

The development and future of oxathiapiprolin- a novel fungicide seed treatment to manage downy mildew

Ryan Humann

NDSU Plant Pathology

Keith Johnson

DuPont Field Development

Scott Meyer

NDSU Plant Pathology

Jim Jordahl

NDSU Plant Pathology

Elizabeth Crane

NDSU Plant Pathology

Andrew Friskop

NDSU Plant Pathology

Tom Gulya

USDA-ARS Sunflower Unit

Michael Wunsch

NDSU Carrington Research Extension Center

Sam Markell

NDSU Plant Pathology

Outline

- Downy mildew
- Oxathiapiprolin research
- Good management practices

Early symptoms and signs



Significant stand reductions



Downy Mildew Management

- Rotation is not effective/practical
- Genetic Resistance
- Fungicide Seed Treatments

Objective

Evaluate oxathiapiprolin for the management of downy mildew

- Efficacy
- Rate determination

Oxathiapiprolin

- Discovered and developed by DuPont
- Novel mode of action
 - Oomycete specific
 - Oxysterol binding protein inhibition
 - FRAC U15

Materials and Methods

- 17 location x years (11 with measurable disease pressure)
- Randomized complete block design
- 3-4 disease incidence evaluations
- No yield data collected

Materials and Methods

Planting



Inoculum production

Materials and Methods

Create a cool, wet environment



Materials and Methods

Inoculating



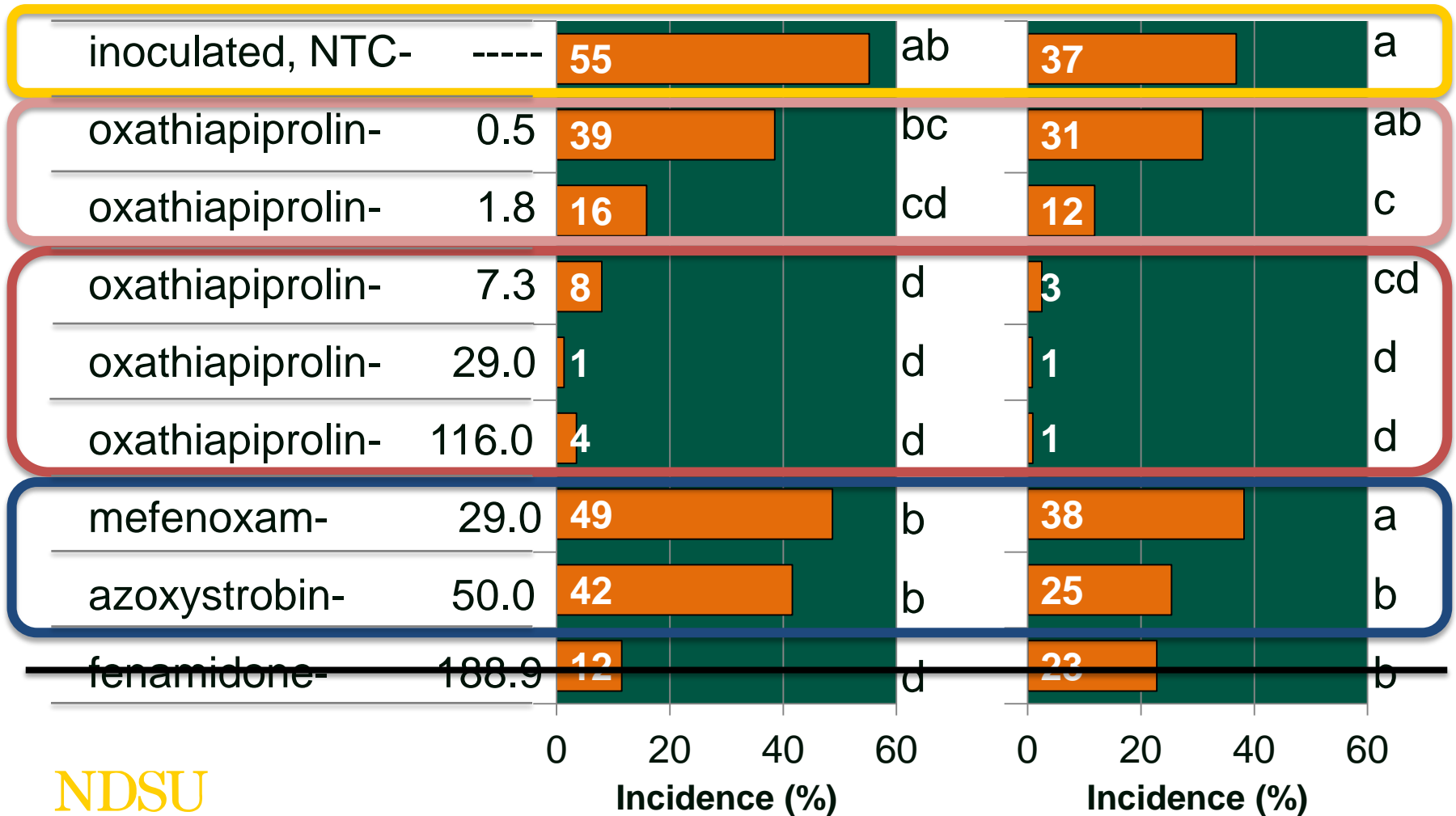
2011

Treatments and rates

($\mu\text{g ai/target}$)

Fargo

Thompson



NDSU

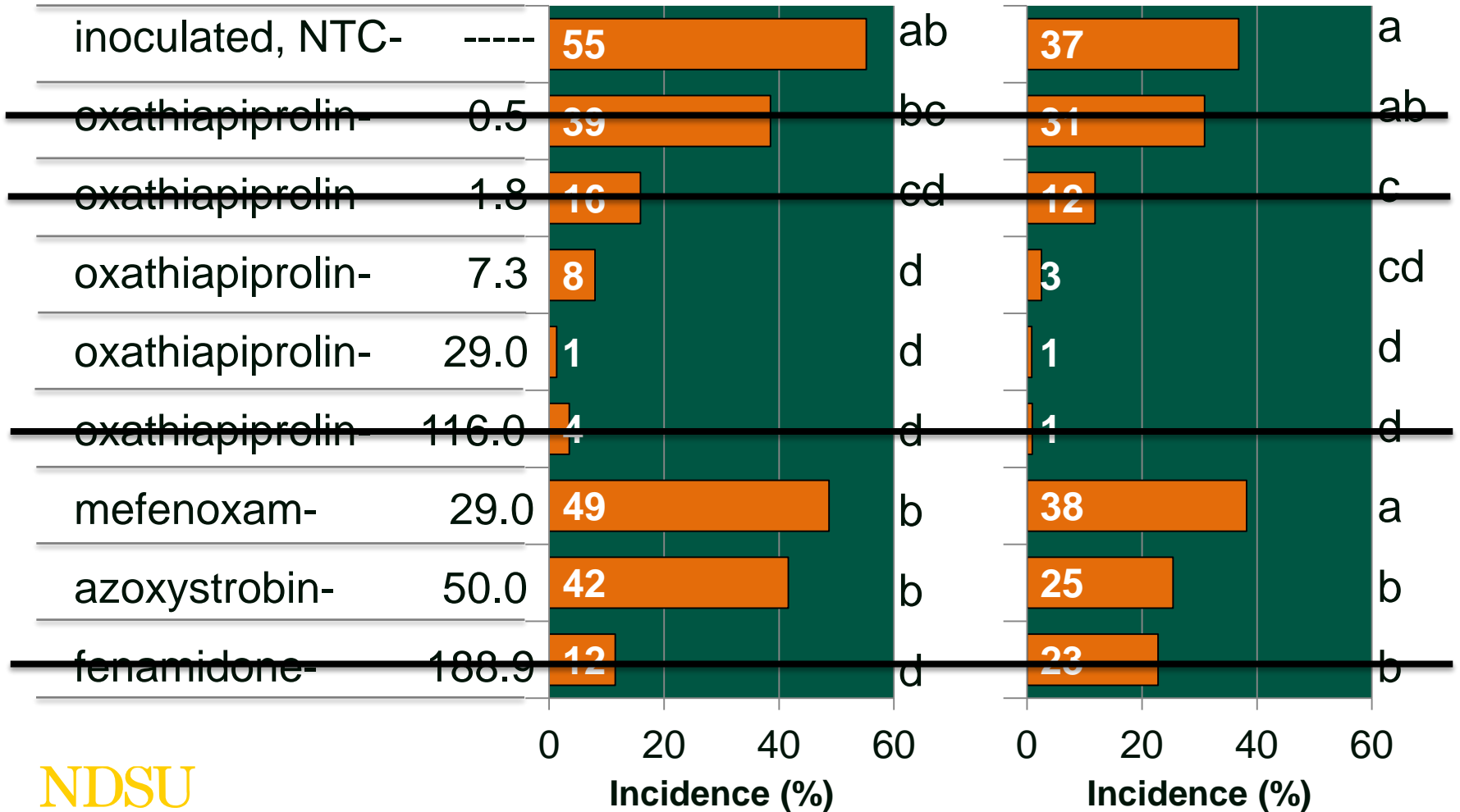
2011

Treatments and rates

($\mu\text{g ai/target}$)

Fargo

Thompson



NDSU

2011 Fargo Trial - rate responses

NTC



55% Inc.

