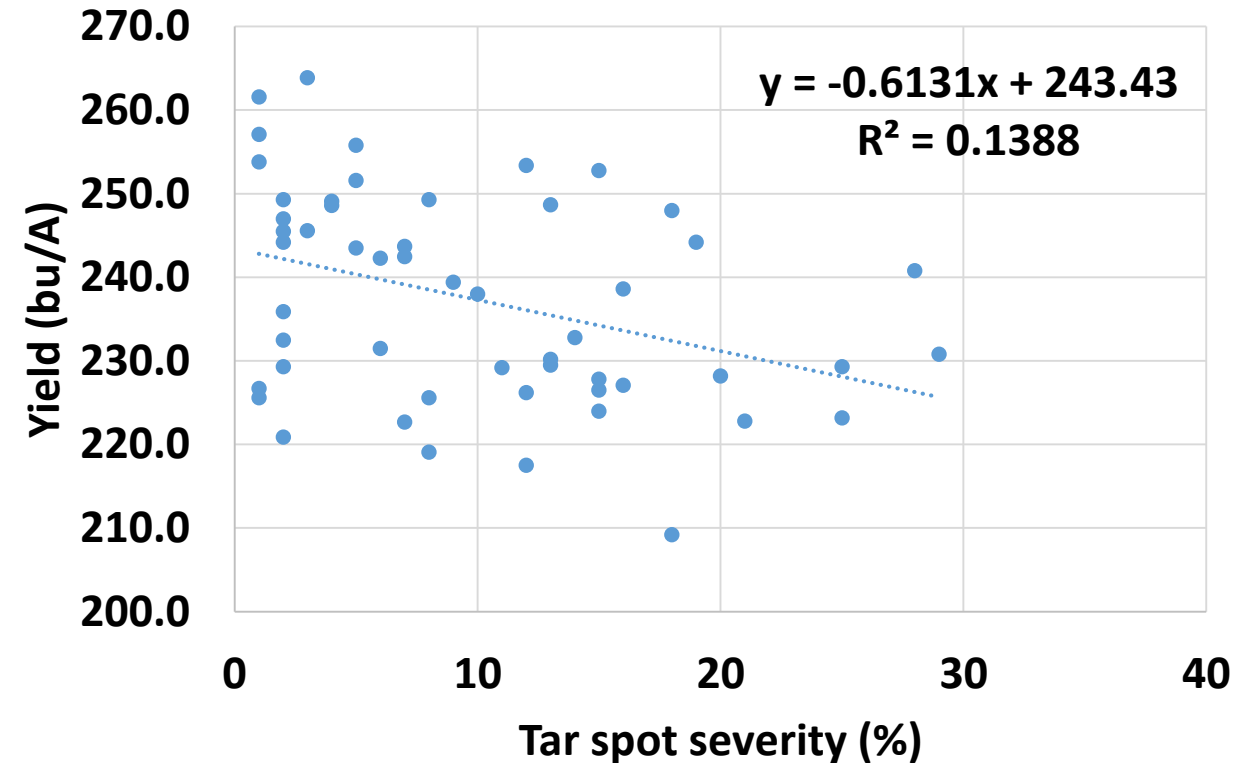
Chilvers, Byrne, Widdicombe, Singh

# Yield loss - 2018 Allegan performance trial

## Early maturity group



## Late maturity group



0.48 to 0.61 bu/A loss for every 1% increase in tar spot severity (i.e 10% severity 5bu/A loss)

