

Update: Validating Saflufenacil (Kixor™) Desiccation of Sunflower Using Aerial Application

- All the research demonstrating saflufenacil effectiveness as a desiccant was conducted using ground equipment to apply herbicide treatments at spray volumes higher than will be used to apply saflufenacil commercially by airplane.
- Need to validate developmental research findings using aerial application before Kixor™ is used commercially for that purpose in 2010.
- Subject to timing of federal and state registration.



Objective

- Demonstrate sunflower desiccation with saflufenacil alone and in combination with glyphosate compared to solo applications of paraquat and glyphosate using commercial aerial application.
- Planned demos in Kansas and North Dakota





Soil Nitrogen Effects Palmer Amaranth Control with Imazamox

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Introduction

- Palmer amaranth is now the most common pigweed species in southern and central Great Plains
- Recent years sunflower survey results:
 - most abundant weed in KS (40-65% of fields)
 - second most abundant weed in CO
- Paam far more robust and competitive than most other pigweed species; emerges throughout season
- 54% yield reduction compared to hand weeded control in rainfed sunflower at Hays, KS in 2009



Introduction

- No herbicides for postemergence broadleaf weed control in conventional sunflowers
- Herbicide-tolerant sunflowers commercialized in recent years:
 - Clearfield™
 - ExpressSun™
- Beyond™ and Express™ herbicides are not effective on ALS-resistant weed species



