New Disease Reports and Continuing Studies from Nebraska

Robert M. Harveson
Extension Plant Pathologist
University of Nebraska
Panhandle REC, Scottsbluff

Presentation Topics

- Research Studies
  - Rust fungicide evaluations
  - Phomopsis stem canker fungicide evaluations
- New Reports
  - Broomrape (*Orobanche* spp?)
  - Unknown virus disease

Sunflower Rust

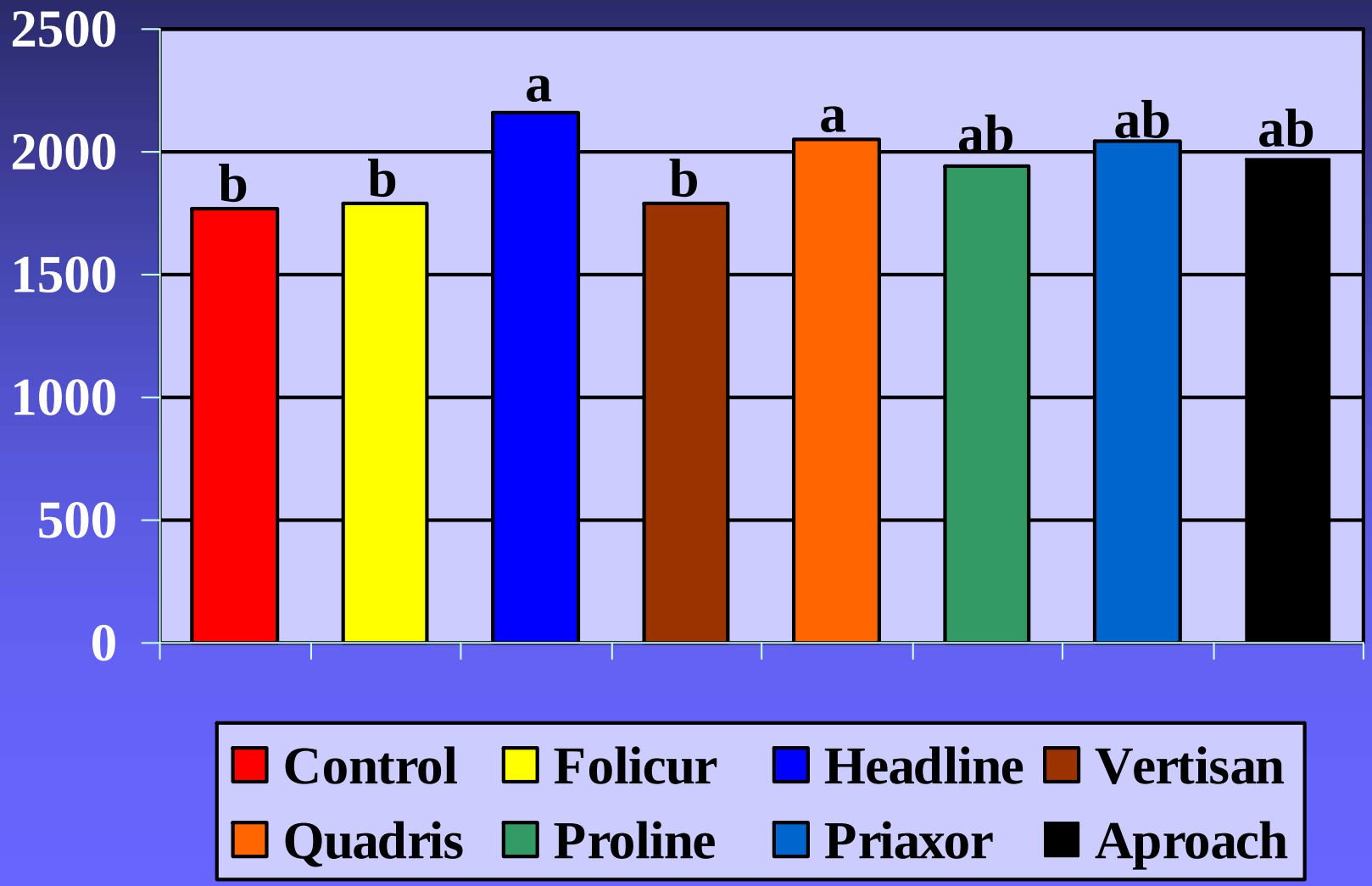
Methodology – Rust Study (2014)

