

Corn Stalk Lodging

What Role Did Stalk and Crown Rot Play?

Tamra Jackson-Ziems

Acknowledgements: Jim Harbour

Brad Tharnish, Terra Hartman,

Casey Schleicher, Jae Behn Brungardt

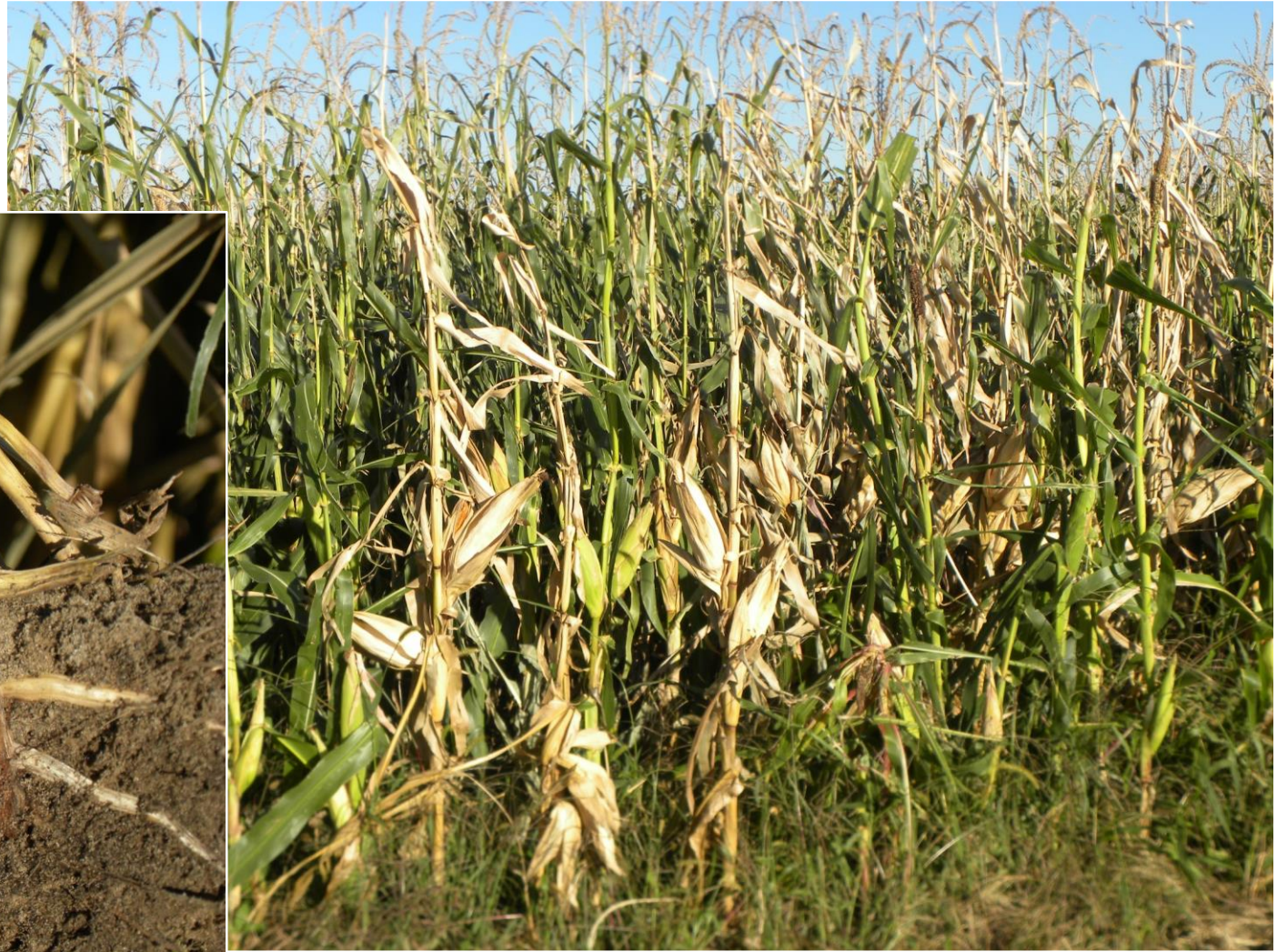
STALK AND CROWN ROT DISEASES



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STALK AND CROWN ROT DISEASES



FUSARIUM STALK ROT

- Most common stalk rot disease in Nebraska
- Same pathogen as Gibberella, but lacks visible fungal reproductive structures
- White cottony appearance
- Pink/red discoloration
- No reproductive structures

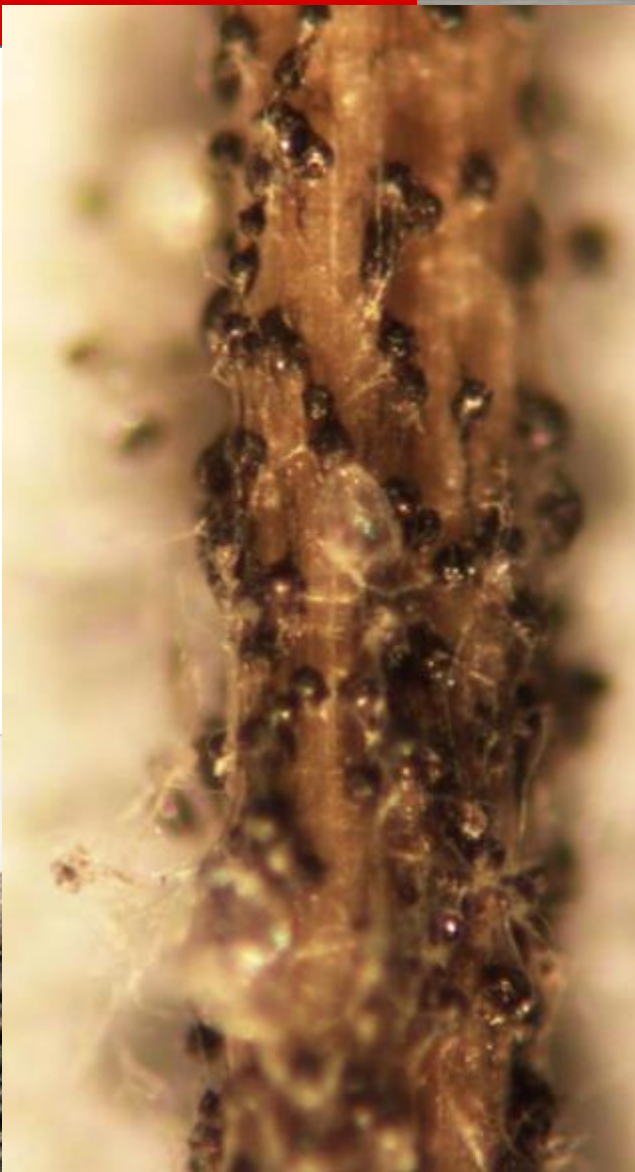


ANTHRACNOSE STALK ROT



CHARCOAL ROT

- Fungal microsclerotia look like charcoal dust
- More common in stressed plants, esp. hot, dry environments



Magnified ~50X



A “PERFECT STORM?”

Stalk Rot Diseases in Nebraska Corn Fields

SEPTEMBER 22, 2017

Kyle Broderick - Coordinator of the UNL Plant and Pest Diagnostic Clinic | Tamra Jackson-Ziems, Extension Plant Pathologist

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Various stalk rot diseases have been confirmed in samples from corn fields across Nebraska. Stalk rot diseases and the pathogens that cause them are common in corn. They can weaken corn stalks, leading to stalk lodging and harvest difficulties for producers (*Figure 1*). These diseases also can impact yield if corn plants are killed prematurely. It's important to be aware of their incidence in fields to better understand the risk of harvest difficulties if plants lodge. In addition, knowing which diseases are present in individual fields can help producers anticipate, manage and prevent them in subsequent growing years.