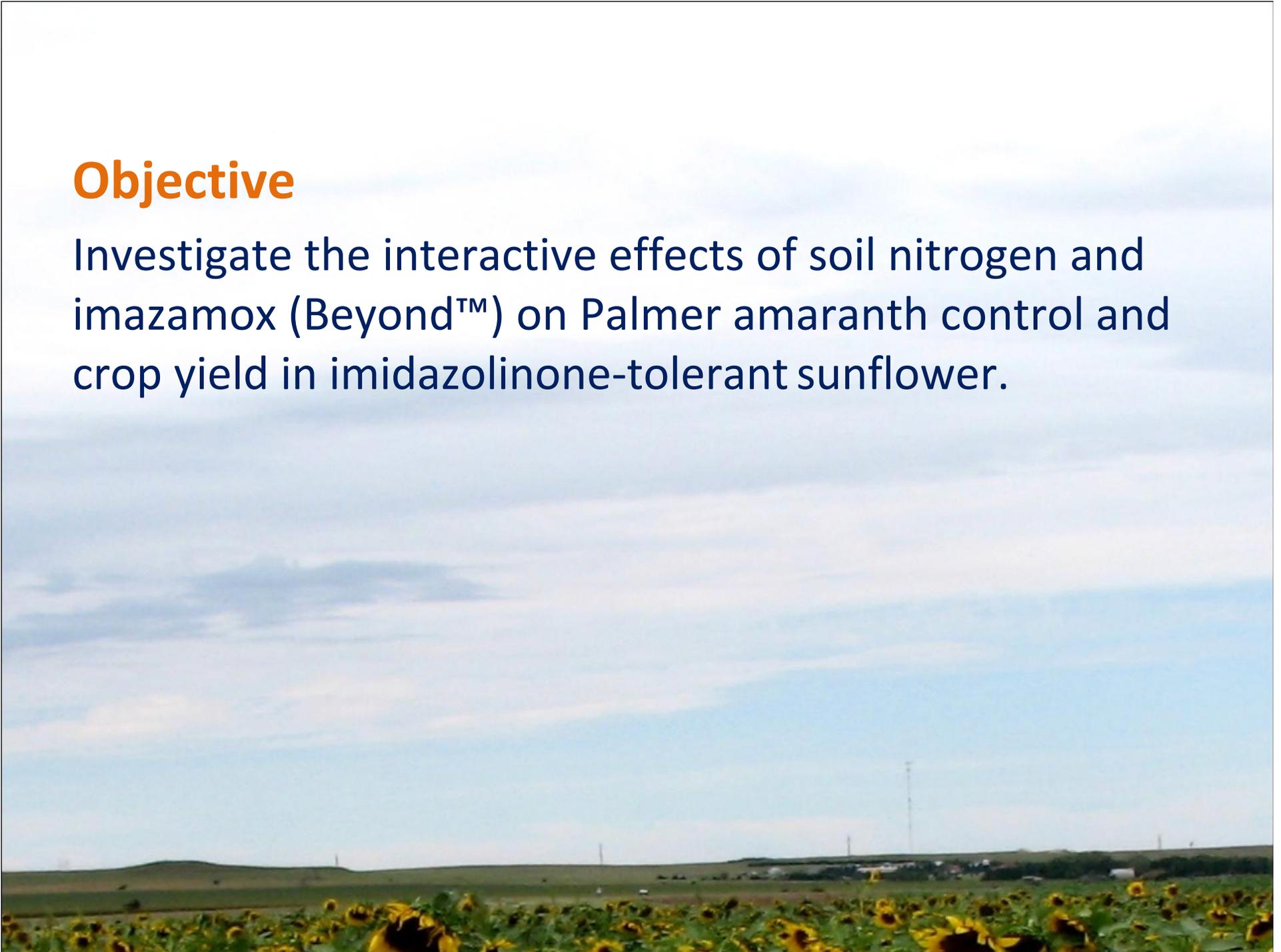
Introduction

- The high cost of nitrogen and herbicide inputs tempt some growers to use less than optimum rates of one or both.
- Soil nitrogen can affect herbicide performance.
- Recent studies suggest a cautious approach when combining reduced fertilizer and herbicide inputs because of greater risk of weed control failure.



Objective

Investigate the interactive effects of soil nitrogen and imazamox (Beyond™) on Palmer amaranth control and crop yield in imidazolinone-tolerant sunflower.



Materials and Methods

Greenhouse experiments

- At KSU in Manhattan in February and April, 2008
- Soil in 20-cm x 10-cm x 10-cm plastic containers
- CRD with five reps
- 28, 56, and 84 kg/ha N before pot filling
- 8 Palmer amaranth plants in two rows
- Sunlight supplemented with 120 mmol/m²s illumination from sodium vapor lamps