# Tar spot on corn silage



Less affected

Severely affected

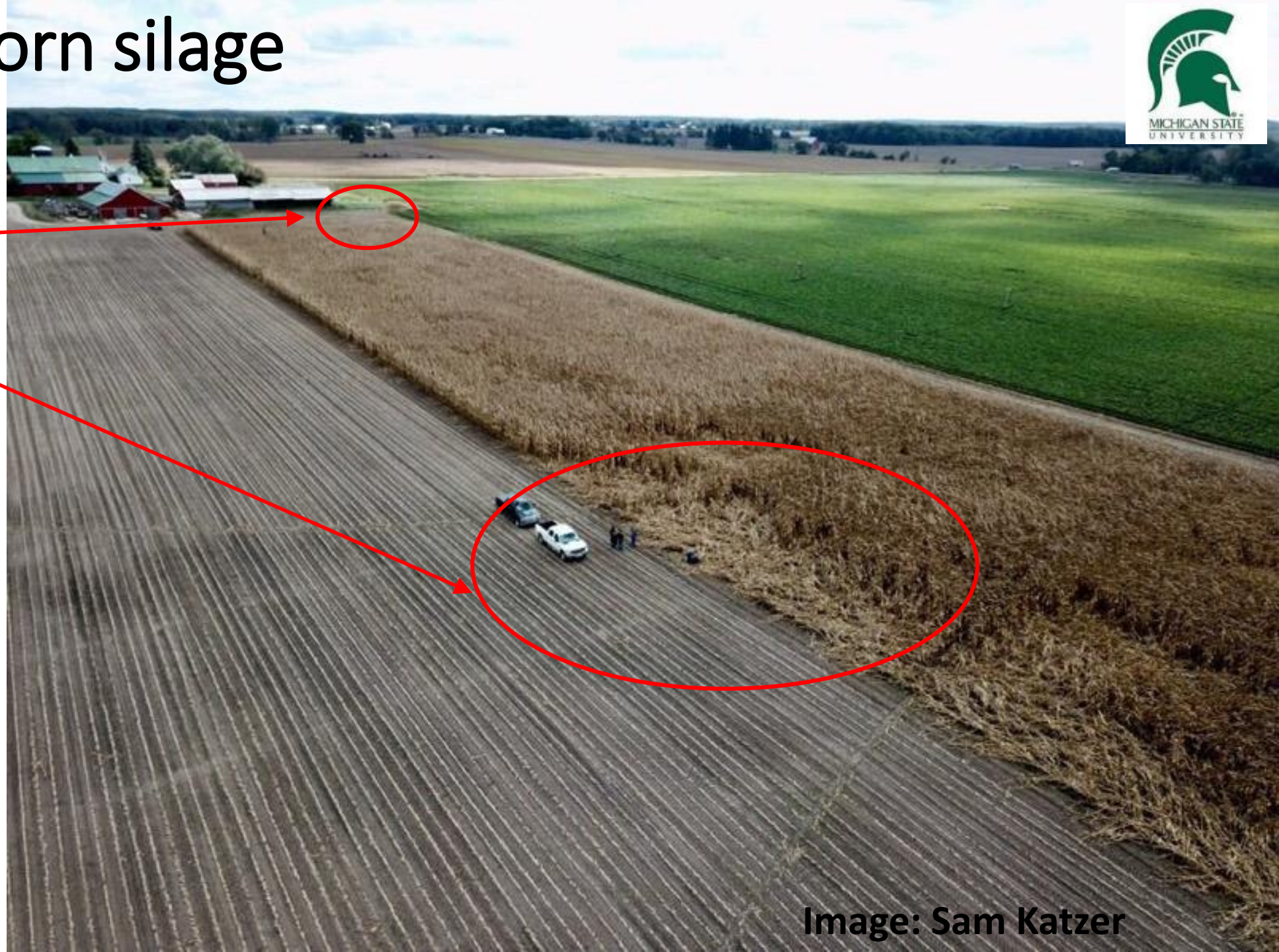
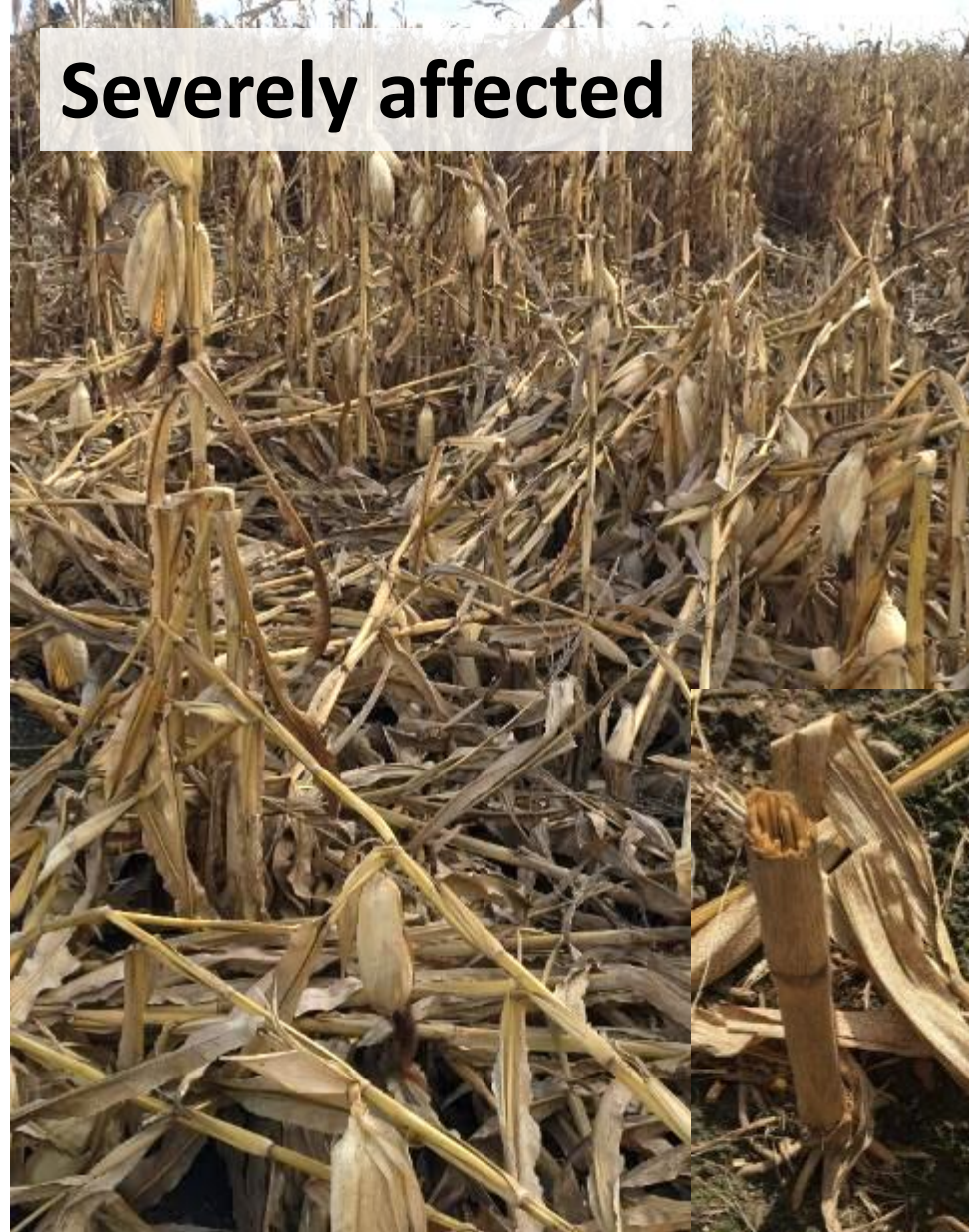