- Planted - 6/4
- Plots - four 30 inch rows, 30 ft long under sprinkler irrigation
- Plots inoculated - 8/12
- Sprays made at R5-6 (8/20) growth stage
- Ratings made 9/15, 10/1, and 10/15 on upper two leaves from each of ten plants per plot
- Harvested by hand – 10/25

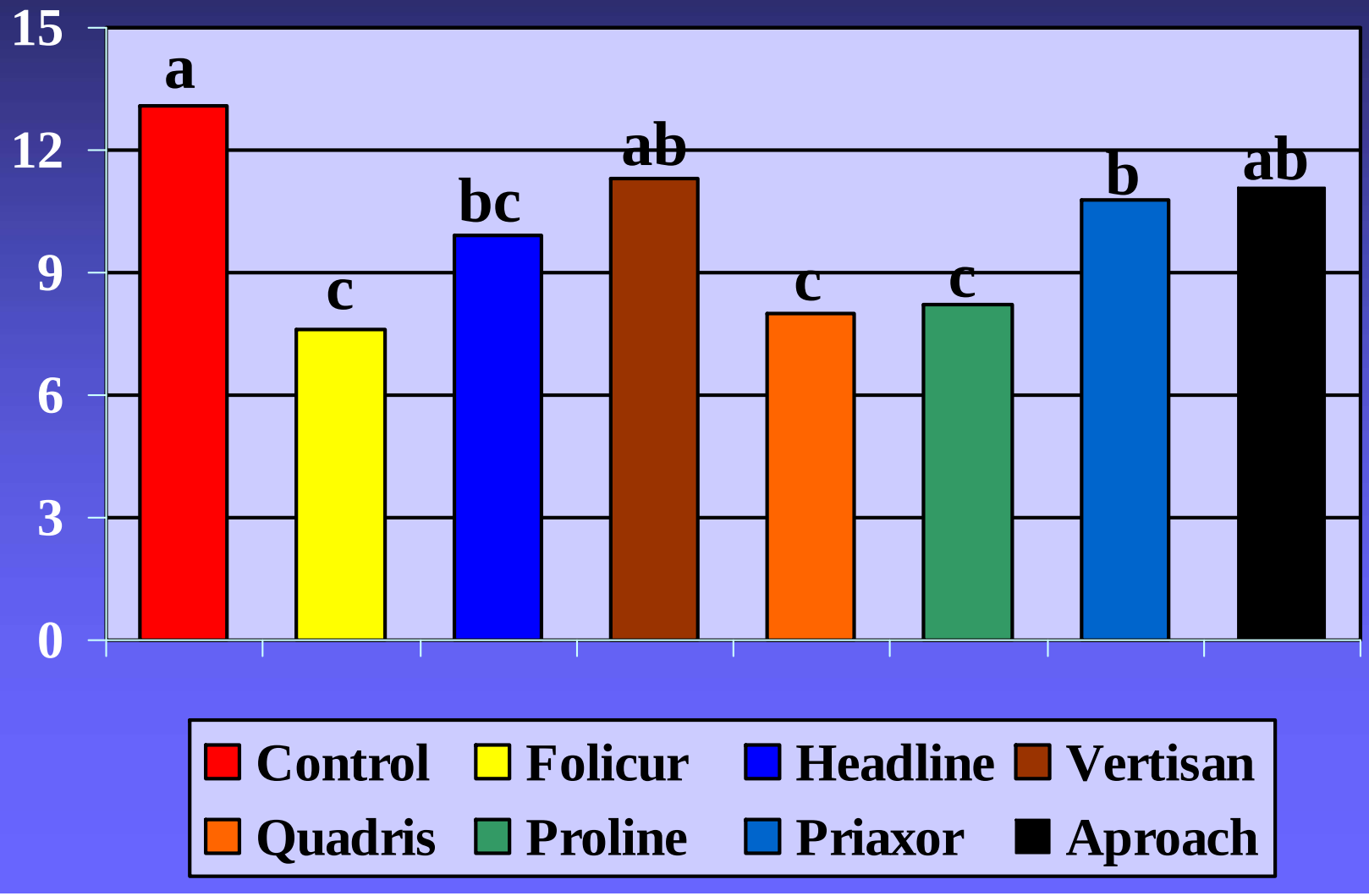
Treatments Utilized

- Control
- Folicur
- Headline
- Vertisan
- Quadris
- Proline
- Priaxor
- Aproach

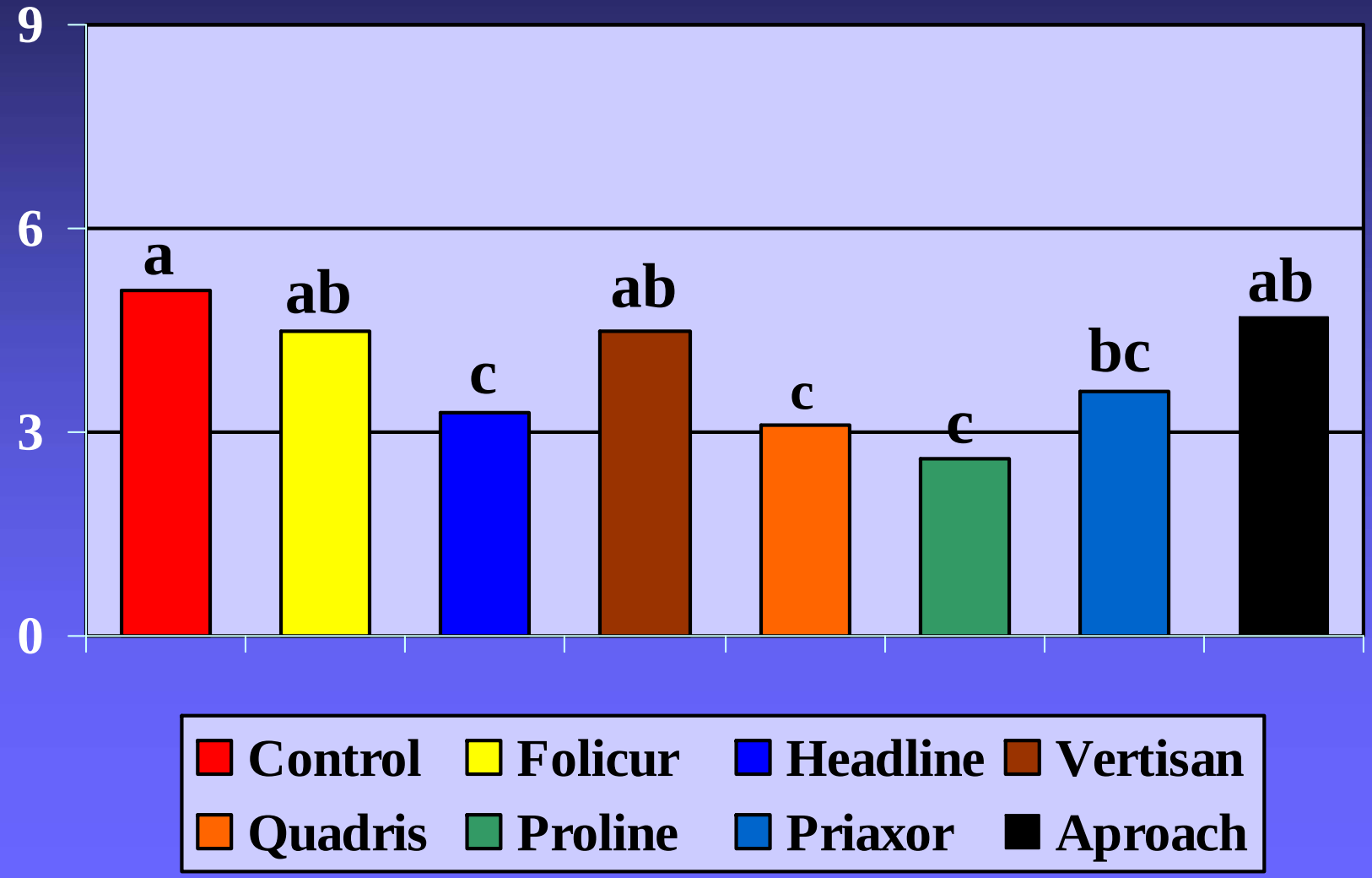
Sunflower Rust Fungicide Evaluations 2014 – Yield (lb/a)