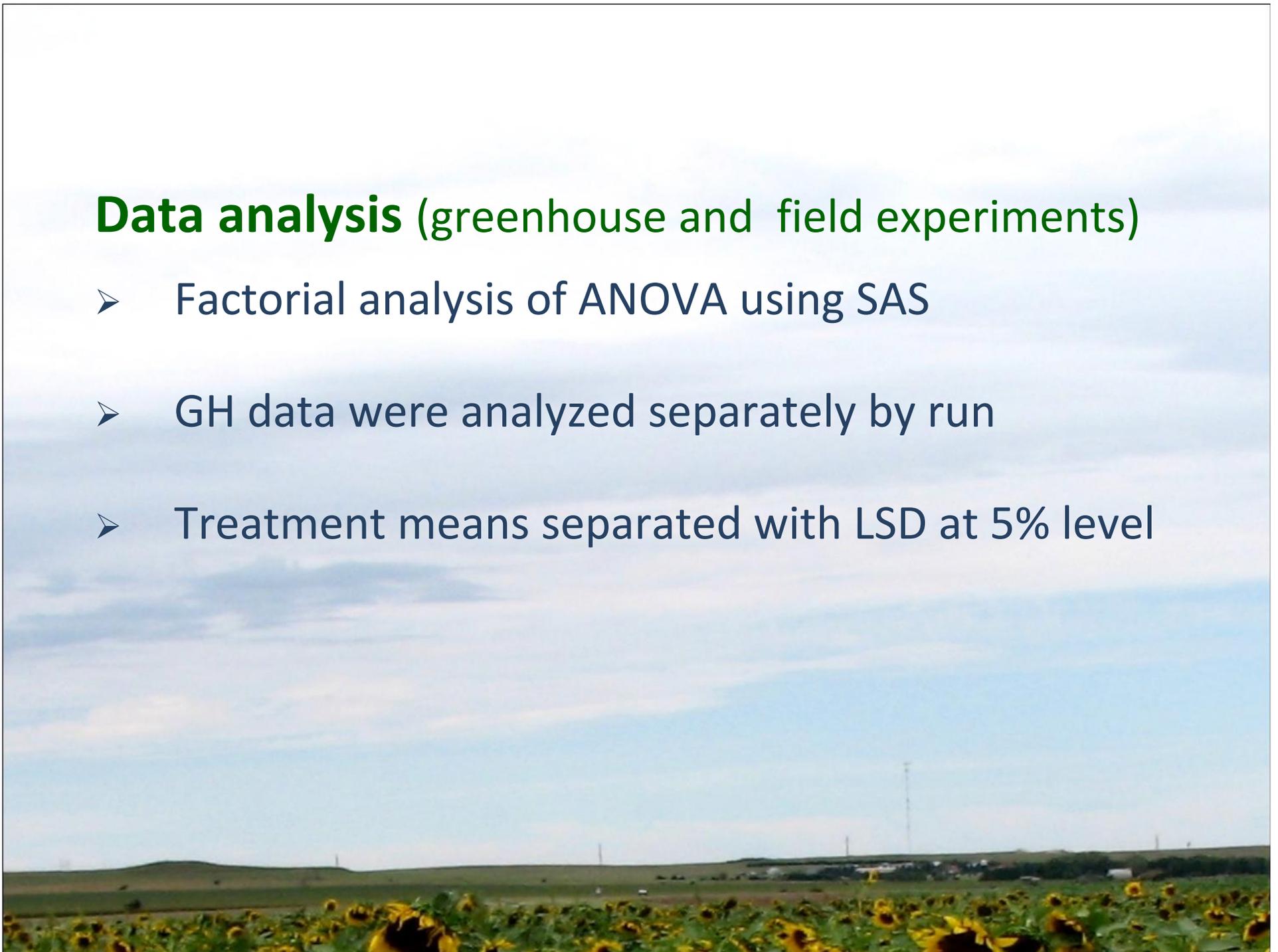
Materials and Methods

- Imazamox applied at 26 and 35 g/ha with 2% w/v AMS and 0.25% v/v NIS
- Aboveground dry wt determined 2 WAT
- Oven dried at 75 C for 72 h



Data analysis (greenhouse and field experiments)

- Factorial analysis of ANOVA using SAS
- GH data were analyzed separately by run
- Treatment means separated with LSD at 5% level



