

Effects of Early Planting and Early-Maturing Sunflower Hybrids on Damage from the Red Sunflower Seed Weevil

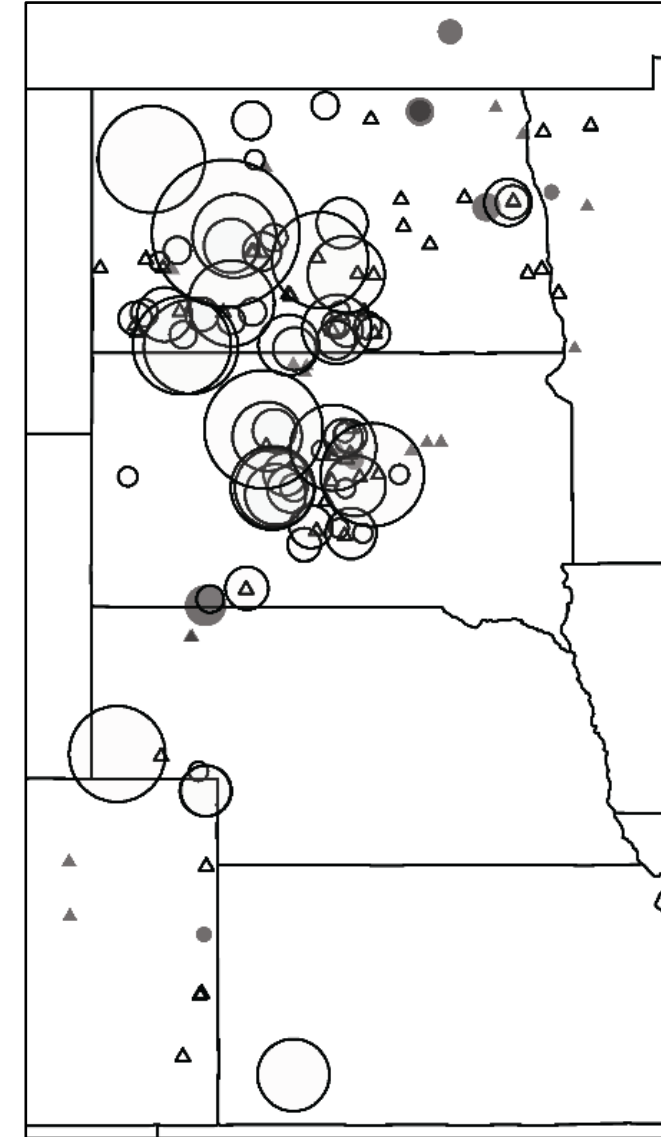
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Pat Wagner
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USDA-ARS, Fargo
SDSU, Brookings
NDSU, Carrington
USDA-ARS, Fargo
SDSU, Rapid City
SDSU, Pierre

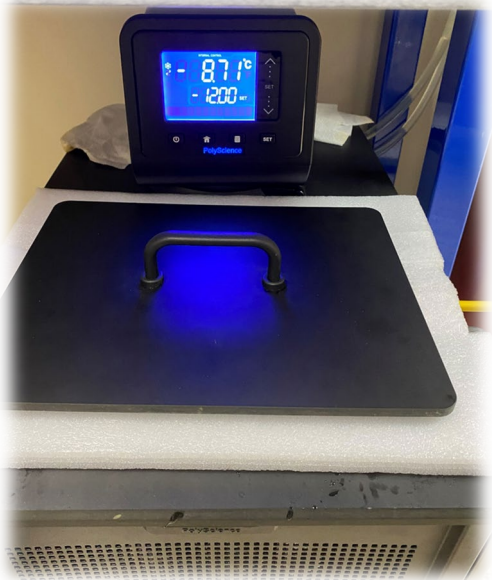
What's The Problem?