Sunflower Rust Fungicide Evaluations – Cumulative Disease Ratings (2014)



Sunflower Rust Fungicide Evaluations – Cumulative Disease Ratings (2013)



Phomopsis Stem Canker Damage

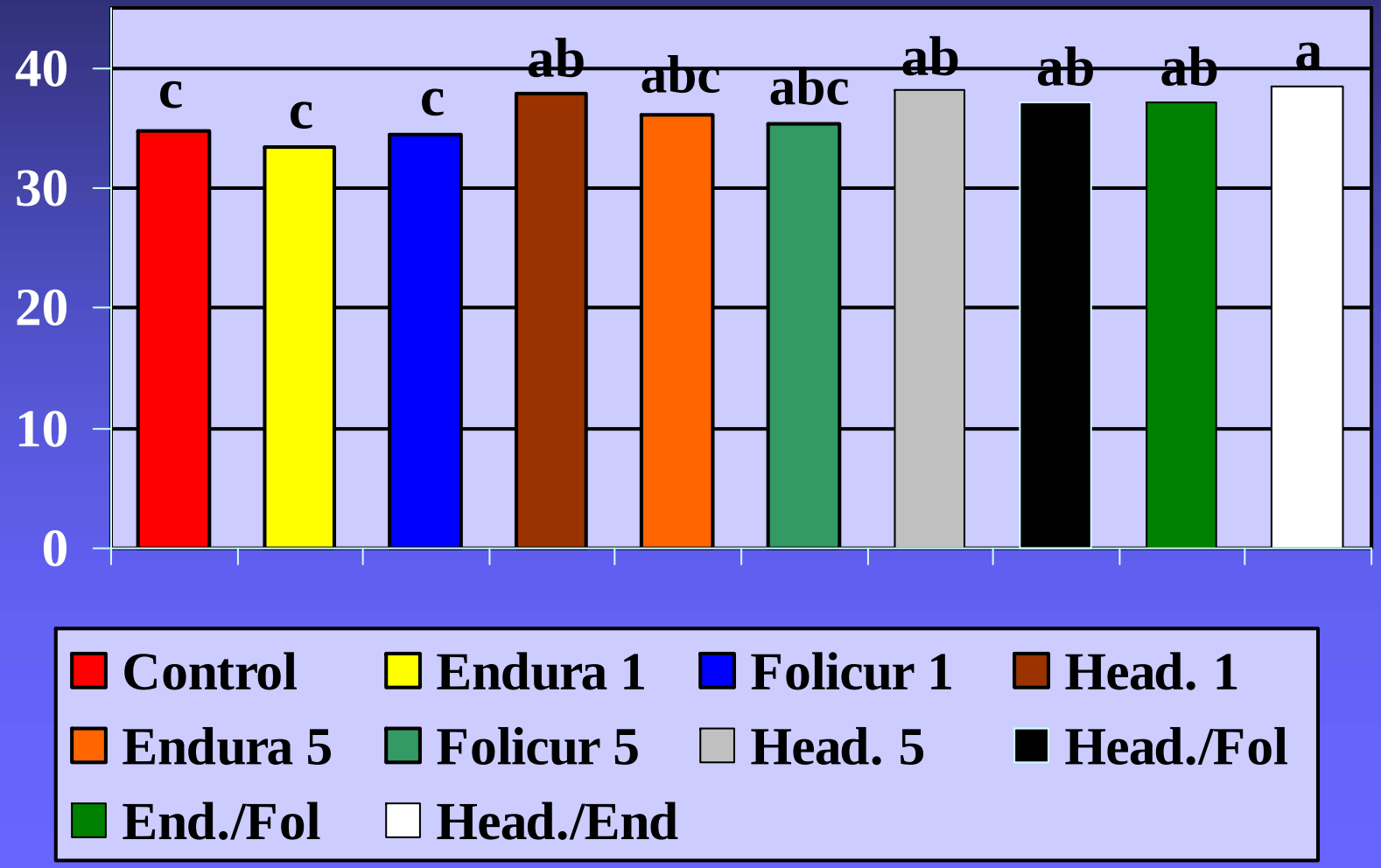
Phomopsis – leaf infection

Phomopsis plots – bird repellents