Unfortunately, the symptoms that stalk rotting pathogens cause can be misleading and make it difficult to diagnose. For example, some of the earliest symptoms of stalk rot disease may be the discoloration of leaves and rapid plant wilting and/or premature death. In recent weeks, several samples of dead leaves have been submitted to the UNL Plant and Pest Diagnostic Clinic. Microscopic observation and testing of these samples has failed to identify any pathogens or provide a

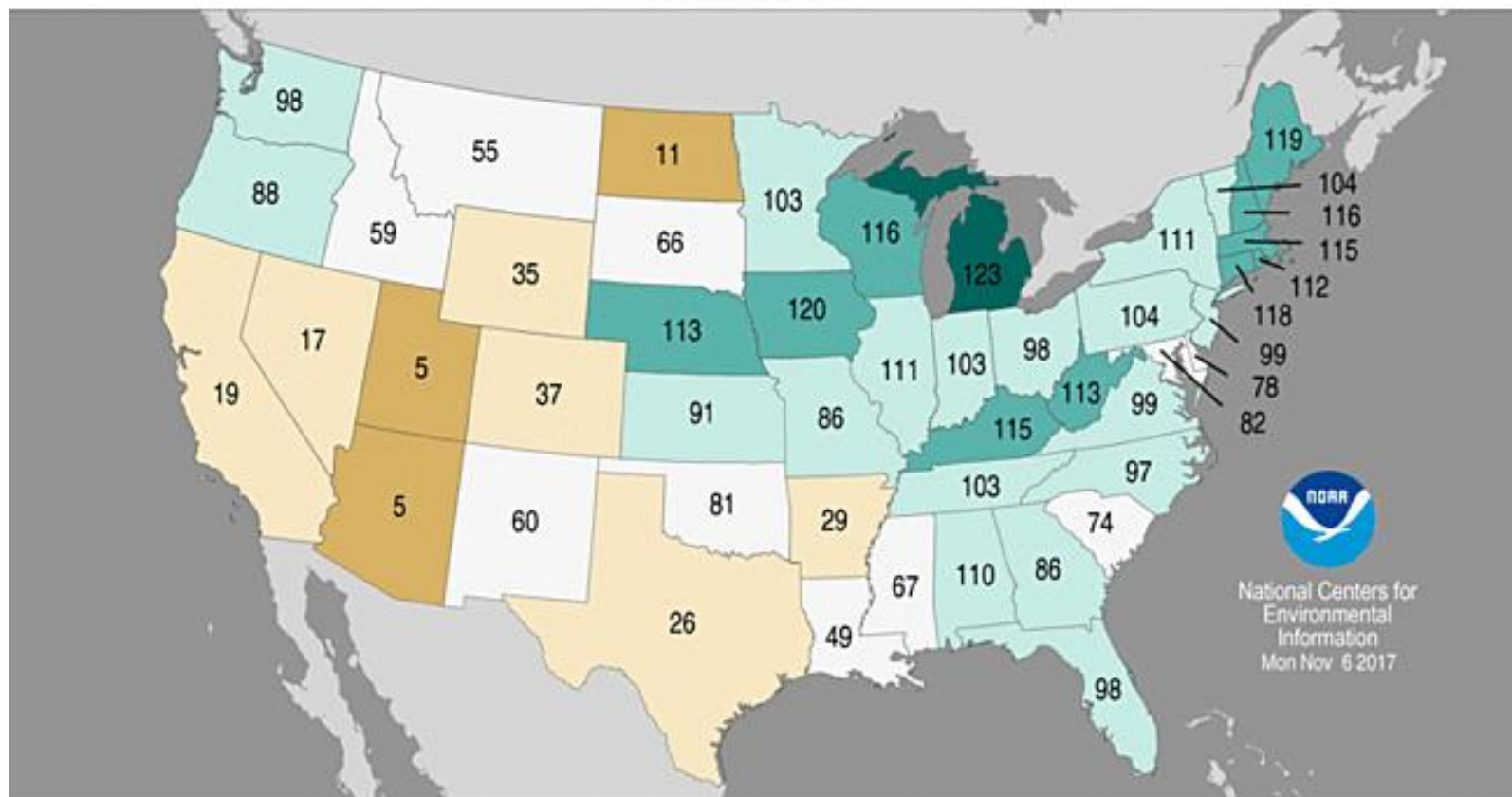


Figure 2: Foliar symptoms of crown and stalk rot diseases can resemble diseases such as Goss's wilt and abiotic factors such as sunscald or nutrient deficiencies. Examination of the corn stalk is usually necessary to identify stalk rot diseases. (Photos by Kyle Broderick unless otherwise indicated)

Statewide Precipitation Ranks

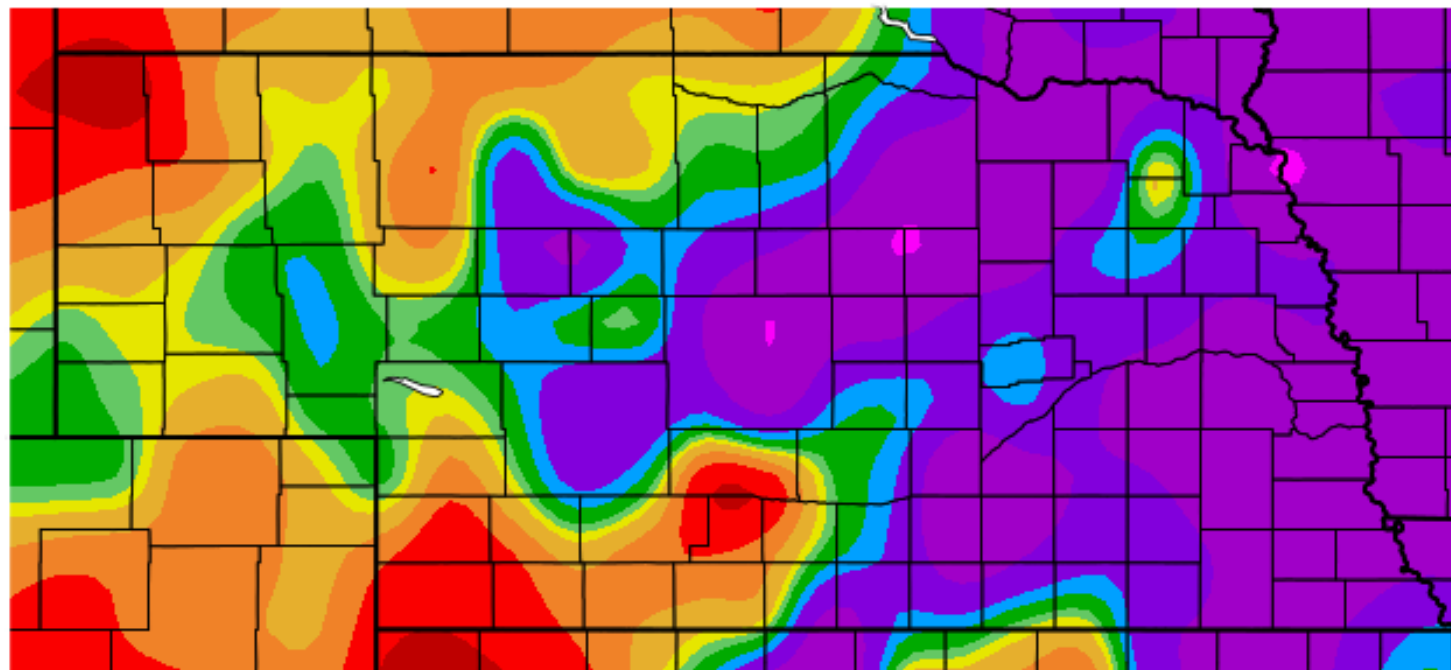
October 2017

Period: 1895-2017



Percent of Normal Precipitation (%)