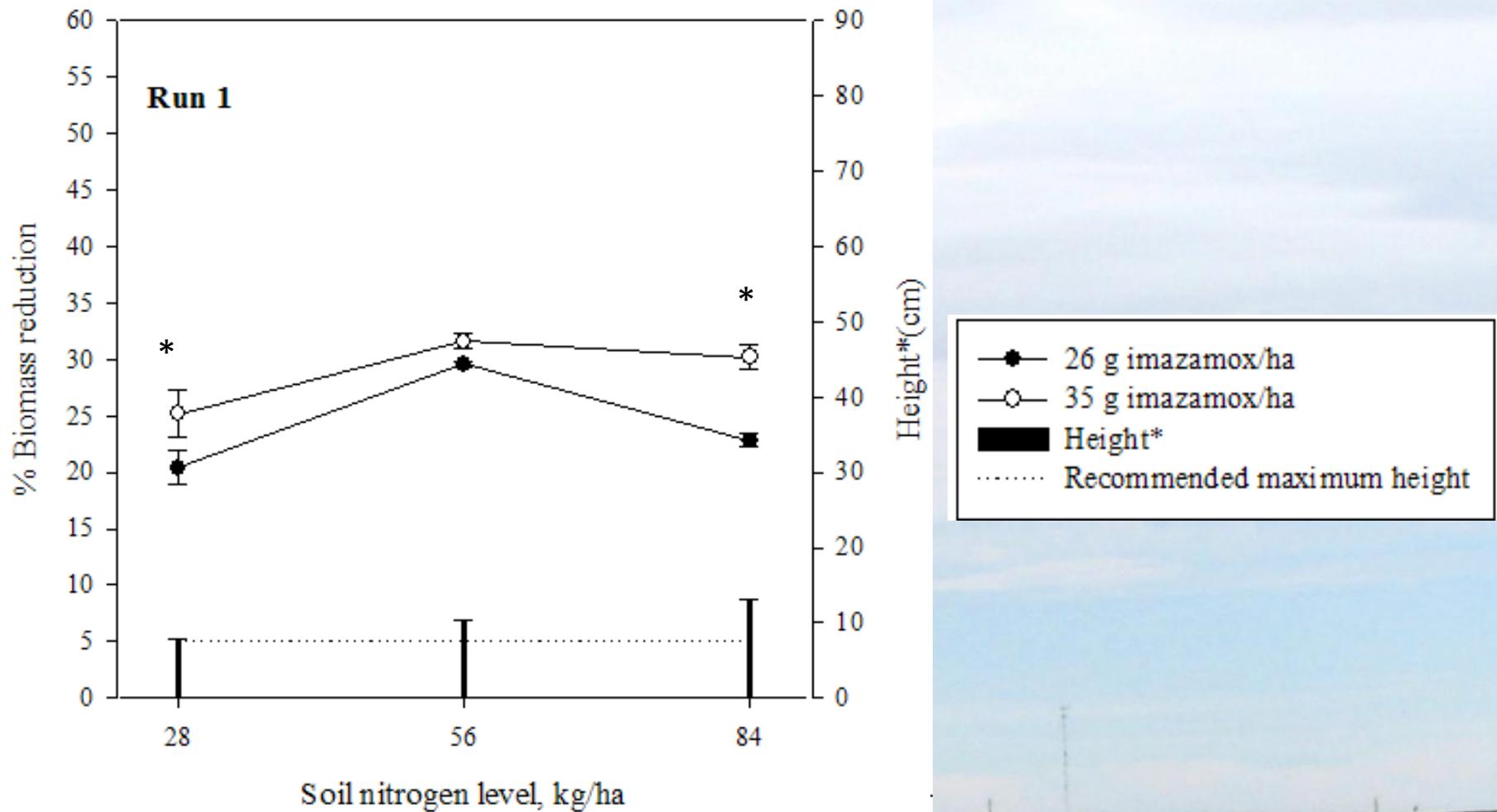
Results

Greenhouse experiment

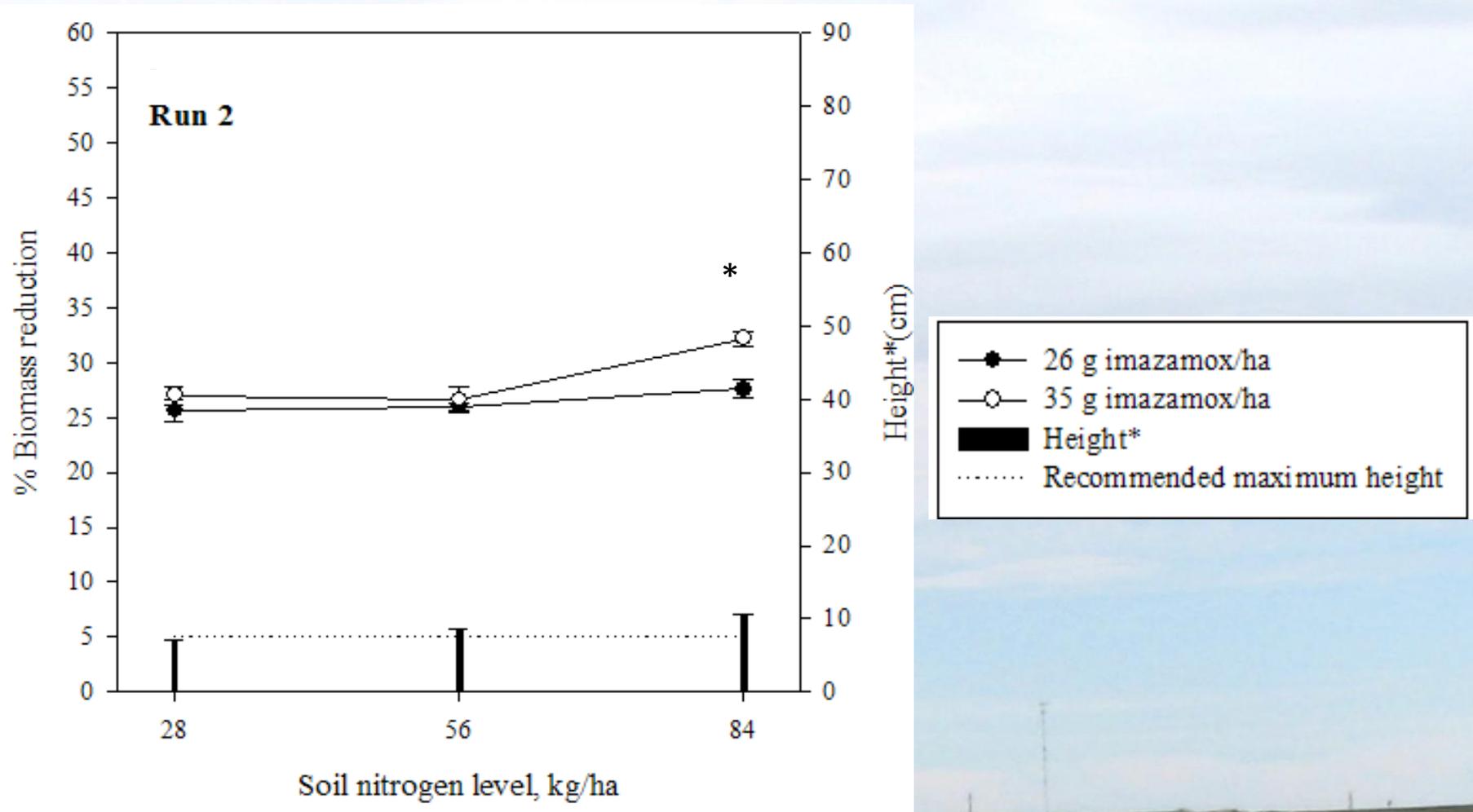
P-values from ANOVA for percent biomass reduction of Palmer amaranth.