- Red seed weevils most damaging seed pest
- Severe: up to 76, 90% damage in 2021, 2023
- SD with \approx 6X times damage in ND in 2023



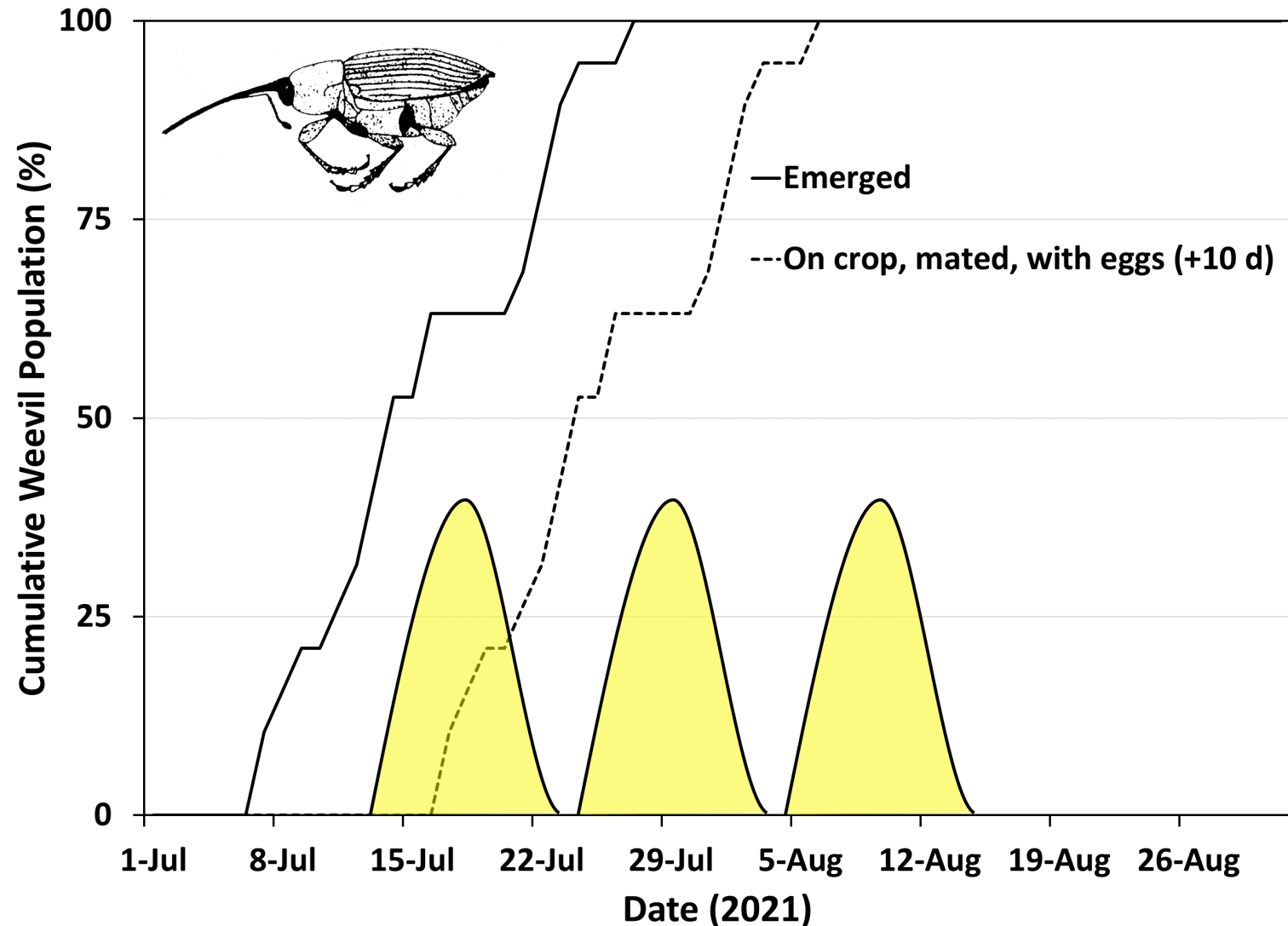
Why Are Weevils Out of Control? (SD vs ND)

- Cold (-90%+)
- Tillage (-35%)
- Few insecticide options (AIs)
- Insecticide resistance (??)



How Can We Manage This?

- Insecticide options
- Early planting
- Early hybrids
- Biological control
 - Parasitoids
 - Entomopathogens



Why Aren't We 'Avoiding' Weevils Now?