10/1/2017 - 10/31/2017



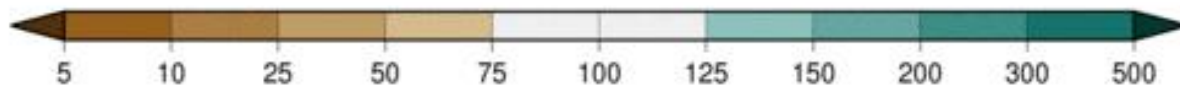
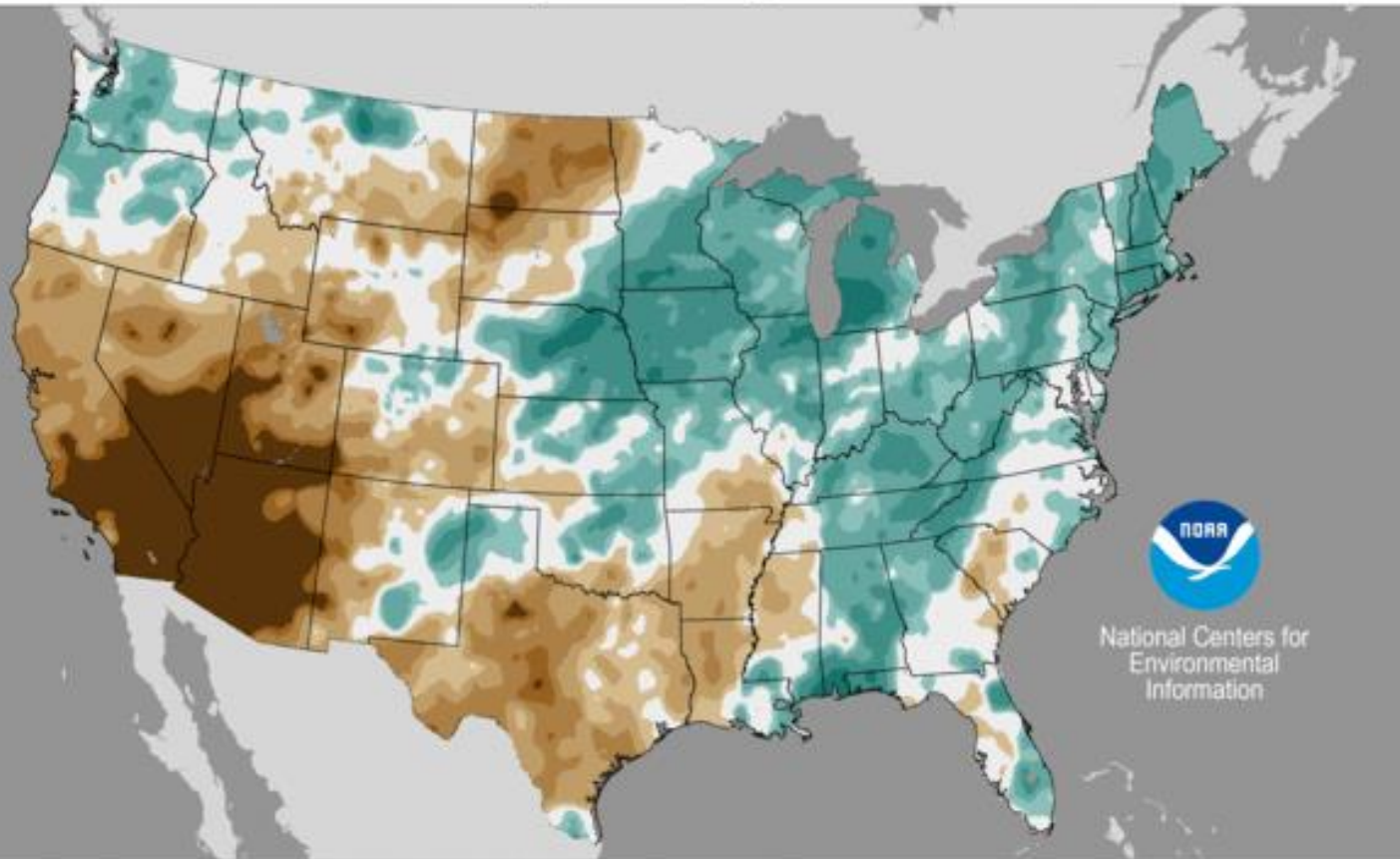
Generated 11/5/2017 at HPRCC using provisional data.