Sources of Variation			
Study	Soil N	Herbicide	Soil N x Herbicide
Run 1	<0.0001	<0.0001	2.4900
Run 2	0.0003	0.0018	0.0950

Palmer amaranth biomass reduction as affected by imazamox rate and soil nitrogen level.

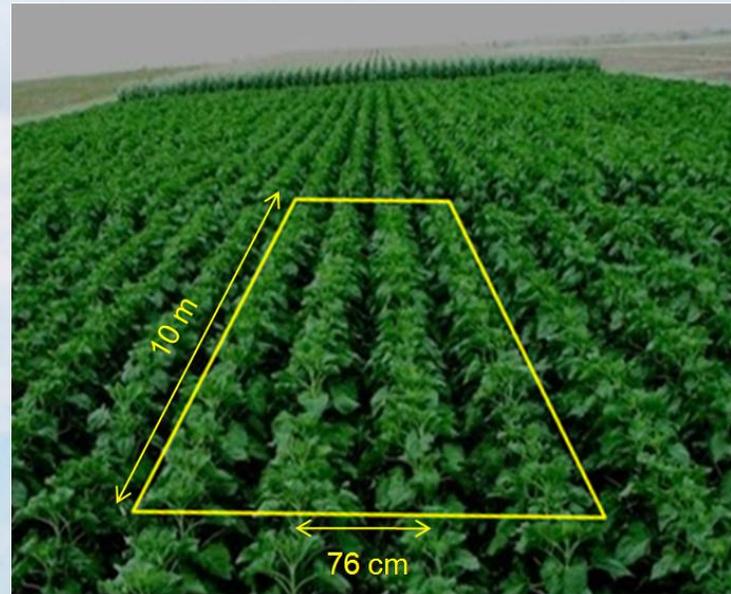


Palmer amaranth biomass reduction as affected by imazamox rate and soil nitrogen level.