Low rate of QGU
(0.45 $\mu\text{g ai/target}$)



39% Inc.

High rate of QGU
(116.0 $\mu\text{g ai/target}$)



4% Inc.

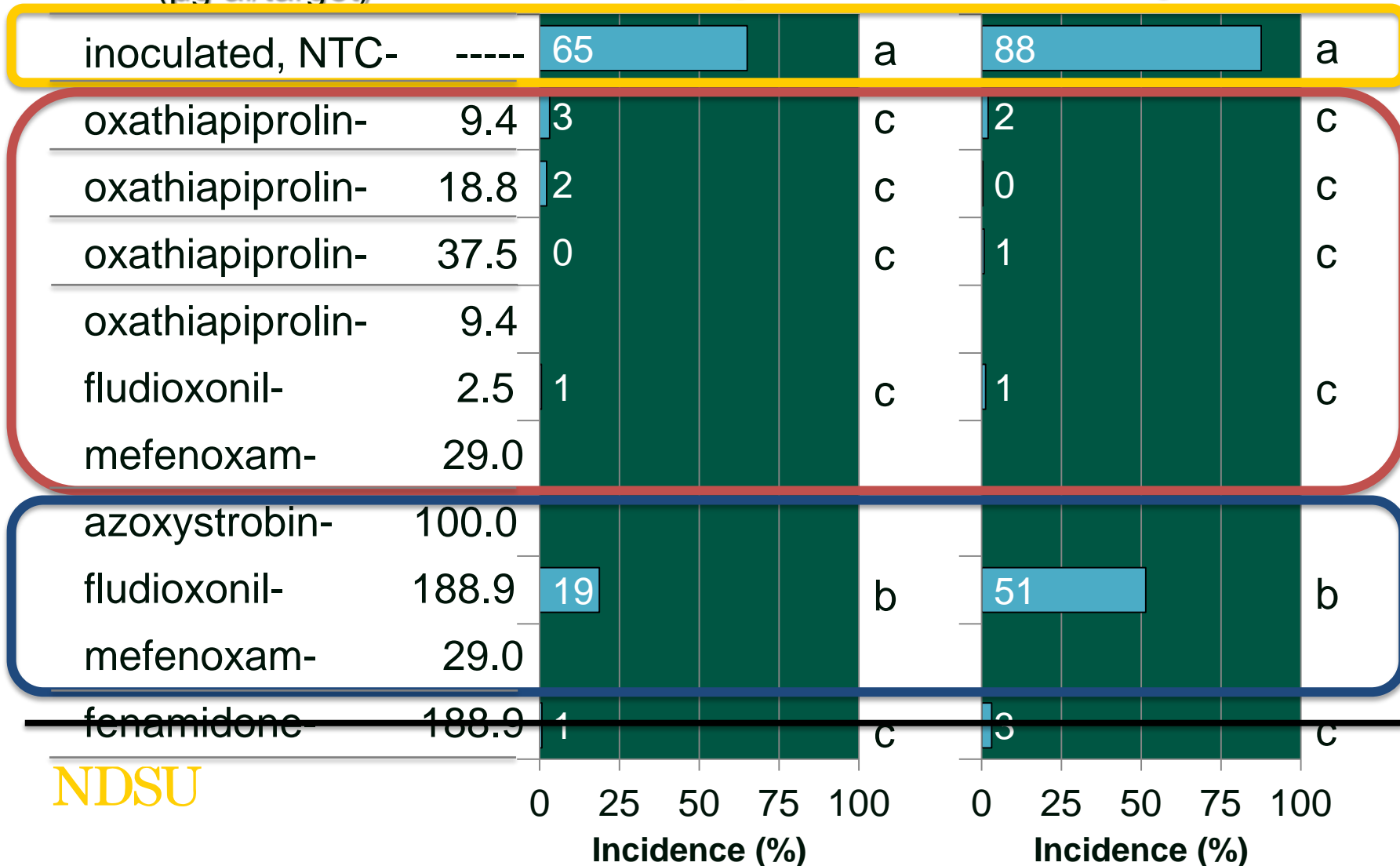
2013

Treatments and rates

($\mu\text{g ai/target}$)

