

Evaluation of Fungicide for Control of Sunflower Head Rot

Scott Halley, Crop Protection
North Dakota State University LREC and

Khalid Rashid, Research Scientist
Agriculture and Agri-Food Canada



Discussion

- Overview of white mold in sunflower (head rot)
- Fungicide testing methodology
- Basic fungicide screening (ND and Manitoba)
- Enhancing fungicide with adjuvant
- Improving efficacy with increased spray volume

White Mold (Northern Plains)

- Caused by the pathogen *Sclerotinia sclerotiorum*
 - Basal stalk rot
 - Mid stalk rot
 - Head rot (most economically devastating disease of sunflower)

Managing head rot in sunflower

- The preferred and most effective way to manage head rot is through genetic resistance
- Sometimes resistance is not adequate and other management strategies need to be employed

Head Rot Biology

- Sunflower susceptible at flowering growth stage (R 5.1 – R 5.9)
- Infected by ascospores – same ascospores discharged from sclerotia so one needs wet soil about 10-12 days before sunflowers reach flowering growth stage.
- Cooperative environment – rain, high humidity, warm temperatures – disease progresses faster

Testing Fungicides on Sunflower

- Development of nursery
- Creating Infection
- Application of fungicides
- Measuring disease
- Measuring agronomic parameters
- Choice of hybrids



Evaluating Fungicide for Control of Sunflower Head Rot





Testing Success

- Partitioning parameters
- Sunflower pests
- Simultaneous flowering
- Control of the environment