Field experiment in 2008

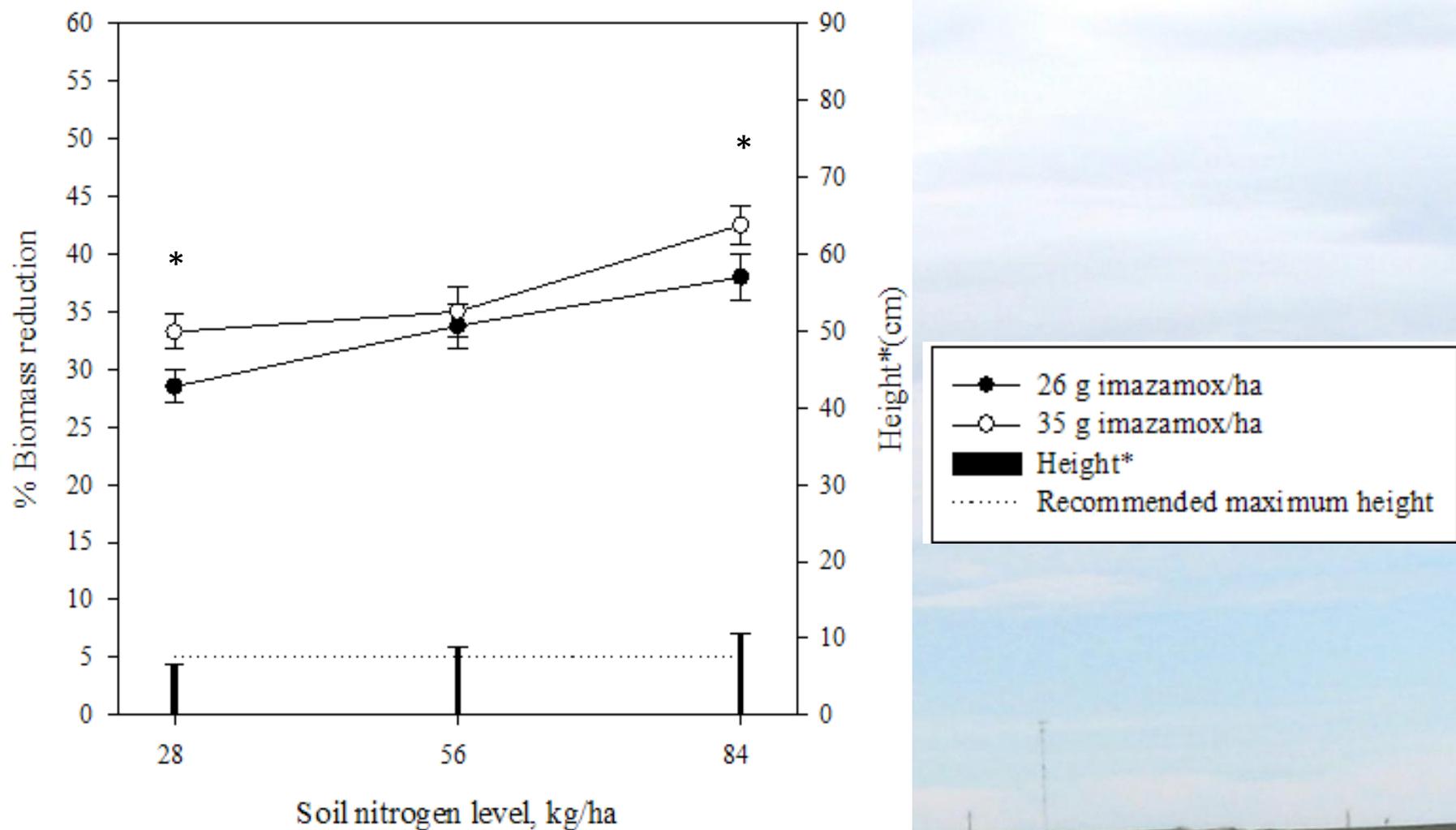
- KSU Agriculture Research Center- Hays
- RCBD with four reps
 - Imidazolinone-tolerant sunflower (Triumph 660CL)
 - Four 10-m long sunflower rows per plot with 76-cm row spacing