- SDSU, NDSU, USDA trials in 1980's indicate this should work
- Yields poor with early planting
- Old results not valid (climate change)
- No time to plant*



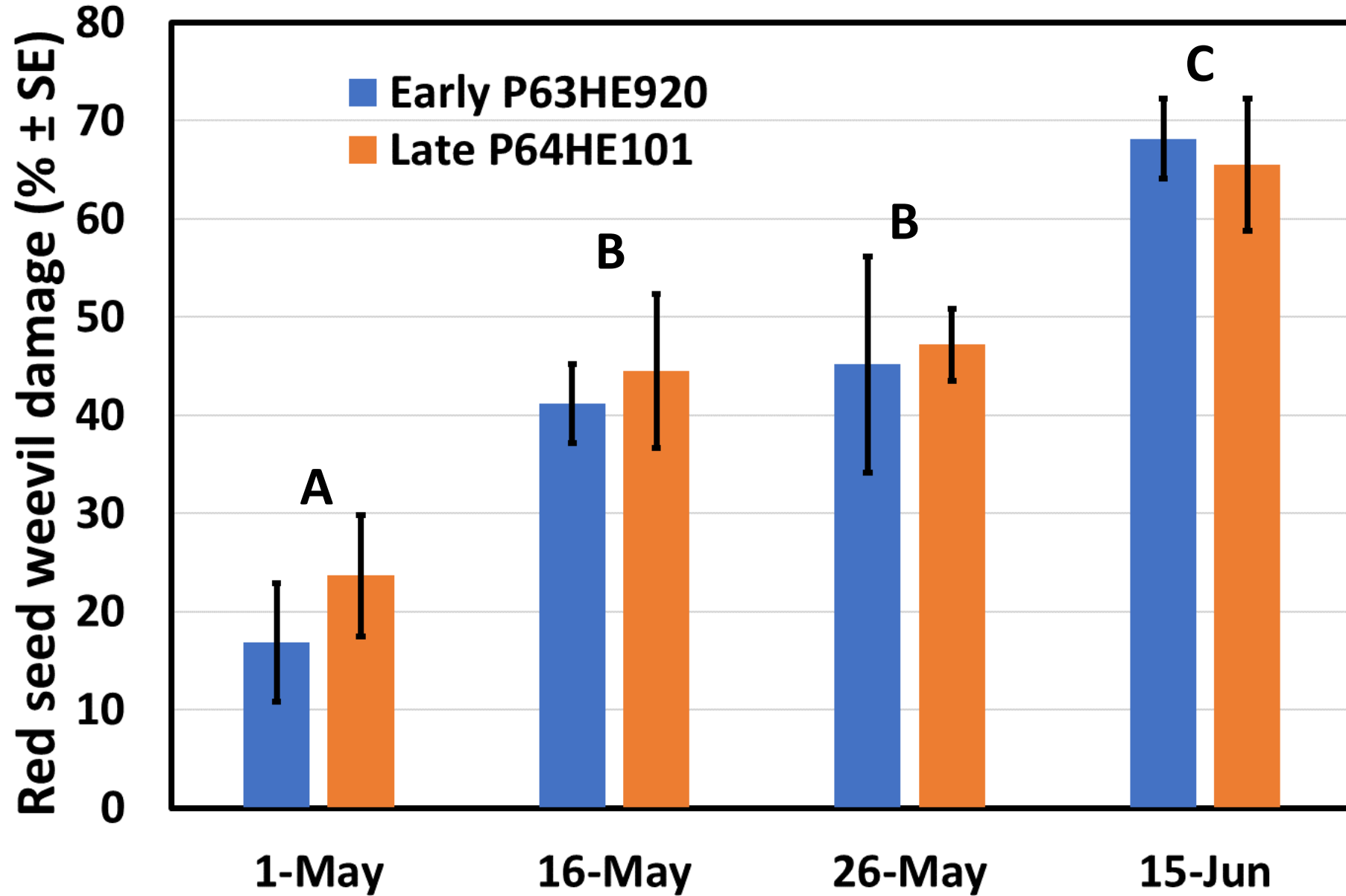
Evaluating Early (+Early) for Weevil Avoidance

- **Dickinson, ND and Pierre, SD in 2022**
Less damage to early plantings, yield data not sufficient
- **New, NSA-funded work in 2023**
Pierre and Sturgis (SD), Carrington (ND)
Varied plot sizes, production practices by site
Weevil damage (%), yield (lb/ac), oil (%)
No insecticides for weevil management