Contrast Between Research Systems

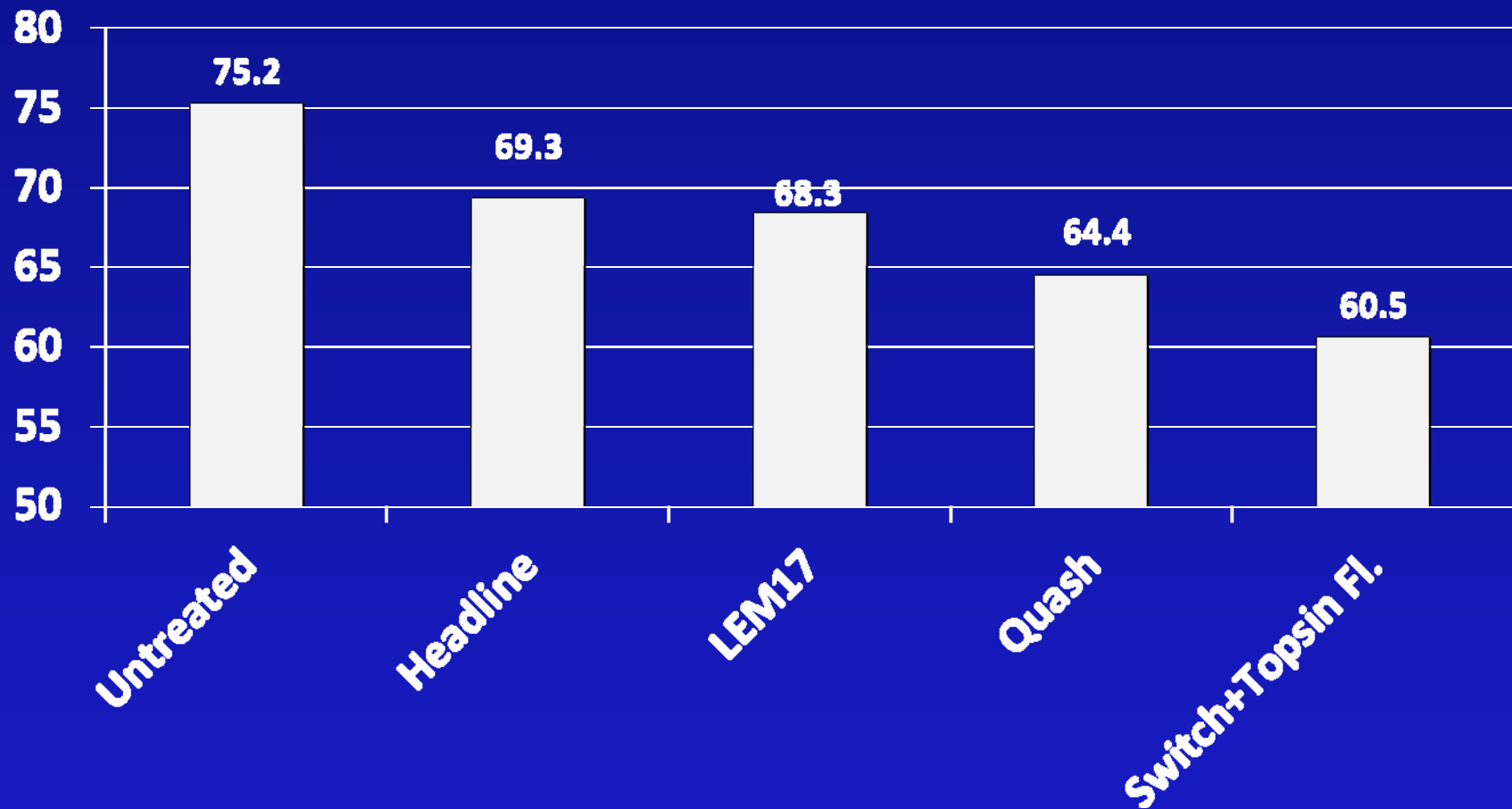
Langdon, ND

- Confection type sunflower except 2010
- Ascospores
- Spray application (three nozzle boom elevated over the plot)
- Prairie pothole region