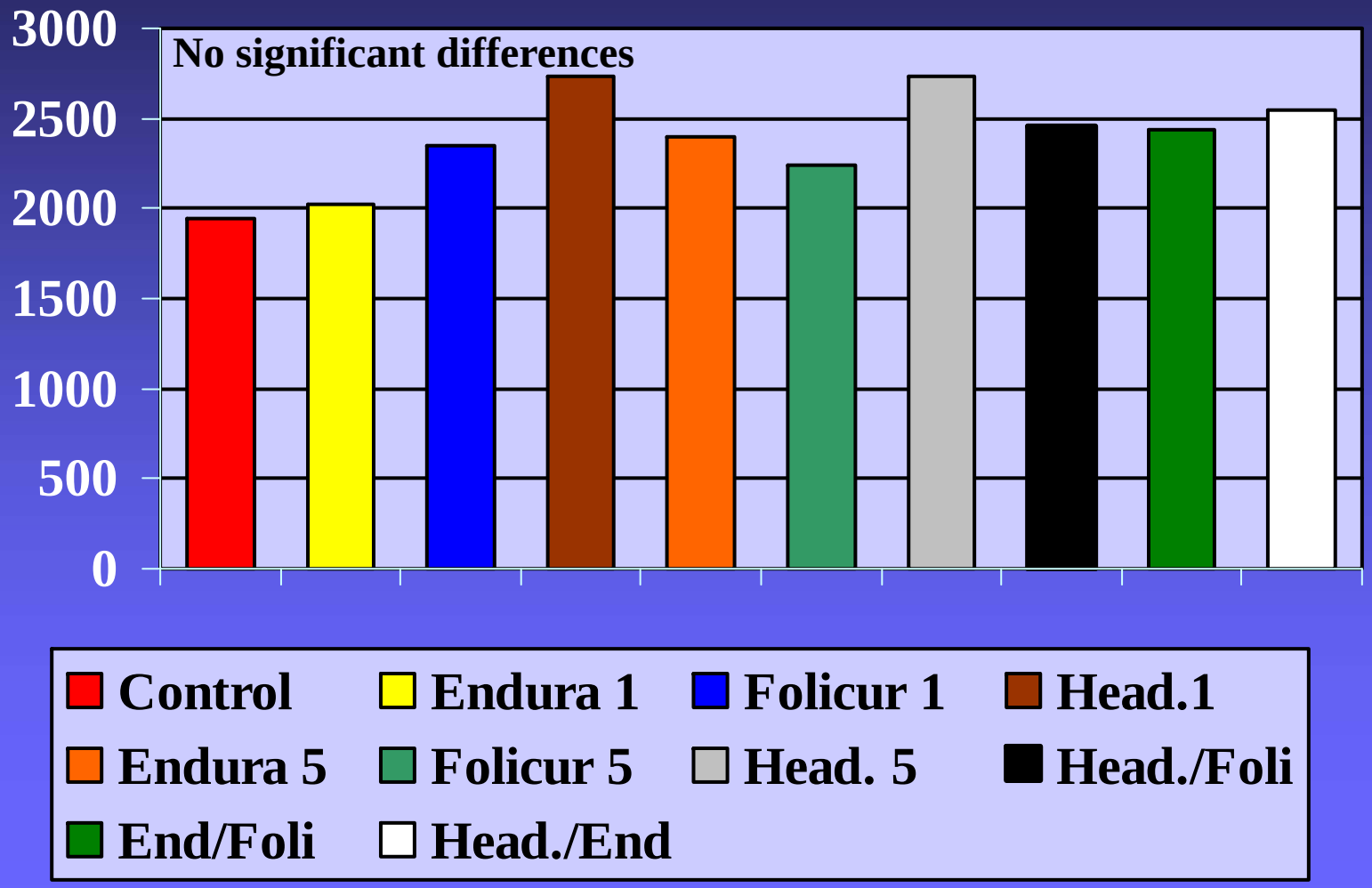
Phomopsis plots – bird trap crop

Phomopsis plots – bird trap crop

Sunflower Phomopsis Stem Canker Fungicide Evaluations – Yield (lb/bu)



Sunflower Phomopsis Stem Canker Fungicide Evaluations – Yield (lb/a)