NOAA Regional Climate Centers **N** EXTENSION

Precipitation Percent of Average

October 2017

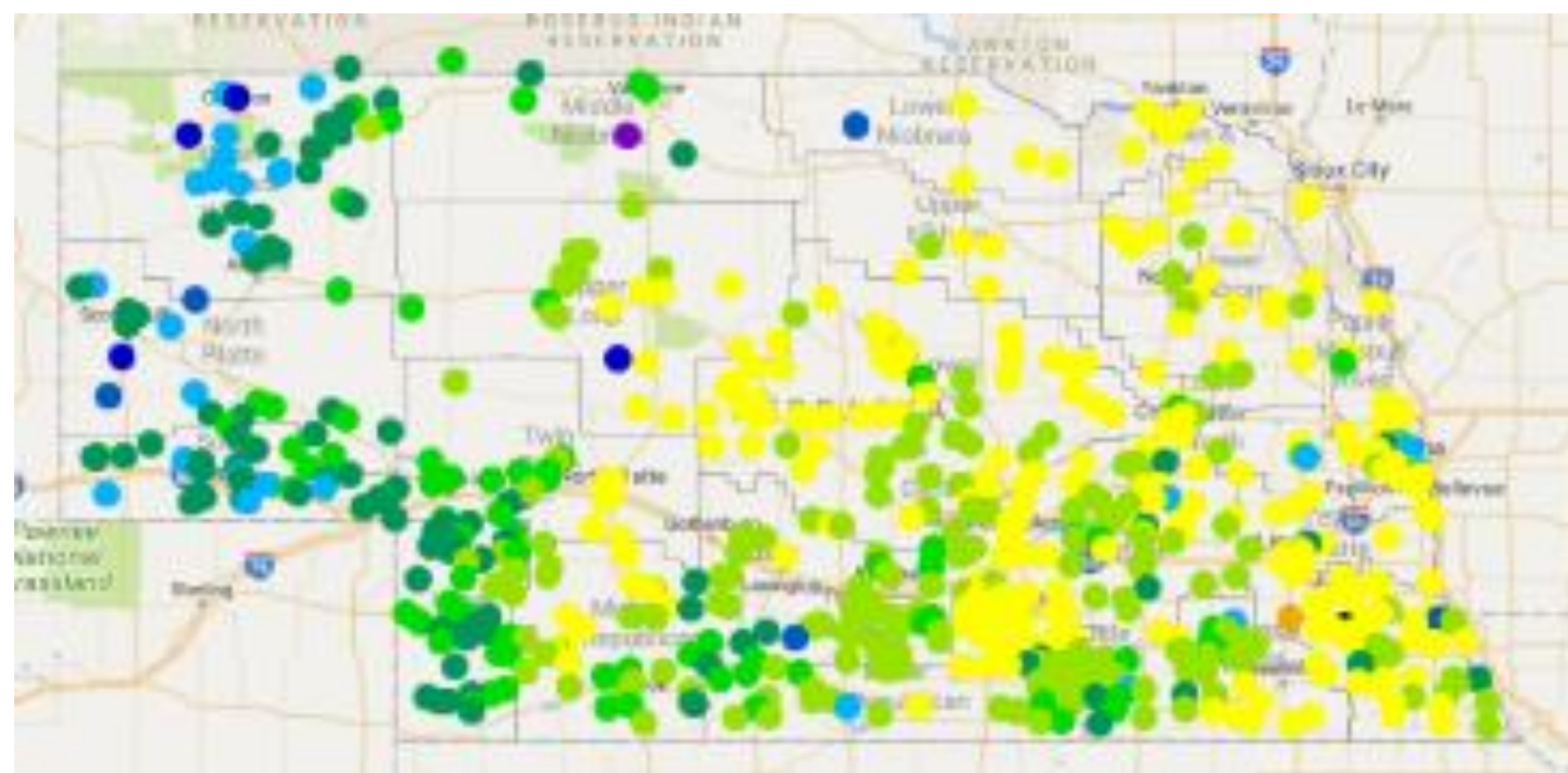
Average Period: 20th Century



Created: Mon Nov 06 2017

Percent

Data Source: 5km Gridded (nClimGrid)



Legend—Depths In Inches

<https://nednr.nebraska.gov/nerain>

●	Zero	●	≥ 0.25	●	≥ 2	●	≥ 6	●	≥ 24
●	> Zero	●	≥ 0.5	●	≥ 3	●	≥ 12	●	≥ 36
●	≥ 0.10	●	≥ 1	●	≥ 4	●	≥ 18	●	≥ 48

EXCESSIVE MOISTURE

- Soil and plant material become (and stay) saturated for a prolonged period
- Microbes flourish!
- Hastening plant decay
- Degradation of stalk quality
 - Soft, hollow stalks



PEAK ONE-MINUTE WIND GUSTS (MPH) AT NWS AUTOMATED SURFACE OBSERVING SYSTEM (ASOS) LOCATIONS, WHERE SENSORS ARE 10' ABOVE THE GROUND.

	23 Oct	24 Oct	25 Oct	26 Oct	27 Oct
Norfolk	41	39	17	47	36
Broken Bow	38	31	22	51	31
Valentine	35	28	15	41	28
Omaha	38	38	13	40	33
Grand Island	39	36	17	45	33
North Platte	35	29	16	38	29
Scottsbluff	37	26	31	37	13
Imperial	39	39	17	45	29
McCook	41	31	18	41	31
Hebron	29	27	12	32	20
Falls City	37	36	18	29	31

***Red numbers indicate recorded highs for the period.** (S. Cooper. 2 Nov 2017 CropWatch.



NUMBER OF HOURS THAT RECORDED A PEAK 5-SECOND GUST EXCEEDING 30, 40, AND 50 MPH (PRELIMINARY DATA)

	23 Oct	24 Oct	25 Oct	26 Oct	27 Oct
Broken Bow					
>30 mph	12	10	0	19	13
>40 mph	5	0	0	14	0
>50 mph	0	0	0	5	0
Norfolk					
>30 mph	14	15	0	17	20
>40 mph	7	5	0	14	6
>50 mph	0	0	0	1	0

(S. Cooper. 2 Nov 2017 CropWatch.

Original sources – NWS ASOS and the National Center for Environmental Information)



WIDESPREAD STALK LODGING

- Early fall – stalk rot diseases were minimal
- Heavy rainfall and prolonged wetness led to rapid decline in stalk quality and delayed harvest
- = Stalk quality declined rapidly + very high winds
- = widespread lodging



<https://nednr.nebraska.gov/nerain>

2016 Nebraska Corn Fungicide Trials

UNL – SCAL near Clay Center, NE

Neal, Jen, Justin, Brad

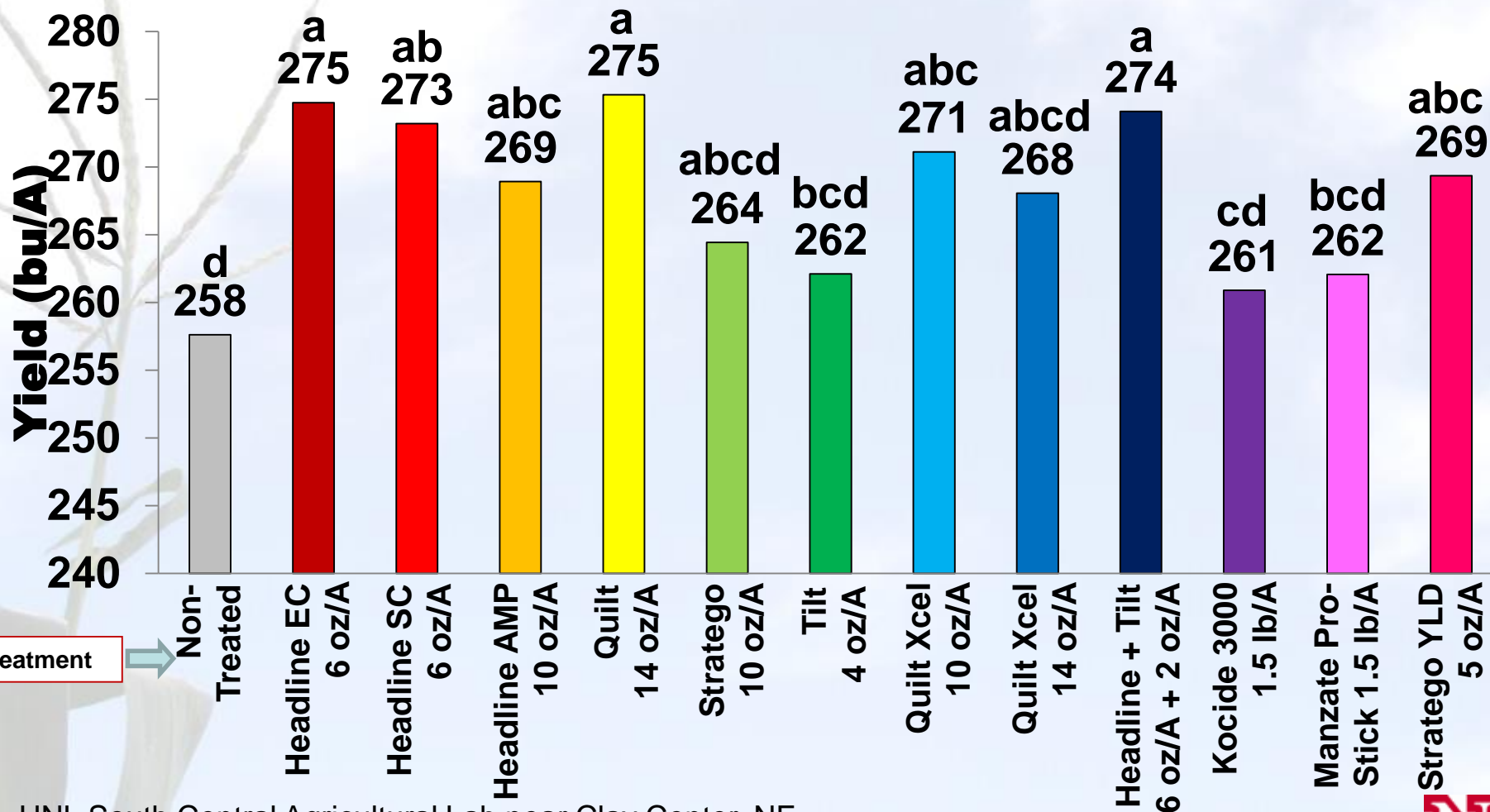
- VT = 7/26/2016
- Temp = 88F
- Wind = 10 mph, WSW
- Experiment Design
 - Plots: 4-rows wide, 40 ft. long
 - 6 replications/treatment
- Ground Application
 - 20 gpa
 - 40 psi
 - 3 mph
 - 6-nozzle boom
 - 11002 nozzles