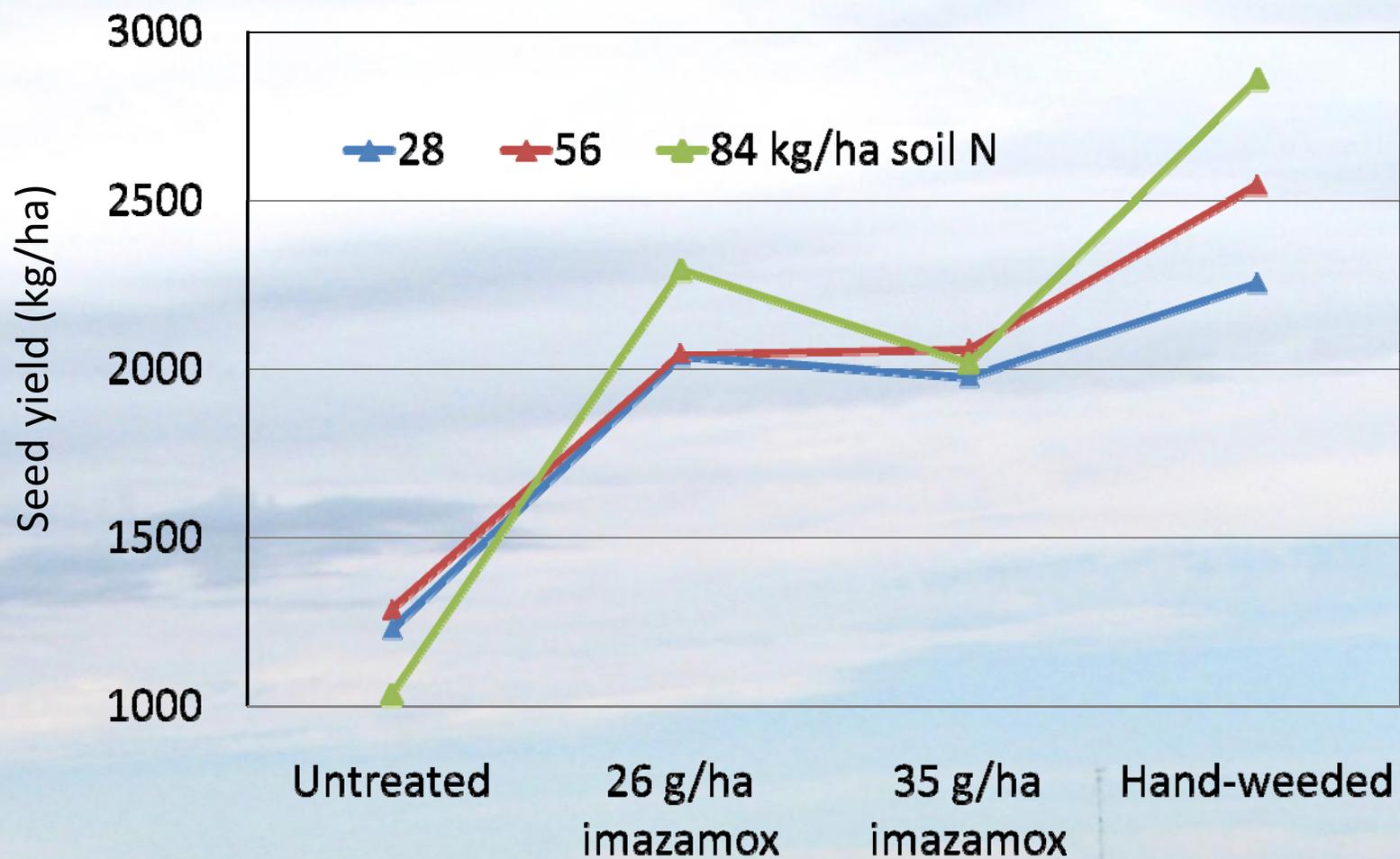
- 3 x 2 factorial
 - 28, 56, and 84 kg soil N/ha
 - 0, 26, and 35 g/ha imazamox at 4-5 WAP
 - Hand weeded
- Aboveground Palmer amaranth biomass harvested 2 WAT and oven dried
- Crop injury ratings at 7, 14, and 21 DAP
- Center two rows of each plot harvested and moisture adjusted to 10%



Palmer amaranth biomass reduction as affected by imazamox rate and soil N level at Hays, KS, 2008.



Interactive effects of soil N levels and imazamox rates on sunflower seed yield in 2009.



Summary

- Palmer amaranth size increased with increasing soil N level; ~30-50% taller in the high N compared to low N treatment at time of herbicide application.
- NSD between imazamox rates at 56 kg N/ha.
- 35 g/ha rate of imazamox was more efficacious than the 26 g/ha rate at the high N level (84 kg/ha).



Take Home Message

These data suggest Beyond™ use rate and application timing are more important than soil N level in preventing seed yield loss in Clearfield sunflower.

Thanks to the Kansas Sunflower Commission for partial funding.