Image: Sam Katzer

**Less affected**



**Severely affected**



# Corn silage: quality (observational)



Image: Sam Katzer

|                                           | “Less affected”      | “Severely affected”  |
|-------------------------------------------|----------------------|----------------------|
| Moisture %                                | 52.4                 | <b>19.0</b>          |
| Crude Protein %                           | 8.2                  | 7.5                  |
| ADF % (cellulose & lignin)                | 14.5 (DM)            | <b>23.2</b> (DM)     |
| aNDF % (cellulose, lignin, hemicellulose) | 27.6 (DM)            | <b>38.4</b> (DM)     |
| Lignin %                                  | 1.99 (DM)            | <b>3.37</b> (DM)     |
| NDF Digestibility (30hr) %                | 58.1 (NDF)           | 50.9 (NDF)           |
| Ethanol Soluble CHO %                     | 7.2 (NFC) 4.2 (DM)   | 3.5 (NFC) 1.7 (DM)   |
| Starch %                                  | 85.6 (NFC) 49.8 (DM) | 89.1 (NFC) 42.8 (DM) |
| TDN (% DM)                                | 76.5                 | 71.2                 |
| Net Energy Lactation (Mcal/lb)            | 0.79                 | 0.73                 |

## Severely affected areas:

- Too dry to ferment, may catch fire, require 40-60% moisture
- High lignin which is indigestible
- **Overall lower quality and energy**
- **No associated mycotoxins**