2009 Fungicide Comparison Trial in NE

DKC 60-18 (GLS rating = 7/fair)

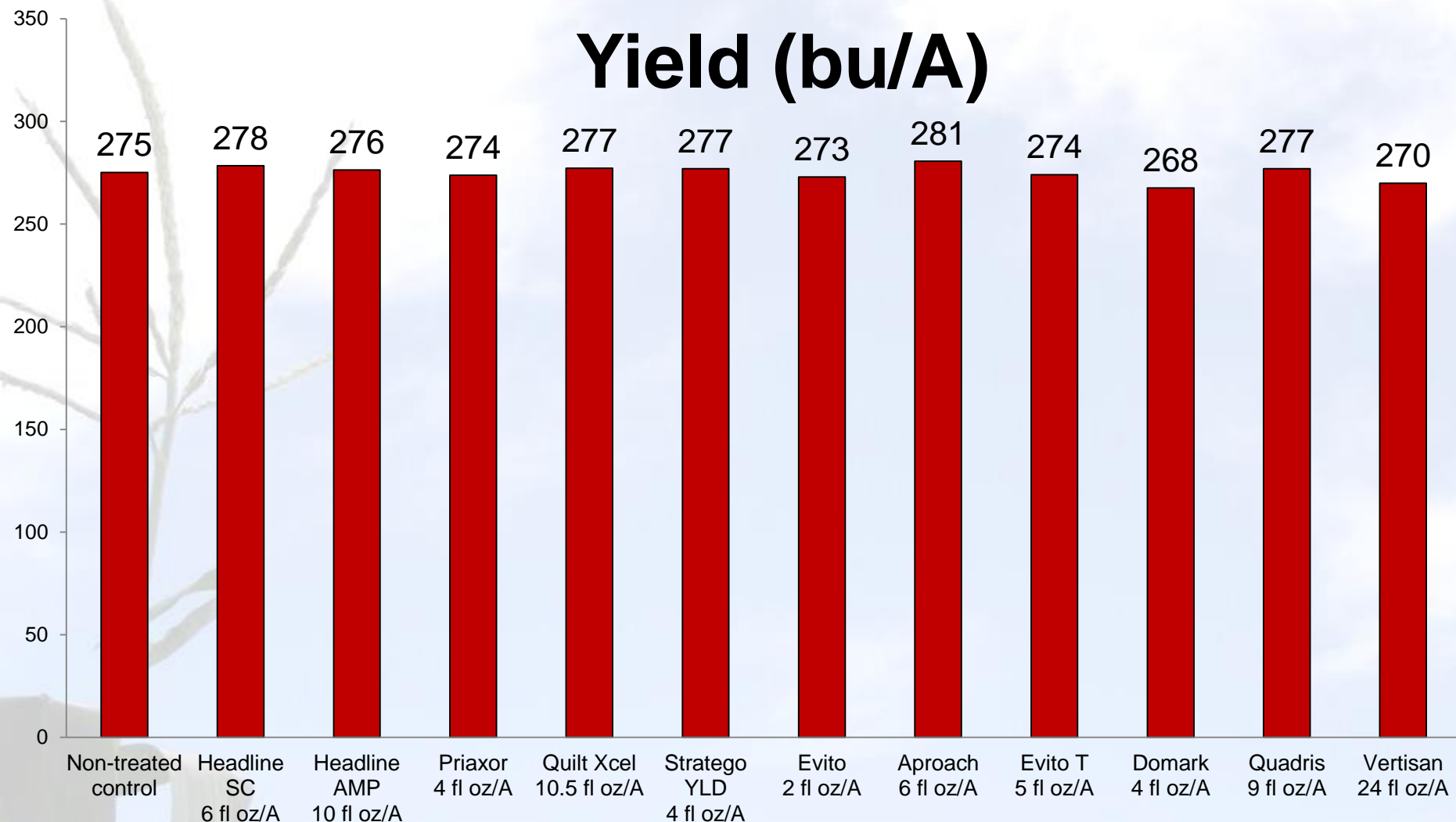
Planted 5/6/09, VT Application 7/17/09



UNL South Central Agricultural Lab near Clay Center, NE

2012 Foliar Fungicide Comparison Trial

Yield (bu/A)