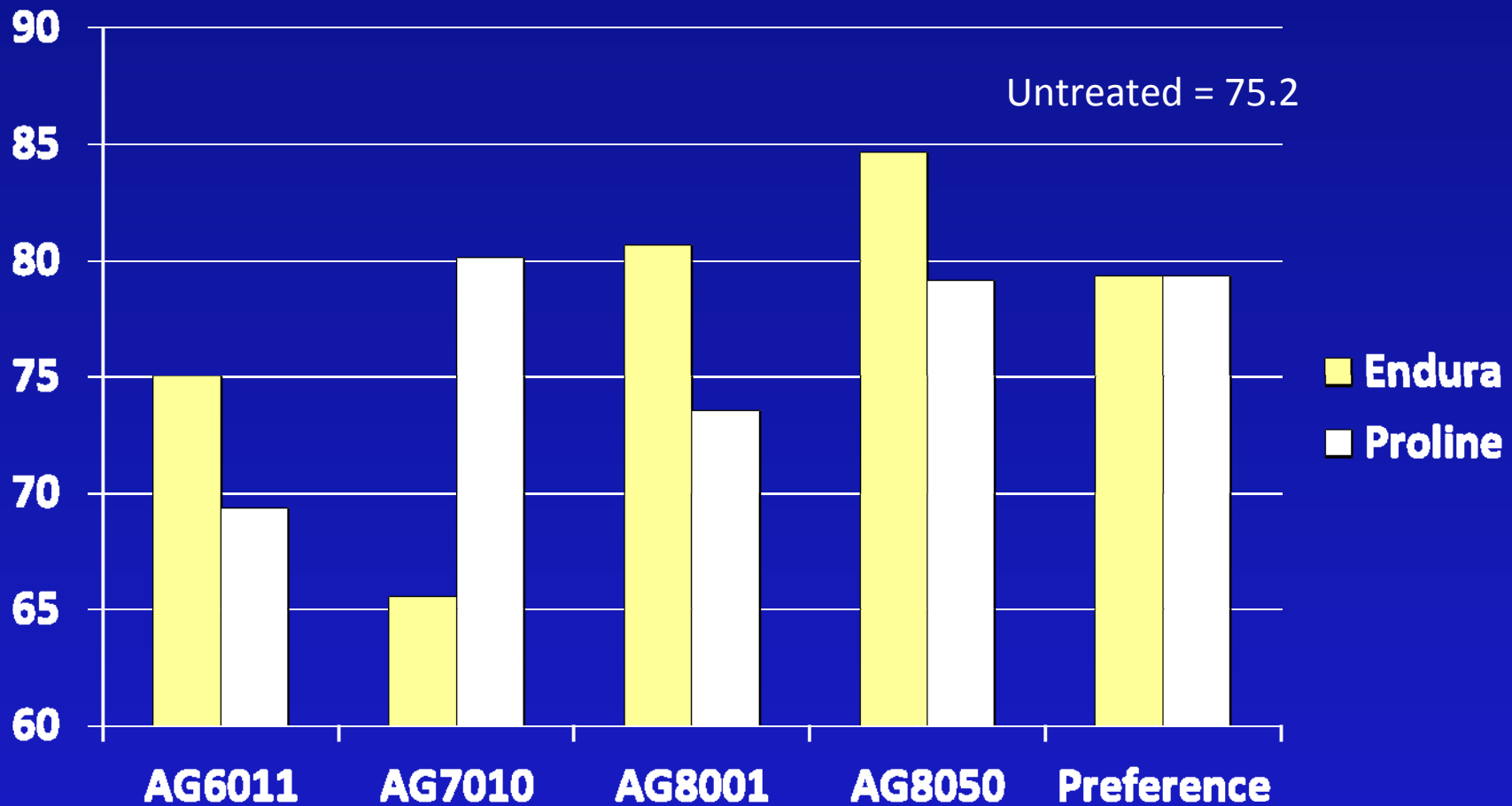
Morden, Manitoba

- Oilseed type sunflower
- Ascospores and mycelia grown on millet
- Single nozzle boom spraying left then right side of head
- Red River Valley

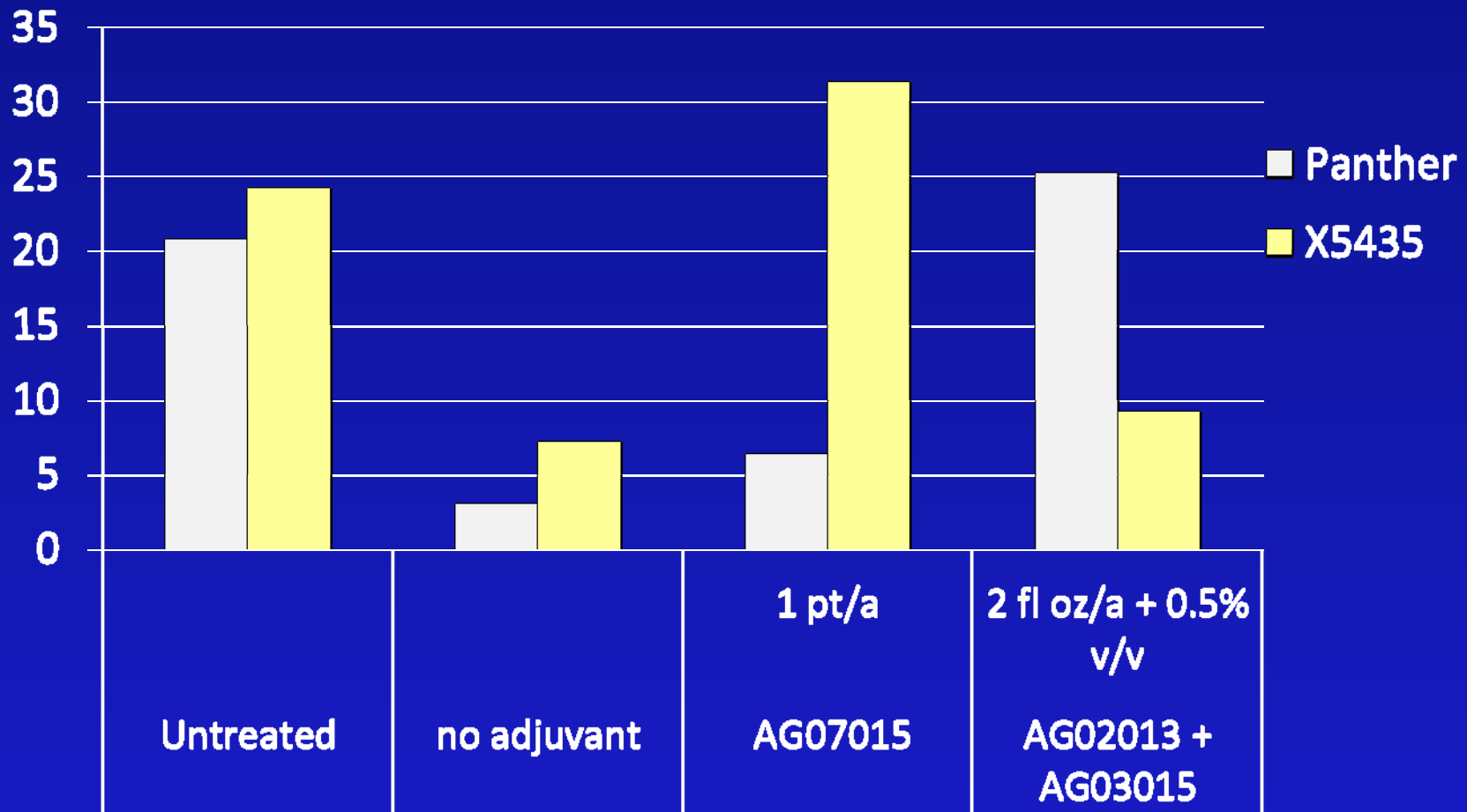
Head Rot Incidence by Fungicide, Langdon 2010