In severely affected fields may consider baling dry stover after ear harvest

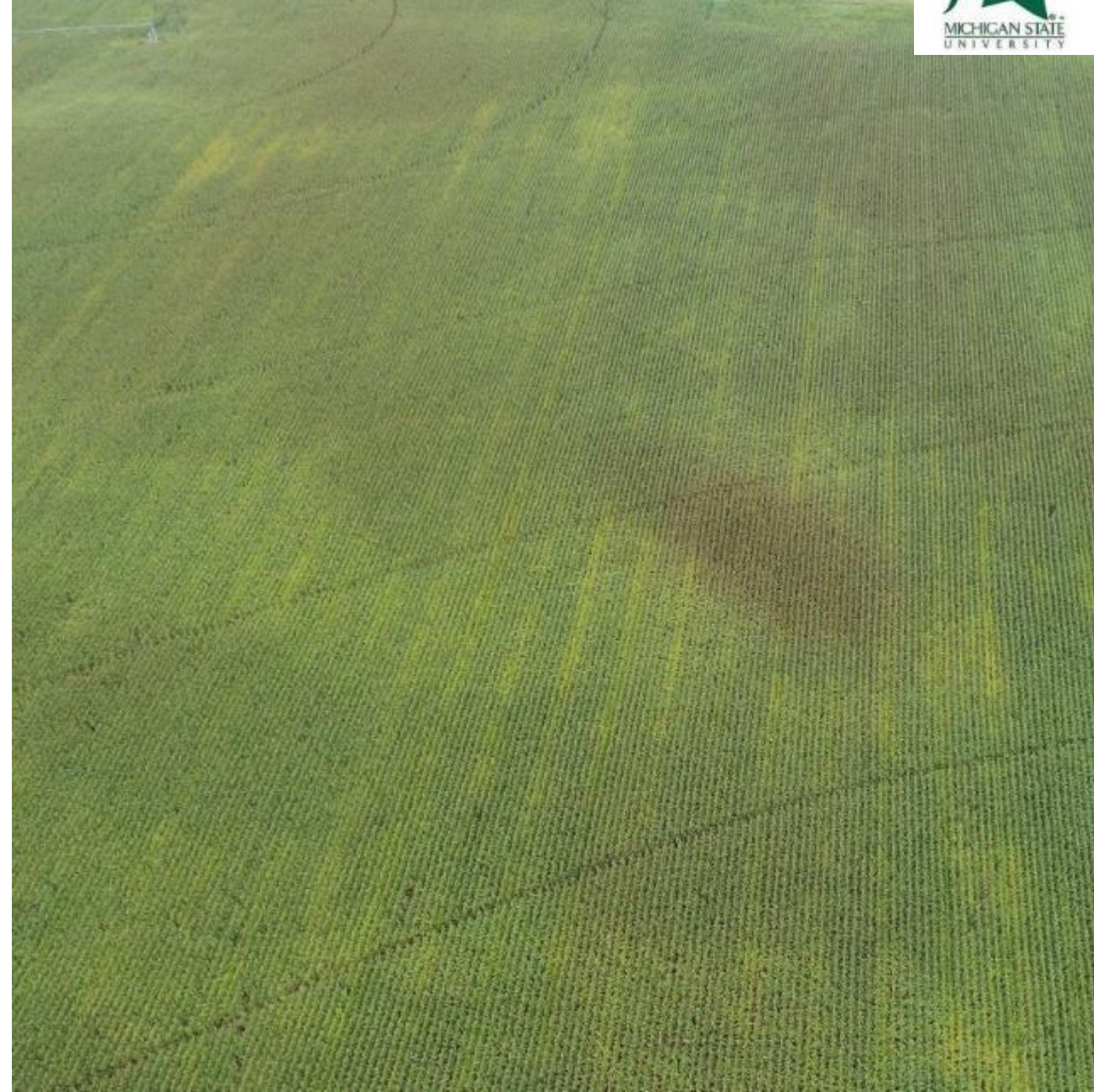
# Cultural management practices

- Rotation and tillage offers little benefit
- Continuous corn and min. or no-till will increase risk (earlier infection)
- Irrigation favors infection conditions
- 150bu/A under irrigation vs 212bu/A non-irrigated (Jim Schaendorf)
- Limit leaf wetness when possible
- Scout fields
- Under heavy disease
- Consider harvesting early prior to lodging

# Scouting for tar spot:



# Scouting for tar spot: from the air





# Management – many unknowns

- **Diversify hybrids** (i.e. plant > one or two hybrids)
  - Talk to seed salesperson for any info
  - Consider high stalk strength to reduce lodging
- **Avoid where possible planting into corn**
- **Scout**
- **Apply fungicide when?**
  - Disease initiates across field, few lesions on all plants
  - R1 appears to provide some protection
- **Irrigation**
  - Limit canopy moisture
- **Consider harvesting early prior to lodging**

# Questions?



**mccoaus@msu.edu**

**chilvers@msu.edu**

**@afunguy95**

**@MartinChilvers1**