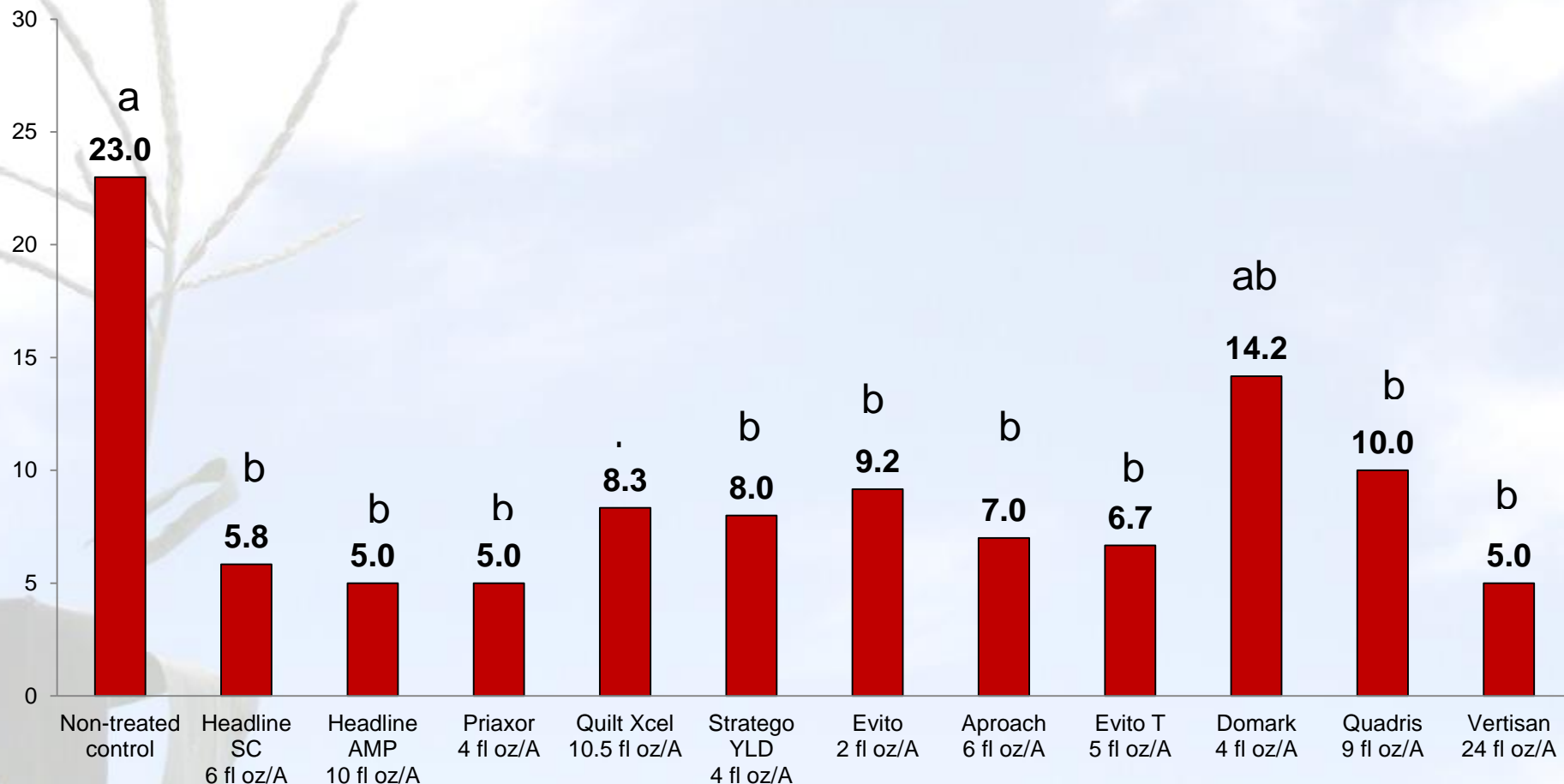
Treatments made at R1 on July 5, 2012

No statistical differences

UNL – SCAL Clay Center, NE – DKC 64-83

2012 Foliar Fungicide Comparison Trial

Push Lodging (%)