Carrington

Fargo



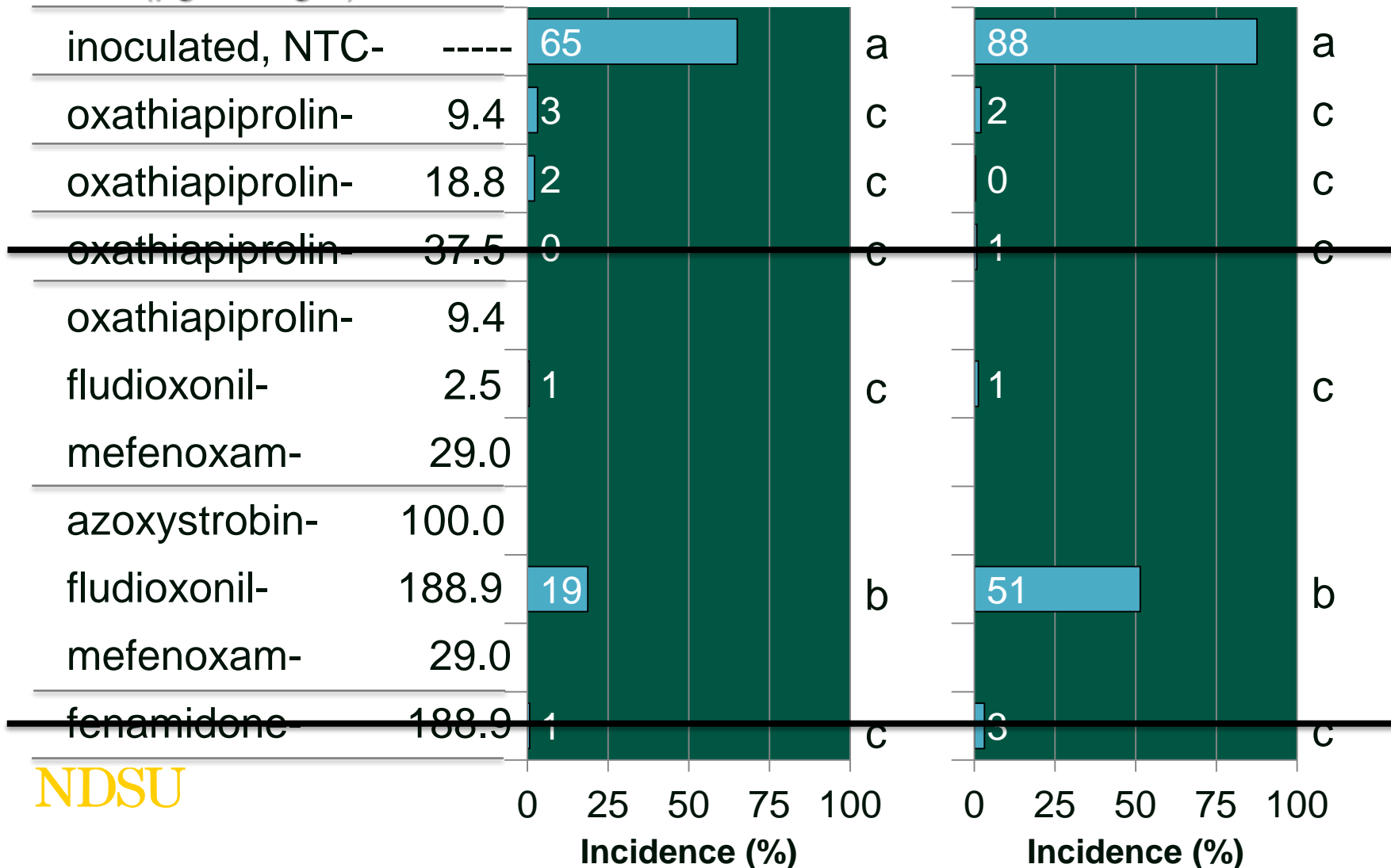
2013

Treatments and rates

($\mu\text{g ai/target}$)