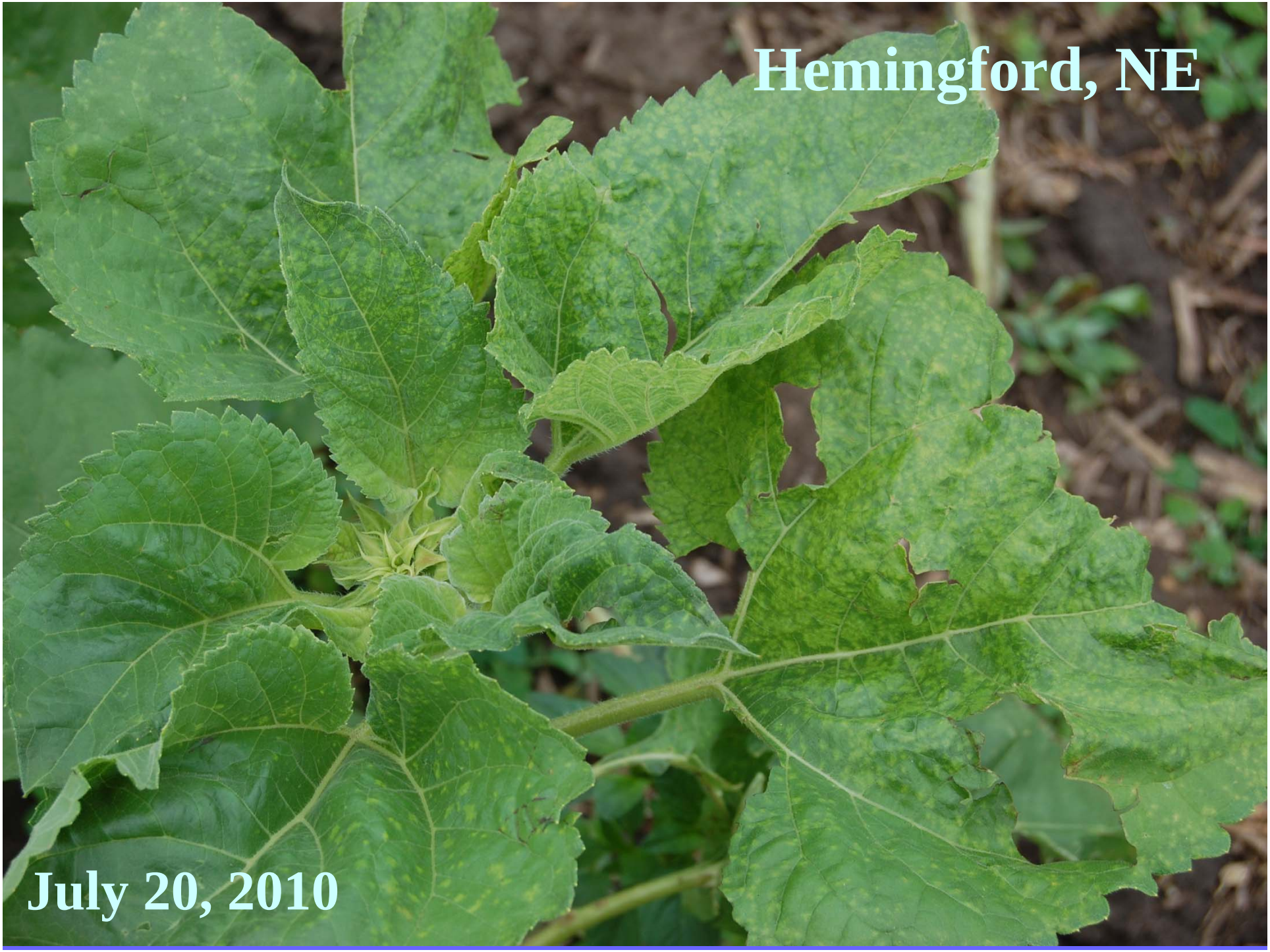

S. Masirevic


S. Masirevic

Orobanche ludoviciana (Louisiana Broomrape)

- Native to dry, sandy upland prairies in the Great Plains stretching from Texas to Canada
- Reported to parasitize sagebrush, ragweed, and cockleburr – first report for sunflowers
- Identified in Nebraska from Banner, Box Butte, Brown, Buffalo, Cass, Cherry, Cheyenne, Deuel, Hall, Holt, Keith, Lincoln, Merrick, Morrill, Saunders, and Sioux counties – this report from Kimball Co

Orobanche ludoviciana (Louisiana broomrape)