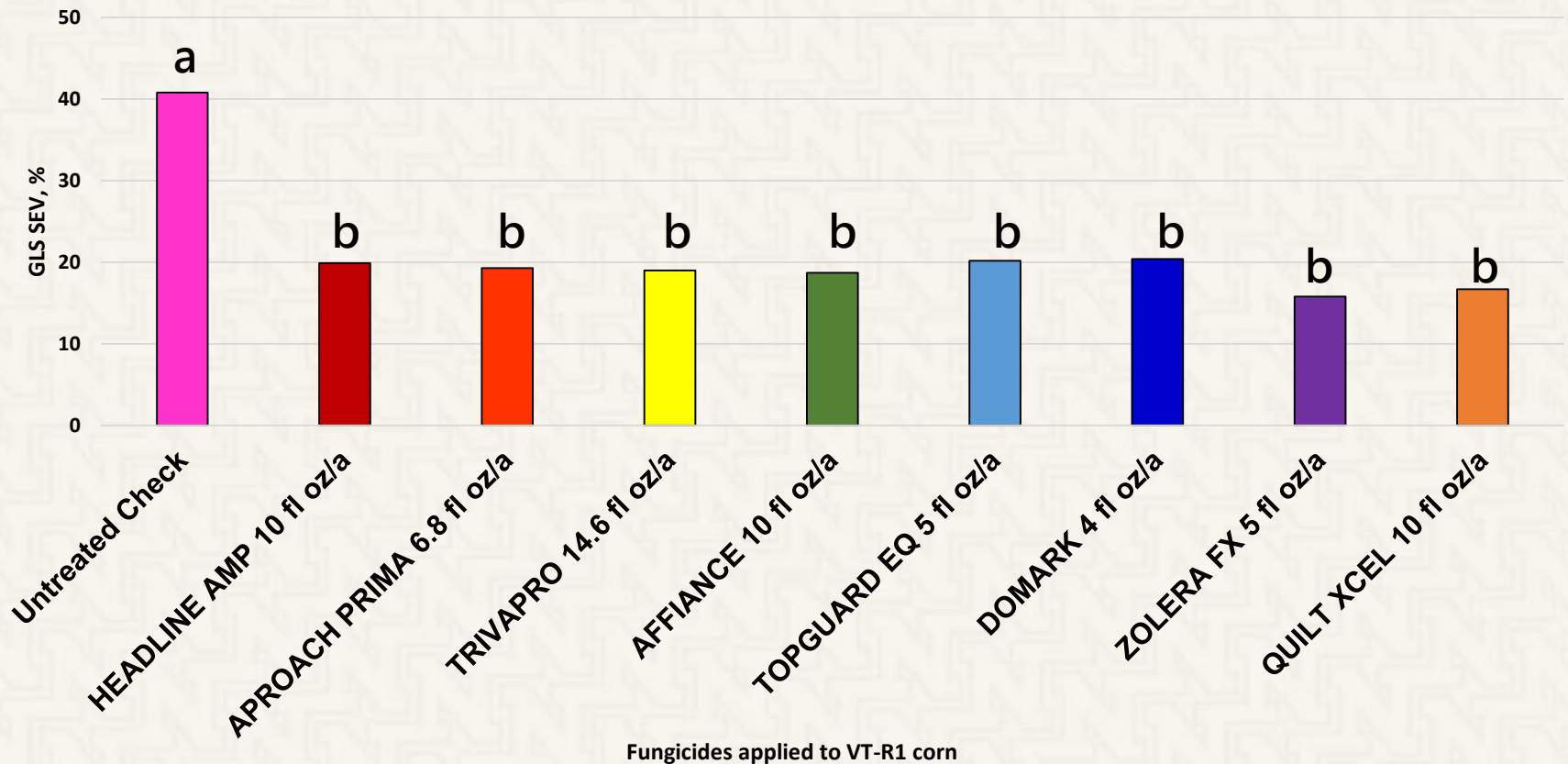


Treatments made at R1 on July 5, 2012

UNL-SCAL Clay Center, NE

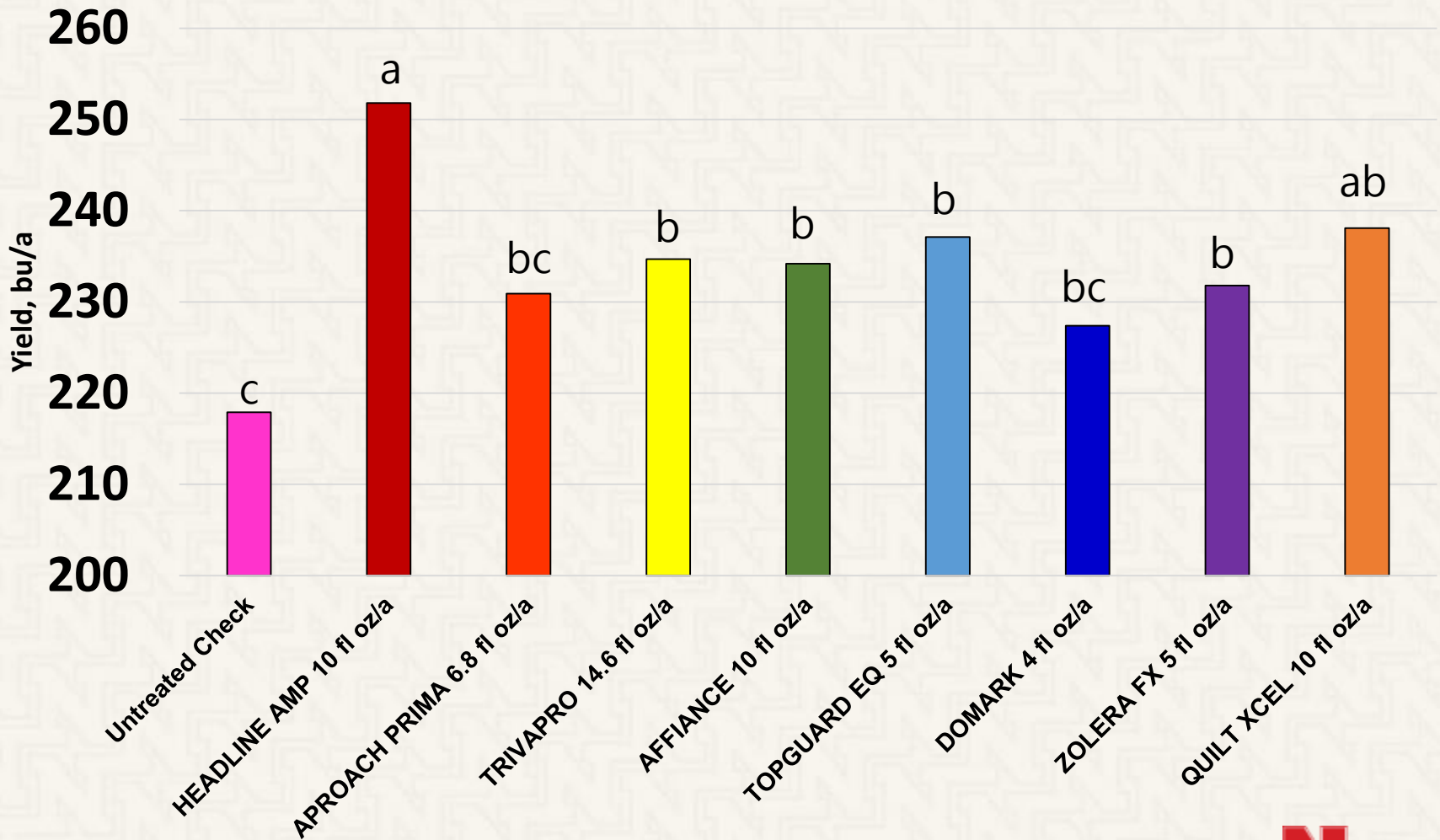
Gray Leaf Spot Severity, 55 DAT

9/19/16



LSD (0.1) = 15.1 bu/a
CV = 6.63%

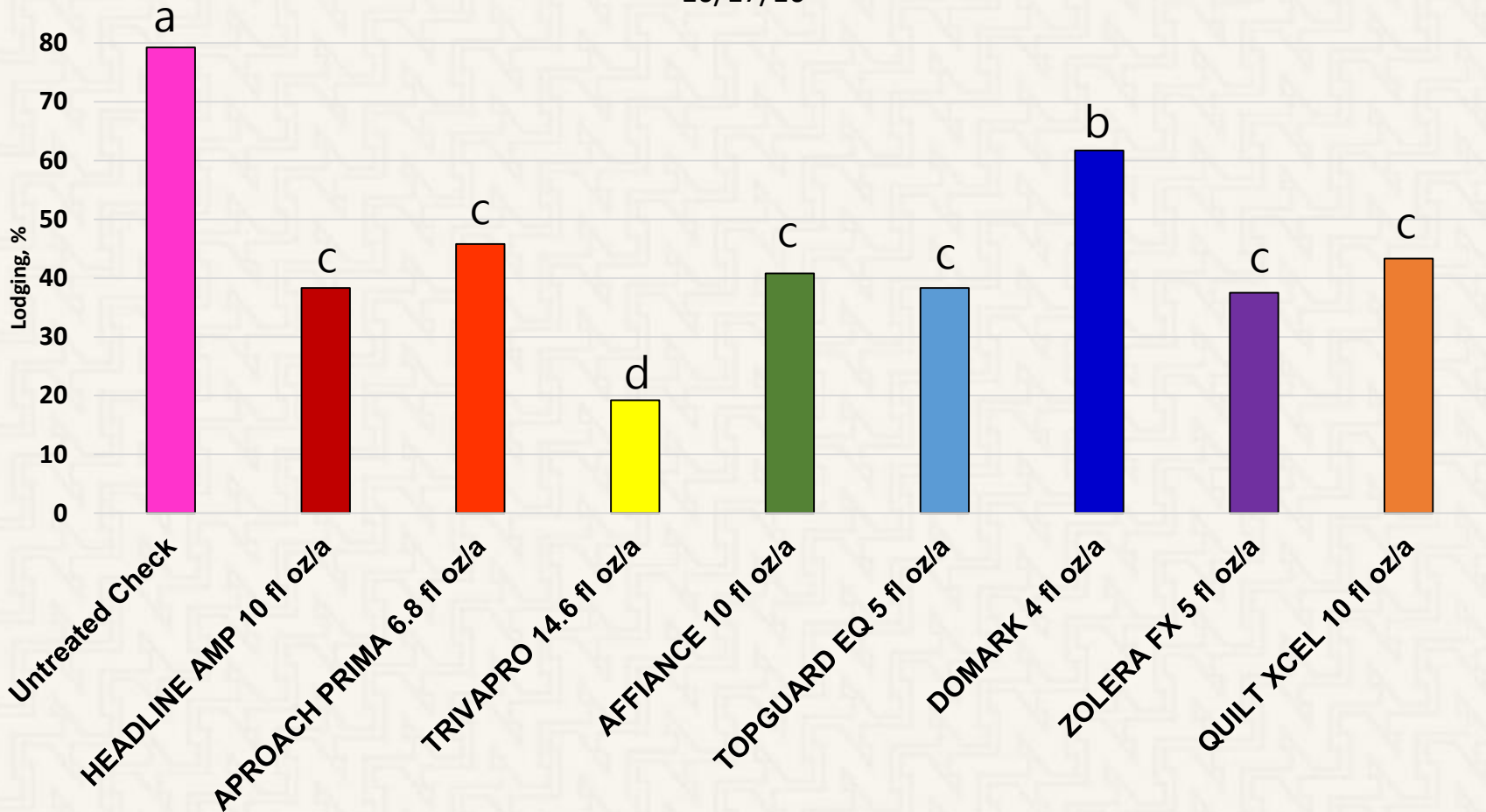
Yield, bu/a



Fungicides applied to VT/R1 corn

Push Lodging, 83 DAT

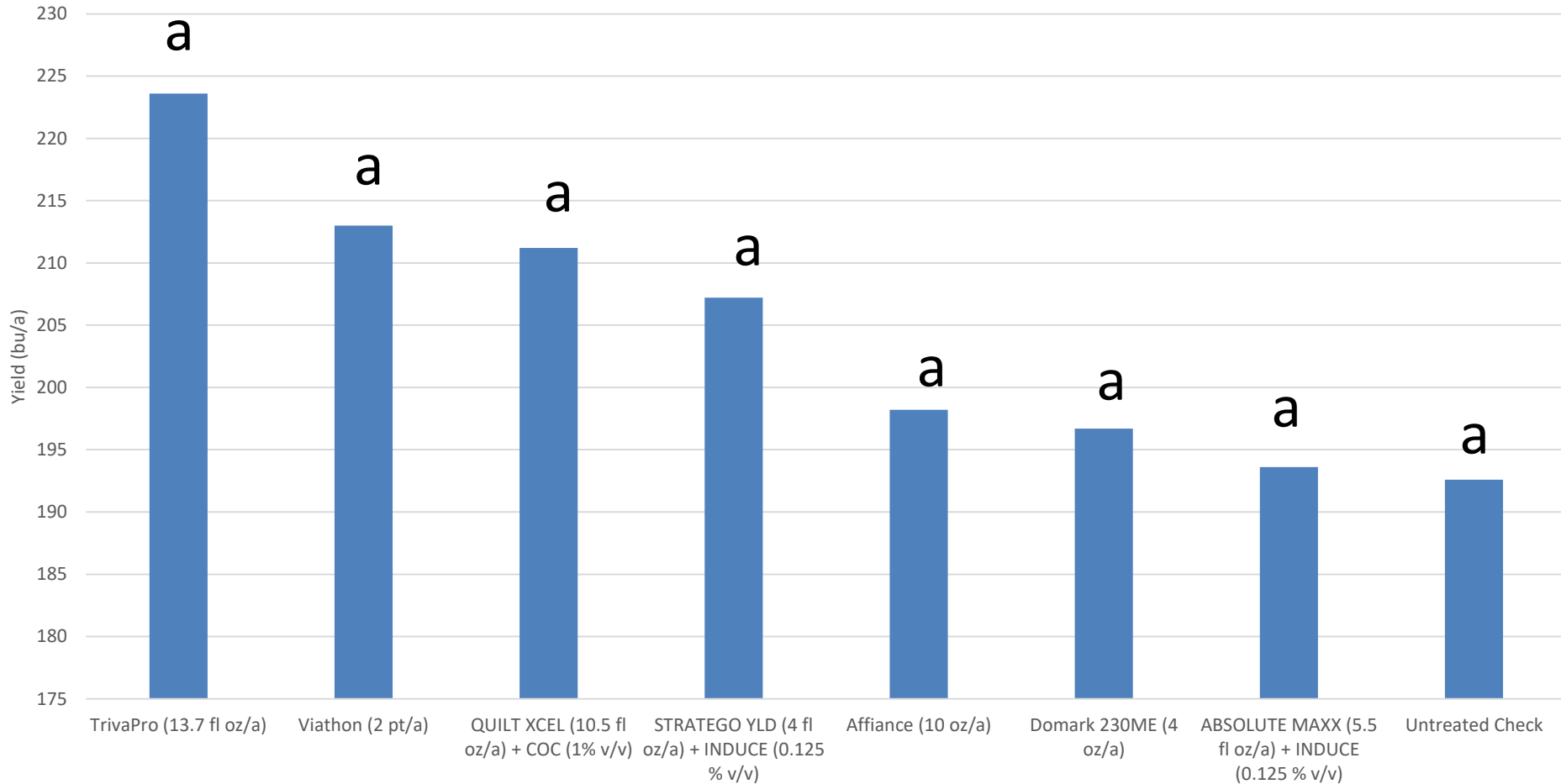
10/17/16



Fungicides applied to VT/R1 corn

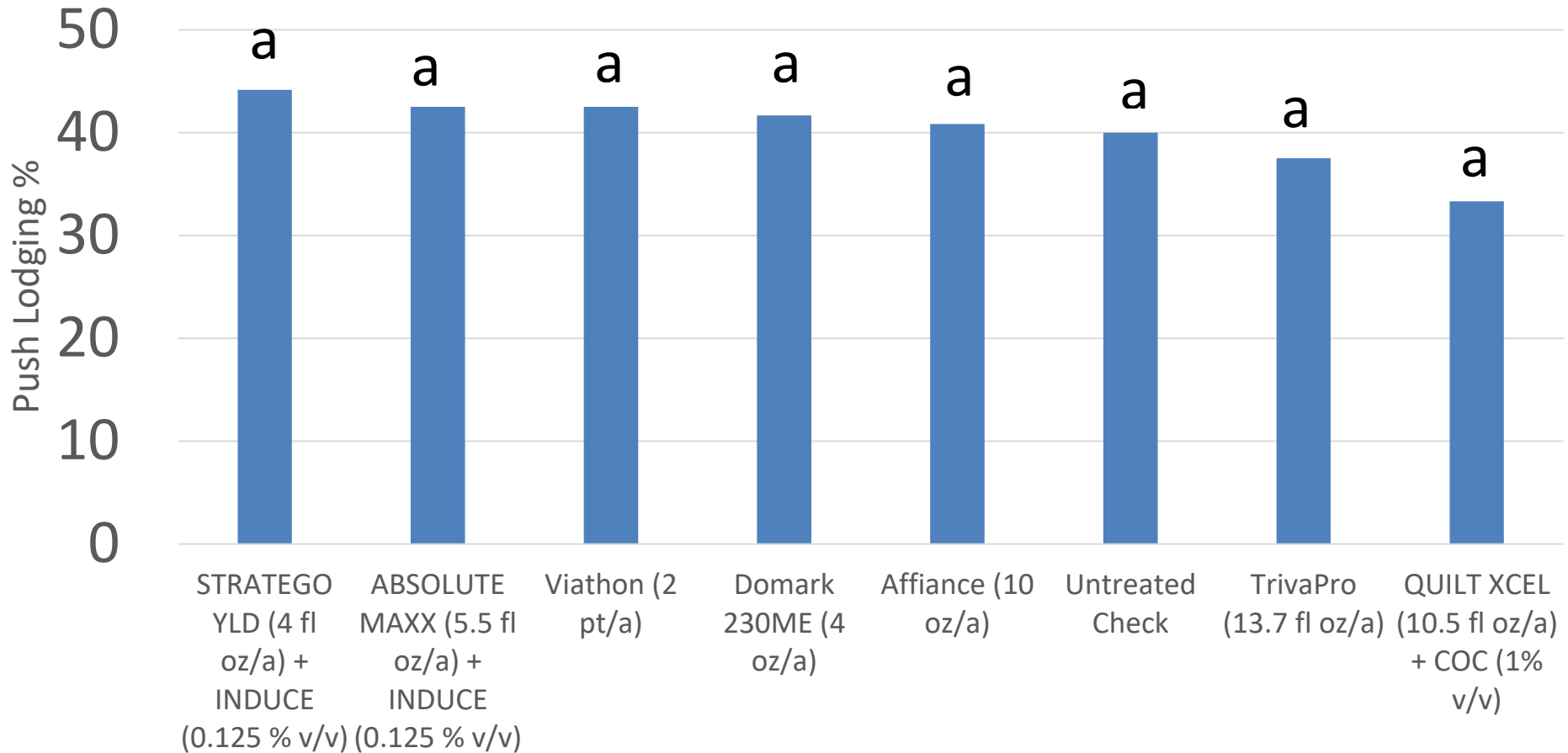
2017 Foliar Fungicide Comparison Trial

Yield



2017 Foliar Fungicide Comparison Trial

Push Lodging %



Statistical significance of collected data from Plant Path Corn Trials conducted in NE (2009-2016).

Year	Trials -- no. / yr --	Evaluation with significant data		The Same Trial Containing both Significant Push Lodging & Yield
		Push Lodging	Yield	
		----- no. of total trials ----		----- no. of trials -----
2009	12	5	5	2
2010	13	8	3	2
2011	17	3	3	1
2012	14	2	5	0
2013	8	3	2	1
2014	12	4	2	0
2015	17	4	1	1
2016	14	8	8	5

p-Value 0.1

Corn Disease Resources



- Crop Watch - <http://cropwatch.unl.edu/>
 - Newsletter, efficacy trial data, and publications



- Market Journal – weekly episode or see videos at: <http://marketjournal.unl.edu/corndiseases>



- Videos – YouTube – UNL CropWatch channel
 - short Corn Disease videos



- Crop Protection Network <http://cropprotectionnetwork.org>



- Tamra Jackson-Ziems on Twitter - @tjcksn
- Contact local county Extension office