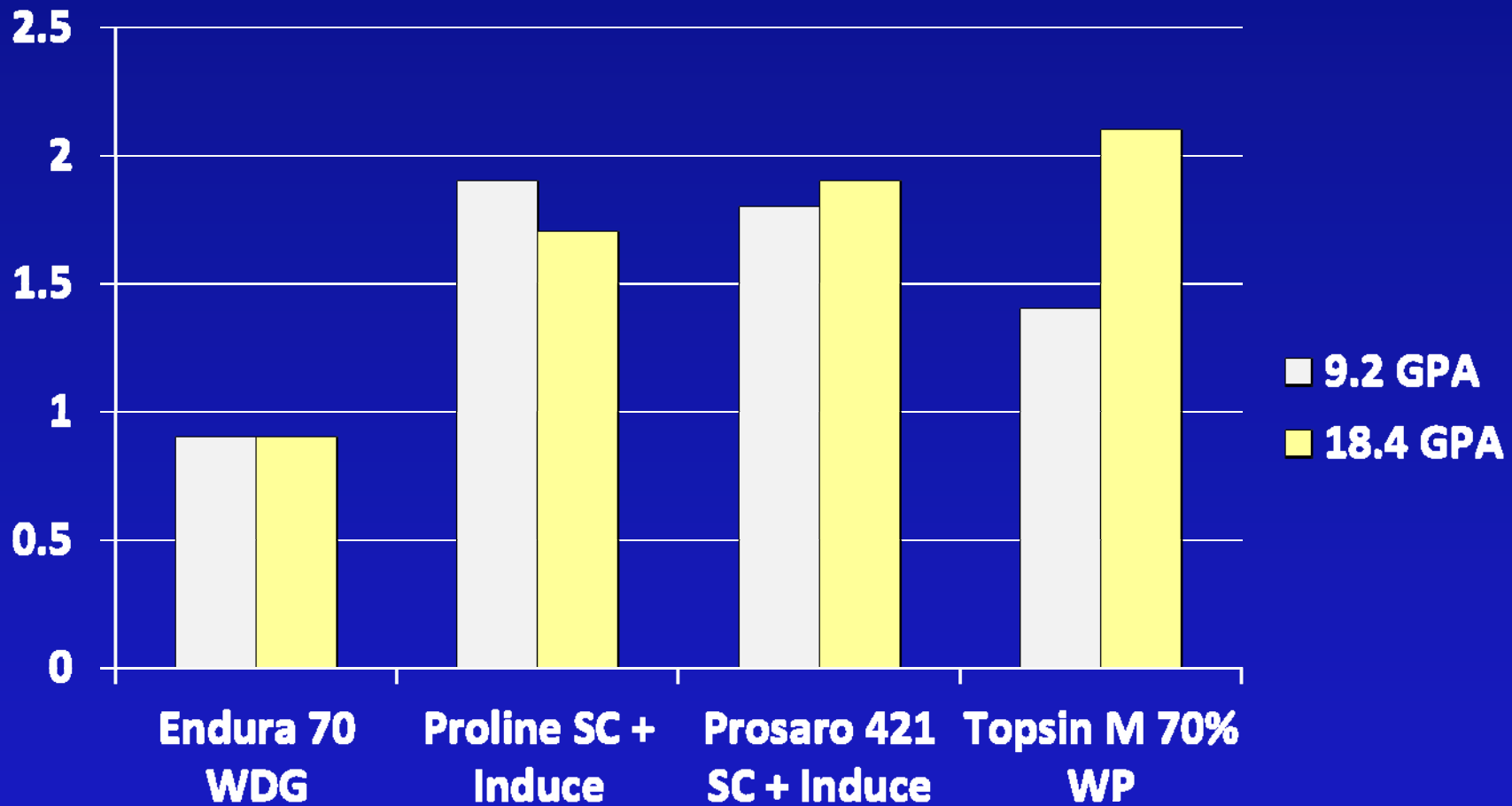
Head Rot Incidence by Fungicide and Adjuvant, 2010