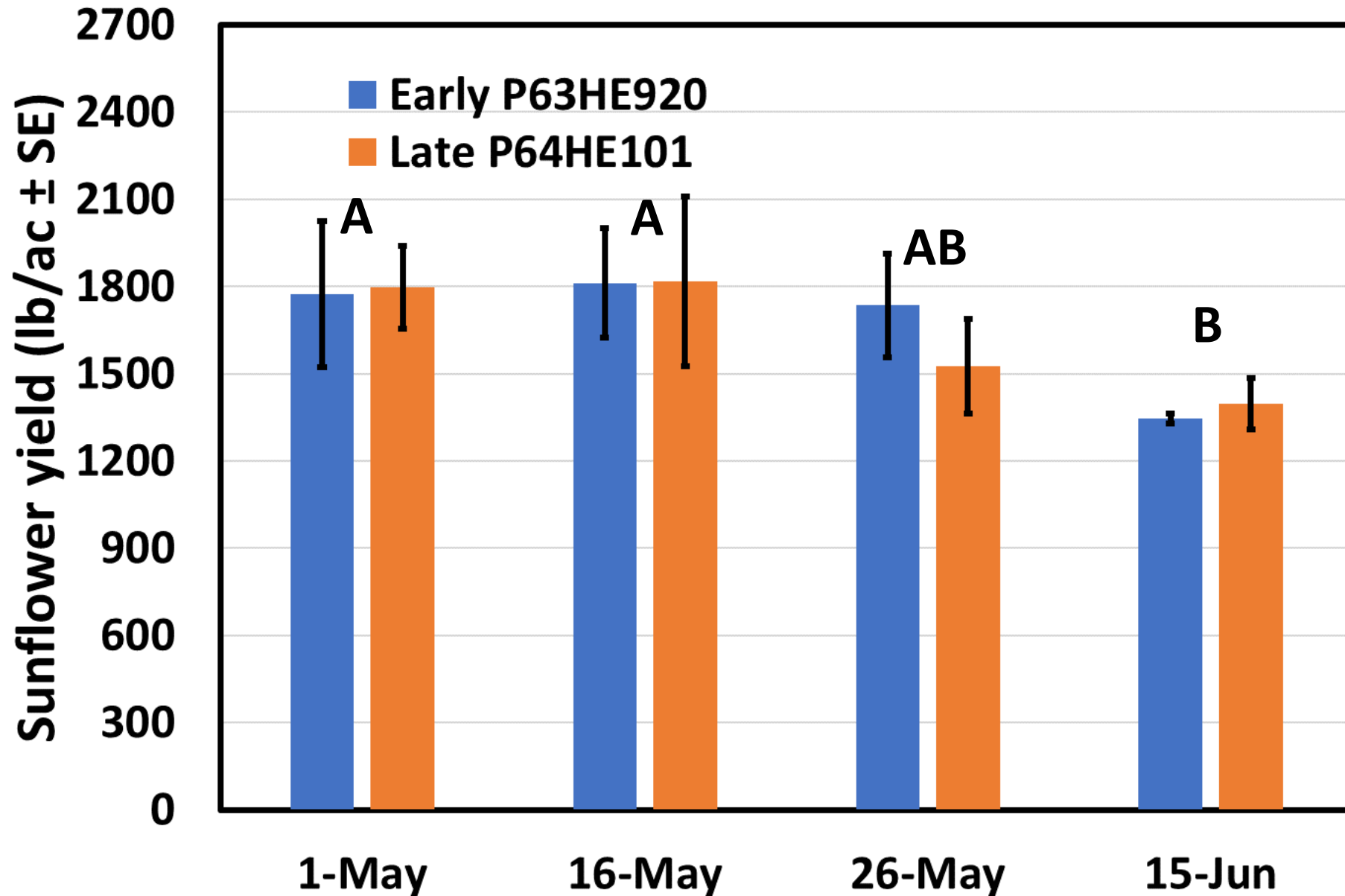
Overview of Trials, Dates

Location	Planting date	Hybrid 1	Bloom 1	Hybrid 2	Bloom 2
Carrington, ND	May 16	N4H161 CL	July 14	N4H422 CL	July 24
	May 30		July 25		August 3
	June 7		July 31		August 9
	June 13		August 5		August 16
Pierre, SD	May 1	P63HE920	July 13	P64HE101	July 16
	May 16		July 21		July 24
	May 26		July 28		July 30
	June 15		August 15		August 15
Sturgis, ND	May 8	P63HE920	July 18	P64HE101	July 20
	May 17		July 24		July 26
	June 1		August 4		August 4
	June 20		August 22		August 22