Hemingford, NE
July 20, 2010


July 27, 2011

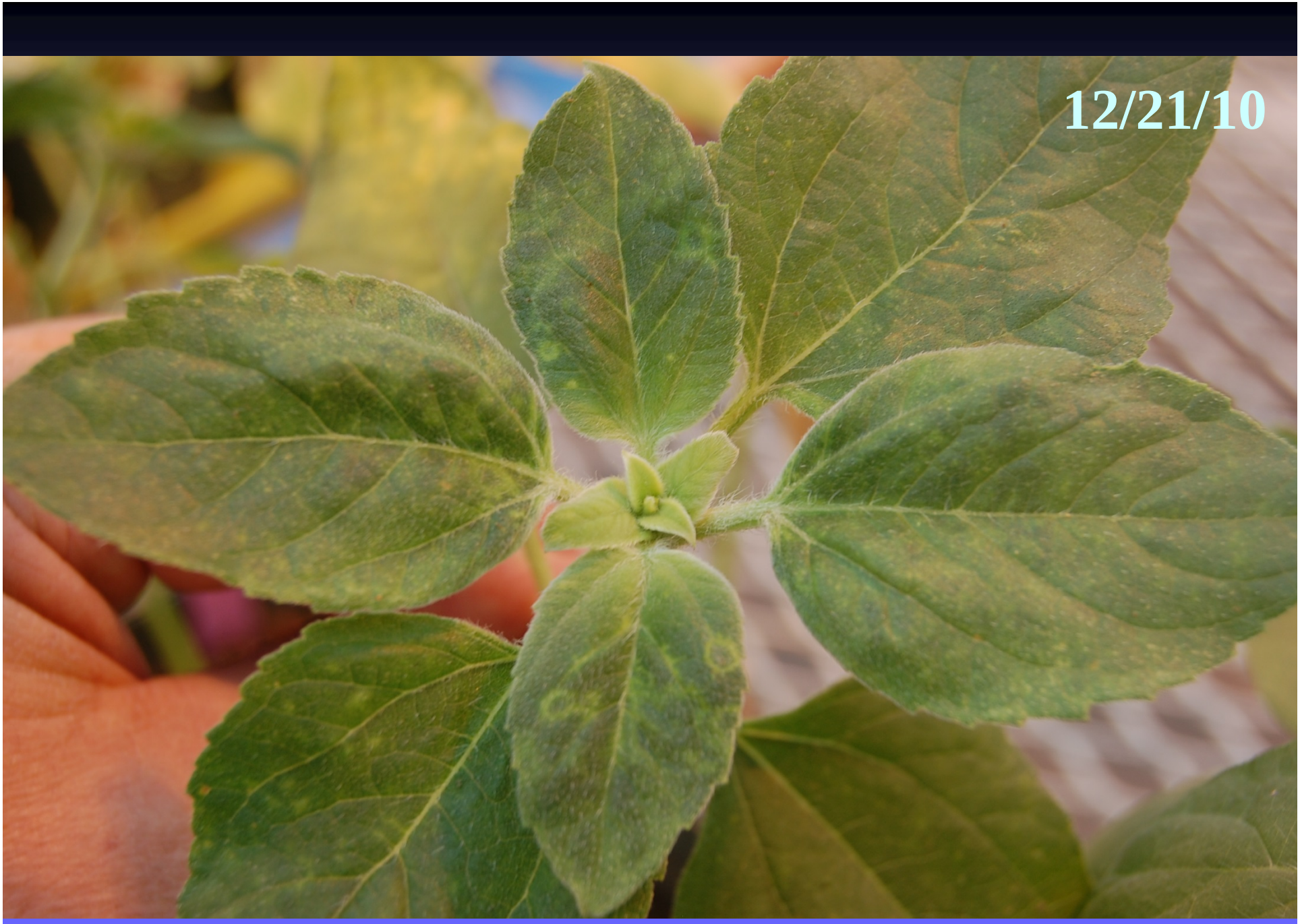

September 7, 2011

Greenhouse Inoculations

- Mechanical transmission was successfully performed multiple times from infected field plants to seedlings in the greenhouse in both years
- New symptoms on inoculated seedlings appeared 10-15 days after inoculation, and began as small chlorotic spots followed by ring spots in some inoculated plants
- Greenhouse symptoms tended to fade over time like those of the field symptoms


09/24/10


10/17/10


12/21/10

Diagnostic Efforts

- Flexuous rod particles observed in EM from initial samples collected from 2010 field but negative for SuMV with serological methods (ELISA) and DNA (RT-PCR) methods (A. Karasev, University of Idaho, Moscow, ID)
- Inoculated samples from 2011 field also tested negative for SuCMoV by collaborators in Argentina (S. Lenardon)
- Planted thousands of seeds from heads of infected plants – no resulting seedlings produced symptoms

September 2014


Stunted, infected plant with undeveloped seed head

Yield Reduction Potential - 2011

Yield Data Estimates

	Infected Plants	Non- Infected Plants
Head Wt (Dry)	**60 g**	**646 g**
Seed Wt (100 seed)	**6.6 g**	**16.1 g**
Ave Seed Wt (wt per head)	**18 g**	**158 g**

Unknown Virus Disease Summary

- Plants with virus-like symptoms were observed in 2010, 2011, and 2014 consisting of stunting, ringspots, and mosaic or mottle-type symptoms