Disease Incidence by Confection Type Cultivar and Endura Fungicide Treatment, 2008



Disease Index by Spray Volume, 2007



Effects of fungicides on sclerotinia head rot and sunflower yield at Morden Manitoba

KHALID RASHID

Agriculture and Agri-Food Canada

Morden Research Station

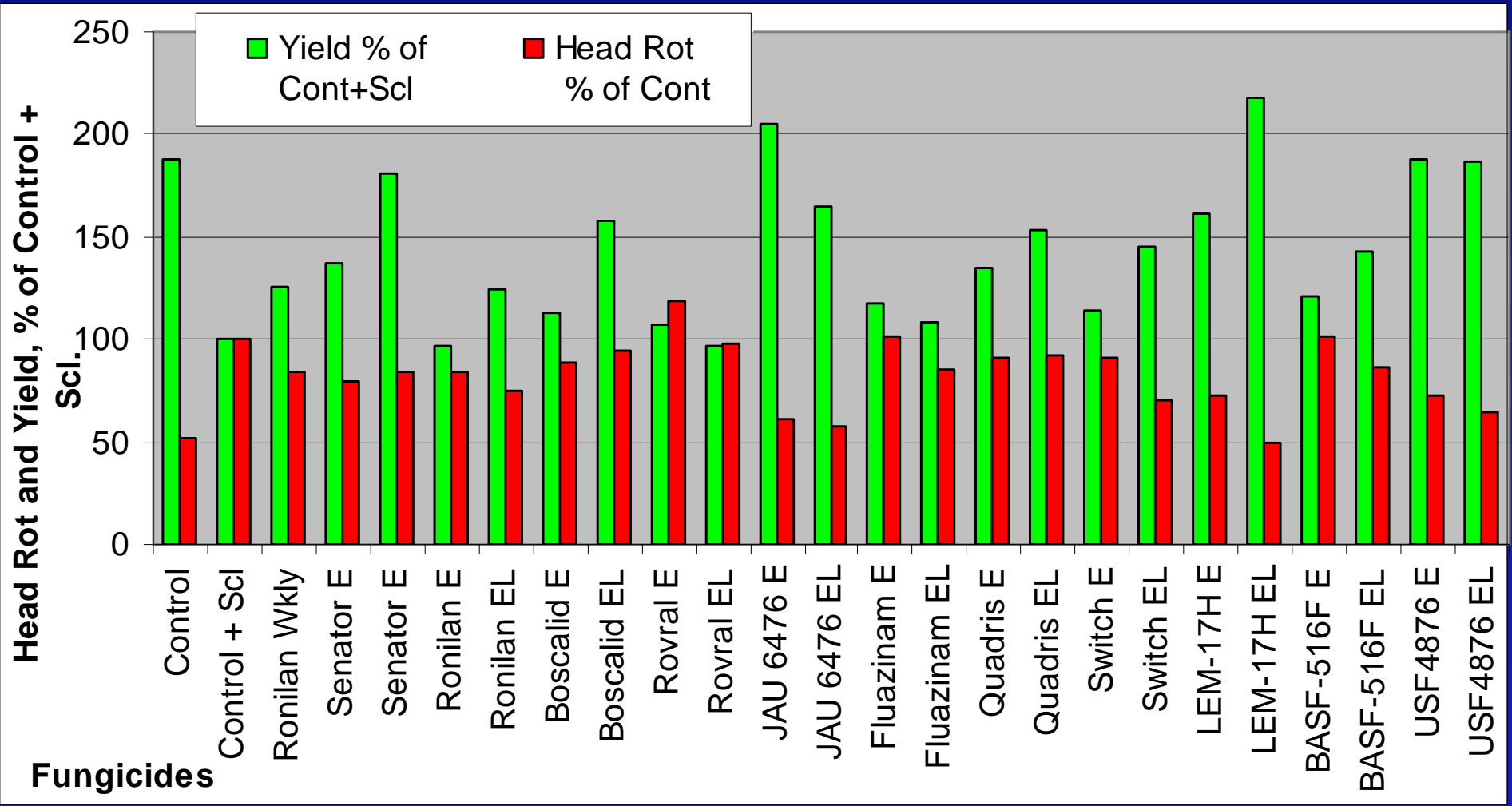


- Short Term Objective:

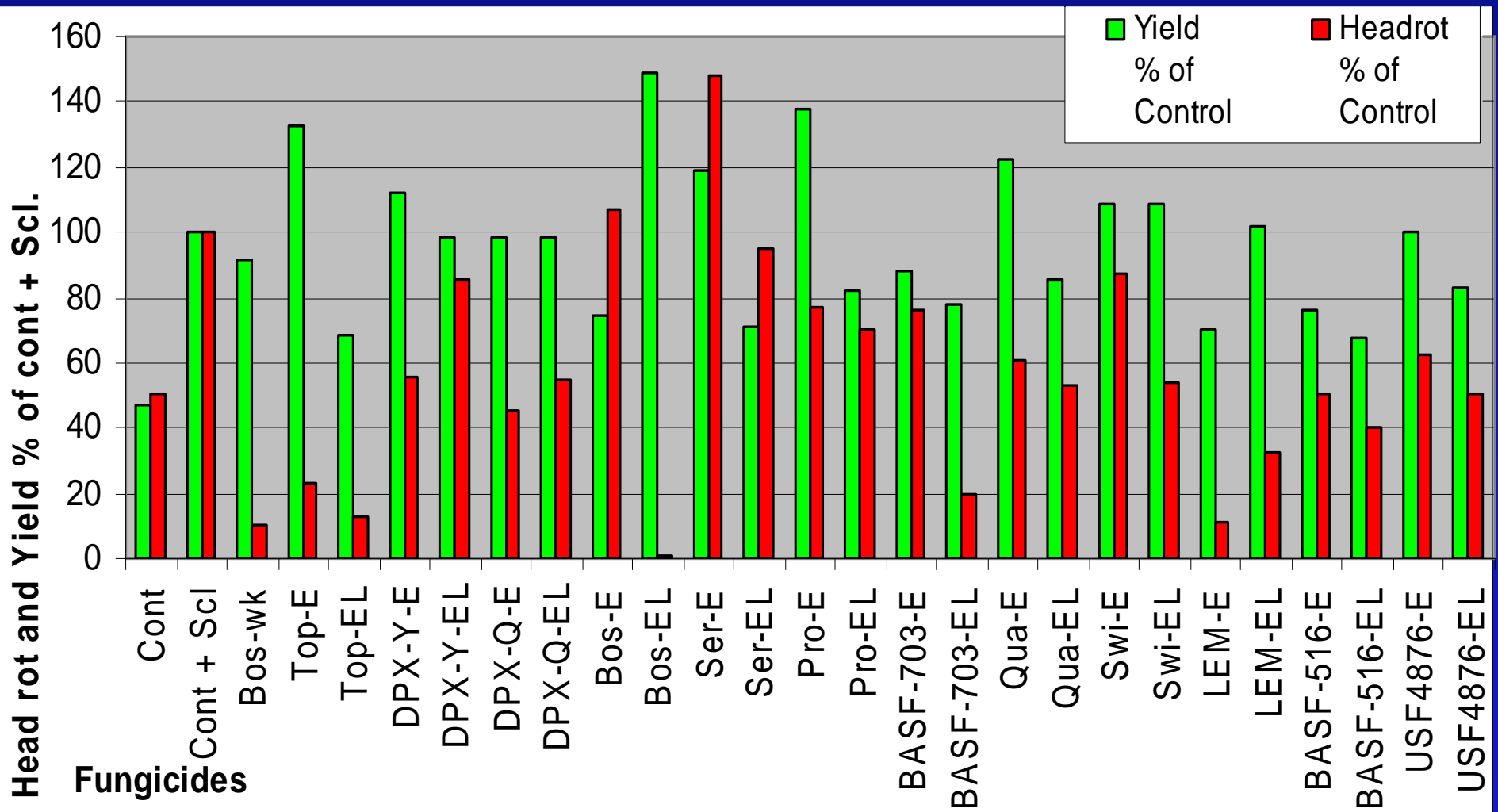
- Lack of genetic resistance to sclerotinia head rot
- Need to identify foliar fungicide applications to reduce the impact on sunflower yield & quality.
- Field trials at Morden Manitoba since 2004
- Susceptible oilseed hybrids
- Three treatments of each fungicide
- Applications at Early and/or Late flowering
- Sclerotinia inoculation 24 h after fungicides
- Head rot incidence and severity weekly