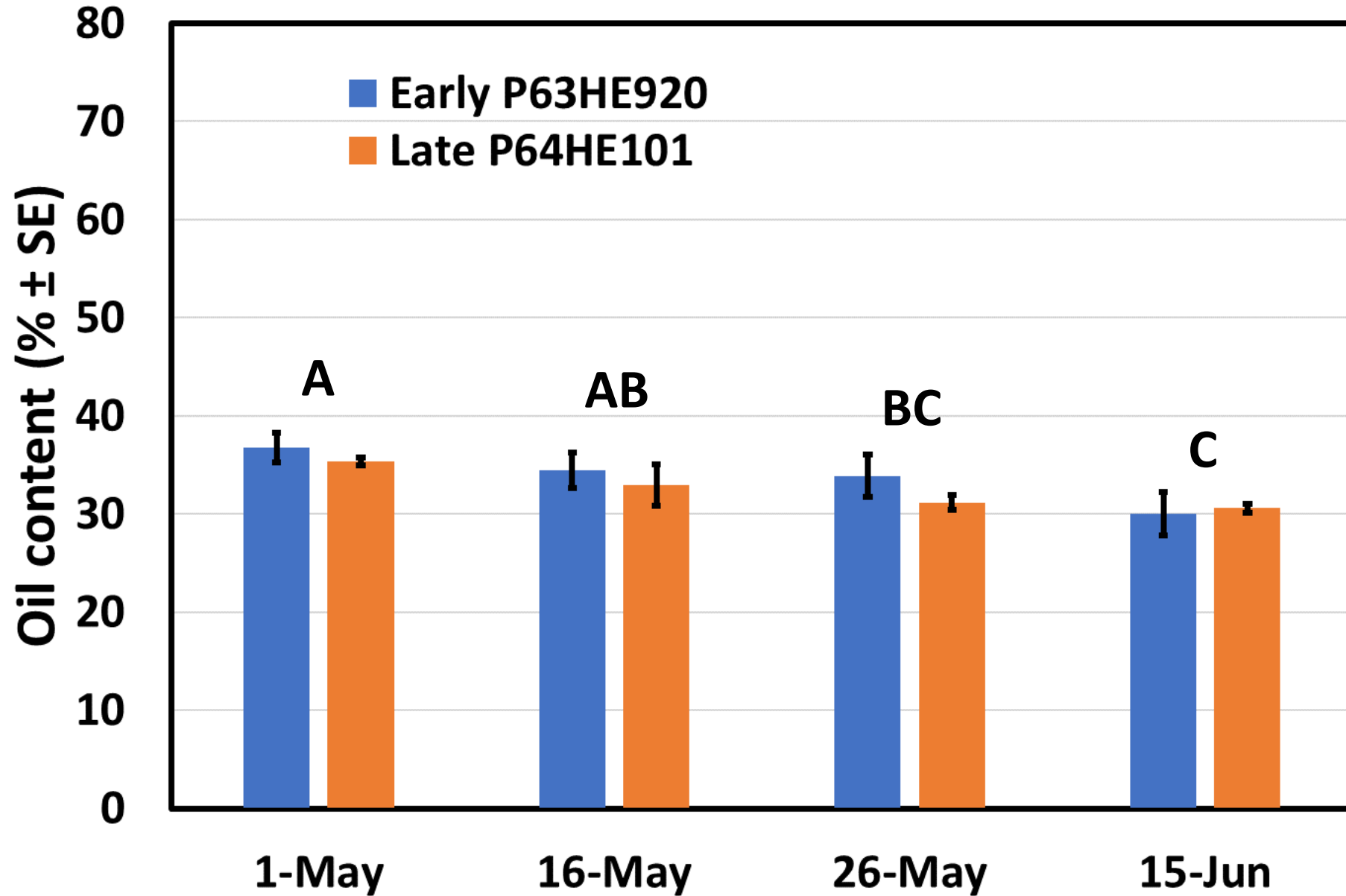
Pierre, SD (2023) Weevil Damage



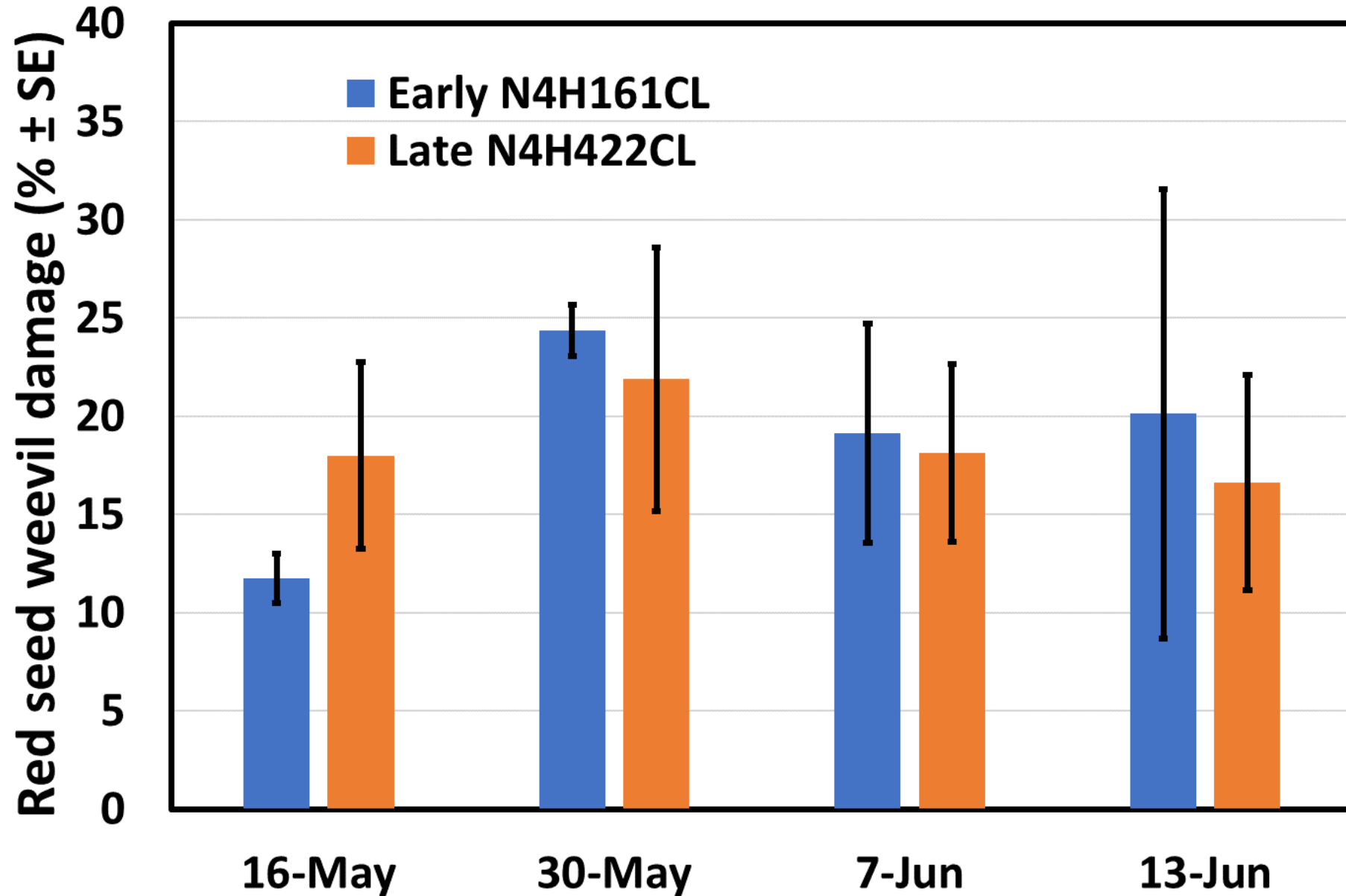
Pierre, SD (2023) Yields



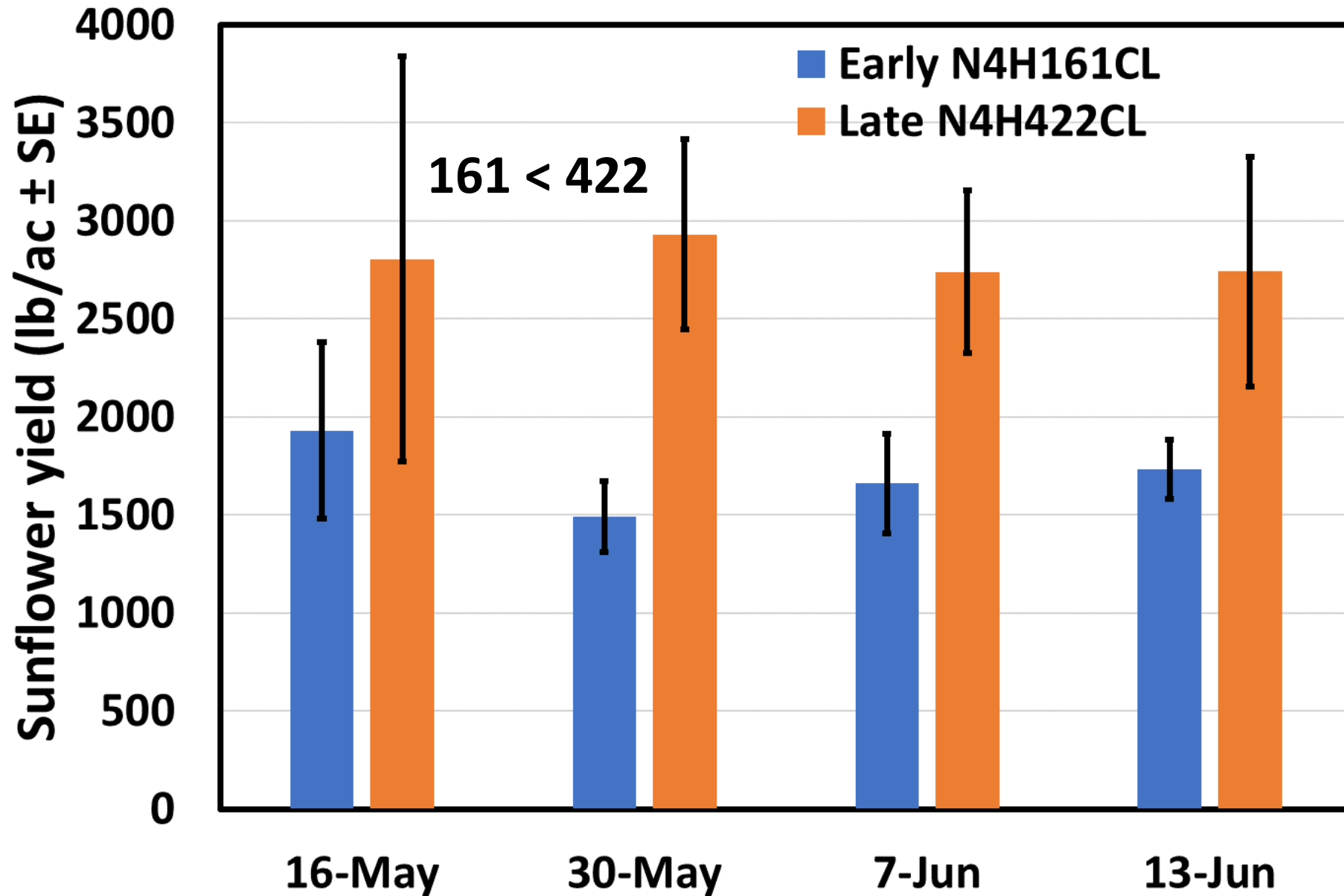
Pierre, SD (2023) Oil Content



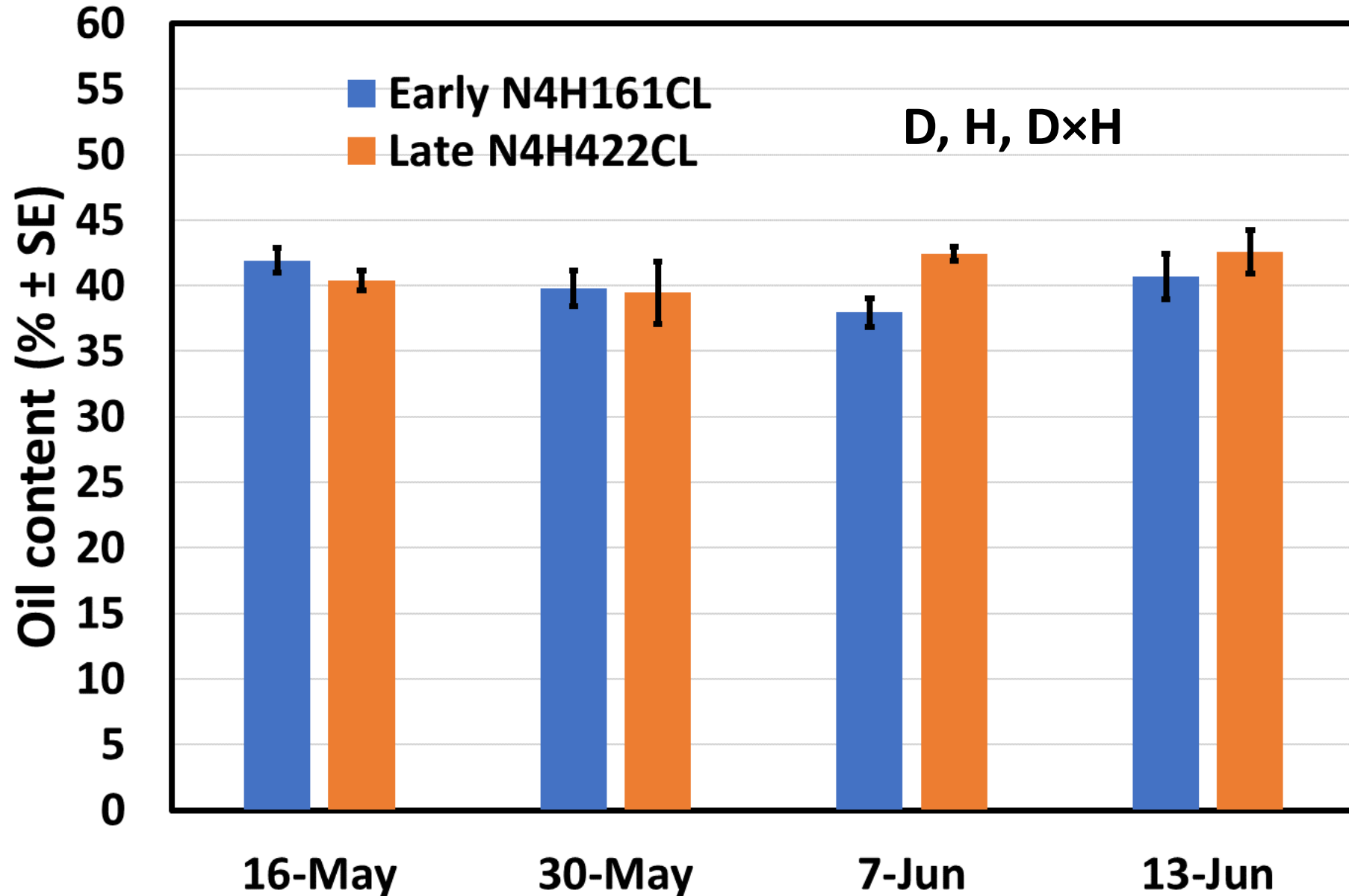
Carrington, ND (2023) Weevil Damage



Carrington, ND (2023) Yields



Carrington, ND (2023) Oil Content



Summary of 2023 Trials

- **Pierre, SD**

Weevil damage reduced $\approx 70\%$ for May 1 planting

Yield, oil % equal (*greater*) in early plantings

Weevil emergence July 7 – August 7 (+)

- **Carrington, ND**

Damage inconclusive. Yield, oil % = early planting

- **Sturgis, SD - [Samples remain to be analyzed]**

What Else is There? (Pt-1)

- **HA 488 resistance mapping?**
- **Pierre-area grower activity**
Early-planting ---> July 10
Led to August (!) harvest
- **Grower-submitted samples**
Reduced damage in early fields...
Some low damage with later-planting (needs follow-up)



What Else is There? (Pt-2)

- **Parasitoids and planting date, insecticides (20%)**
- **Look at 'edge effects' on weevils**
Pathogenic fungi (existing products)
Conventional insecticides
- **Weevil (plant) volatiles ongoing**
Improved monitoring
Trapping, trap-and-kill



Acknowledgements and Questions

- National Sunflower Association
- Zach Tarble (USDA-ARS)
- Pierre-area growers
- (Till / strip-till / soil disturbance?)
- Other questions