Carrington

Fargo

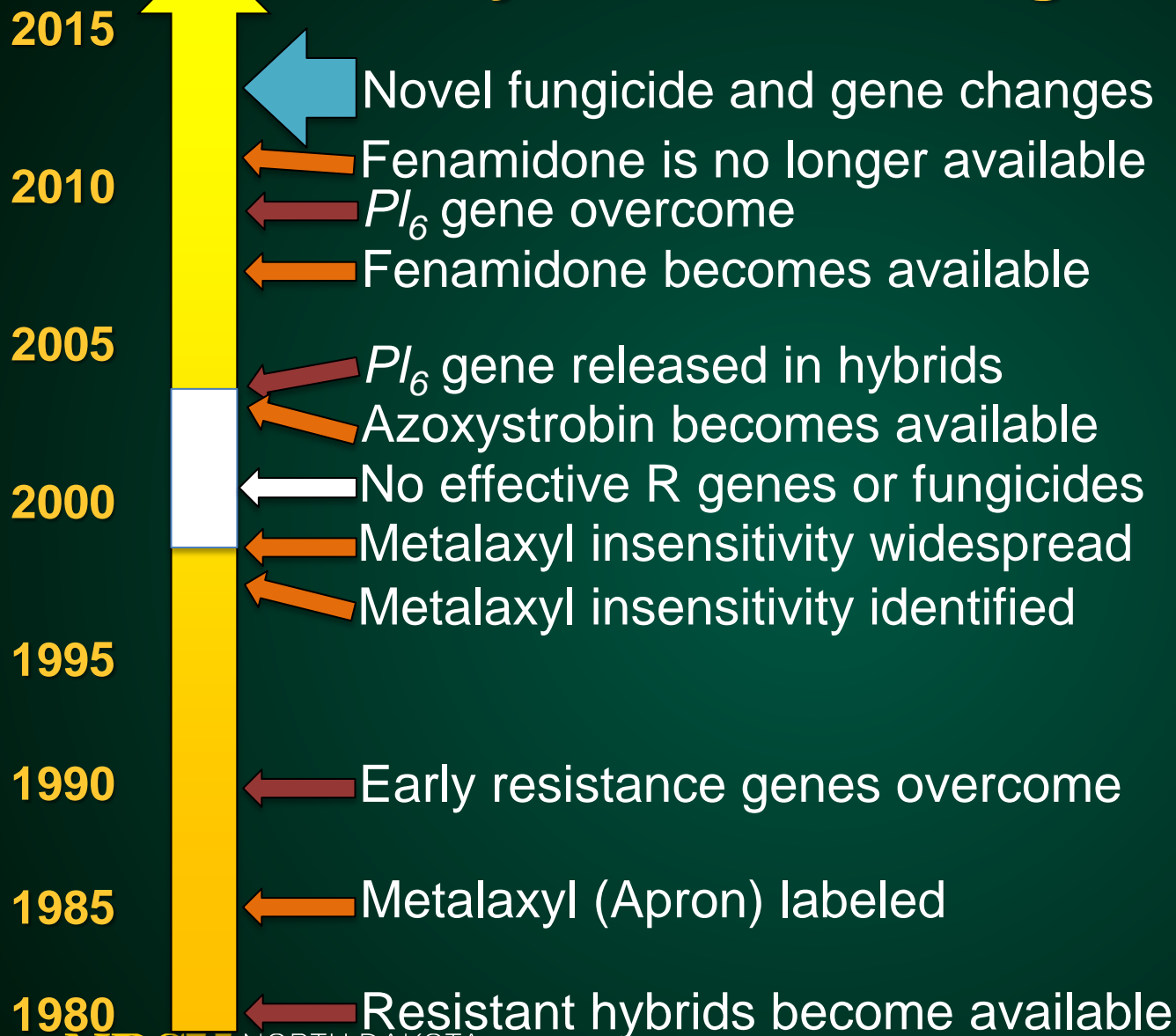


NDSU

Conclusions

- No phytotoxicity at any rate
- Rate range of oxathiapiprolin narrowed
- 9.37-18.75 $\mu\text{g ai/target}$ rates significantly reduced downy mildew incidence

Downy mildew management over time



NDSU NORTH DAKOTA STATE UNIVERSITY

Genetic resistance

Fungicide seed treatment

Best Management Practices

- Pair fungicide seed treatments with resistance genes
- Use fungicides with multiple modes of action
- Gene pyramiding

Acknowledgements

- National Sunflower Association
- DuPont
- ND Agriculture Experiment Station
- NDSU Extension Service
- NDSU Ext. Plant Path Group
- Carrington Research Extension Center Group

Questions