<u>Fungicides</u>	<u>Chemical % active</u>	<u>a.i / ha</u>	<u>Company</u>
Bravo	Chlorothalonil 50	1 kg	Syngenta
Dithane	Mancozeb 80 Ethyl carbamate	2.25 kg	Dow Agro
Folicur	Tebuconazole 39	0.125 kg	BAYER
Headline	Pyraclostrobin 25	0.15 kg	BASF
Lance	Boscalid 25	0.25 kg	BASF
LEM Exp.	DPX-LEM17	0.35 kg	DuPont
Proline	Prothioconazole 48	0.2 kg	BAYER
Stratego	Propiconazole/Trifloxystrobin12.5E	0.18 kg	BAYER
Tilt	Propiconazole 25	0.125 kg	Syngenta
BASF-516	Experimental	0.2 kg	BASF
USF-4876	Experimental	0.3 kg	BAYER
DPX-YT669	Experimental	0.22 kg	DuPont
DPX-Q8X63	Experimental	0.35 kg	DuPont
Quash	Experimental (metconazole)	0.28 kg	VALENT
BASF-703	Experimental	0.25 Kg	BASF
Topsin (Senator)	Thiophanate-methyle	1.5kg	EngageAgro
Serenade	<i>Bacillus subtilis</i> (Biocontrol)	5 kg	AgraQuest
Switch	Cyprodinil / Fluxdioxonil	0.6 kg	Syngenta

Effects of fungicides on sclerotinia head rot and yield in sunflower, Morden 2009



Effects of fungicides on sclerotinia head rot and yield in sunflower, Morden 2010





<http://www.ag.ndsu.edu/langdon/plantpathology.html>

Acknowledgements

- Winfield Solutions
- Bayer CropScience

- Kevin Misek
- Amanda Arens
- Blaine Schatz, CREC
- USDA-ARS Sclerotinia Initiative