- Symptoms were first observed each year in early to mid-July from commercial fields except 2014
- Field symptoms faded rapidly, particularly from the field in 2010
- Late in the 2011 and 2014 seasons, leaf symptoms on field-infected plants exhibited bright yellow ringspots on upper leaves
- Similar symptoms seen in greenhouse

What We Know

- Infectious agent – transmissable with virus-like particles observed
- Fortunately was not economically damaging overall – small areas of fields affected
- Severe reductions were observed on affected plants – severe stunting and reduced seed head sizes
- Symptoms tended to fade over time – yet still remained infective

Future Investigations

- Identity of pathogen?
- Mechanism for spread-
  - Seedborne?
  - Insect vector?
- Virus complex – two (or more) different pathogens?

Acknowledgements

- **NSA and ND Harmonization Board for support**
- **Collaborators - Sam Markell, Febina Mathew, Andrew Friskop, Gerald Seiler, Tom Gulya, Allan Nelson, Sergio Lenardon, Alex Karasev**

Greetings from Nebraska – Questions?

Thank You - Questions?

Thanks to NSA and ND Harmonization Board for support!

Collaborators - Sam Markell, Febina Mathew, Andrew Friskop, Gerald Seiler, Tom Gulya, Allan Nelson

Carl Thomas

Scotts Bluff County Grower

Thanks – Questions?

http://www.apsnet.org/apsstore/shopapspress

Thank you - Questions?