Replacements for Paraquat as a Harvest Aid in Sunflower

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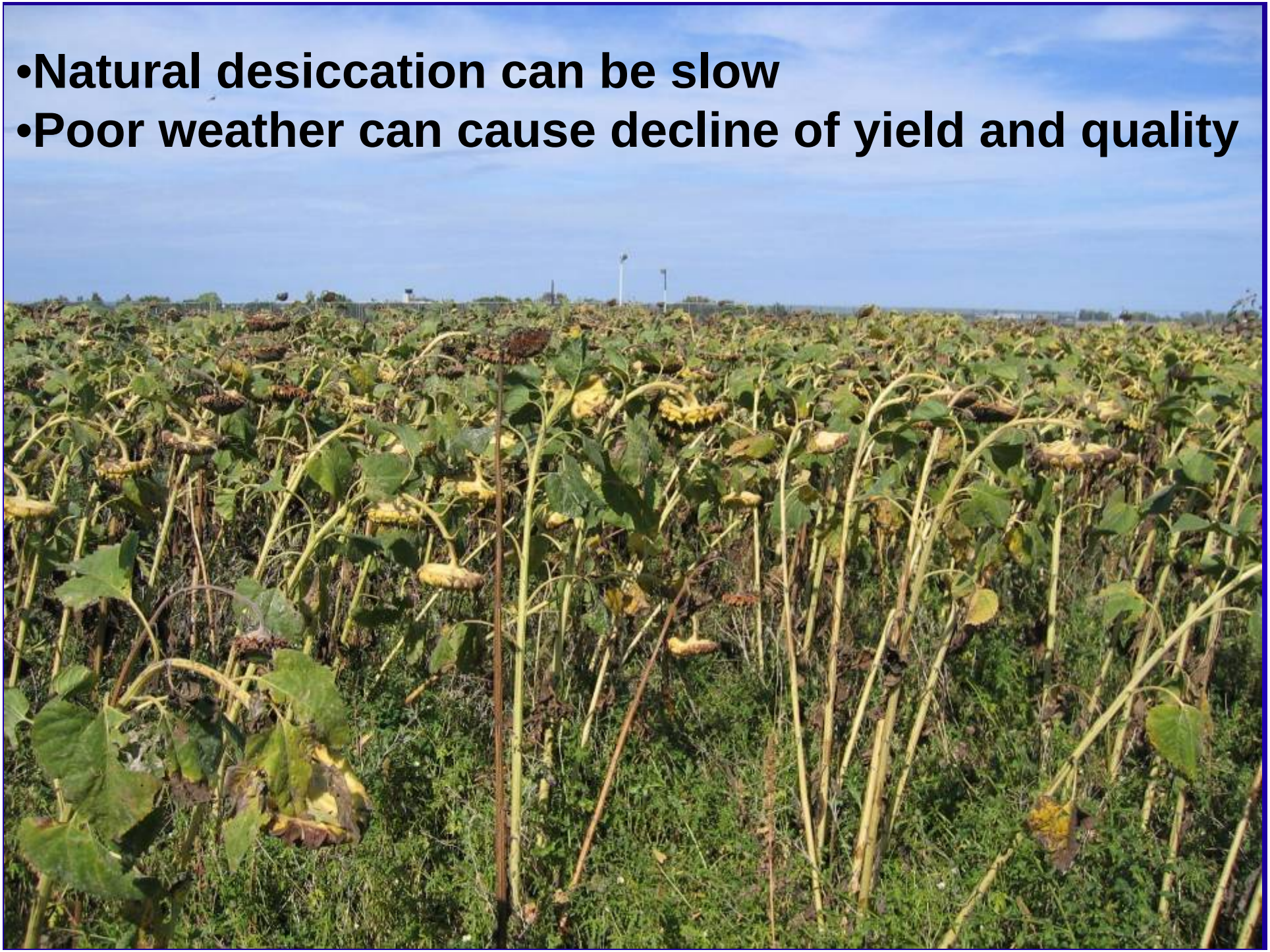

•Natural desiccation can be slow
•Poor weather can cause decline of yield and quality


Staygreen trait causes
timing uncertainty

http://www.naturalsciences.org/education/treks/swans_bears_06/images/Red-winged%2520Blackbird%2520flock.jpg&imgref

RoundUp

- First use season in 2007
- Labeled for weed control, will affect sunflower
- Apply up to 22 fl. oz./A Weathermax, 12 oz ae/A glyphosate
- Slow activity

Sharpen

- Originally BAS 800H
- Proposed common name saflufenacil
- Trademarked Kixor technology
- Low use rate (less than 1 oz ai/A)
- Favorable environmental profile
- Label pending
  - Availability for sunflower in 2009 uncertain

Experiment Methods

- Objective – determine the effect of application timing on seed quality
- Four locations
  - Minot and Fargo, ND
  - Brookings, SD
  - Hays, KS
- Locally adapted hybrid and production practices

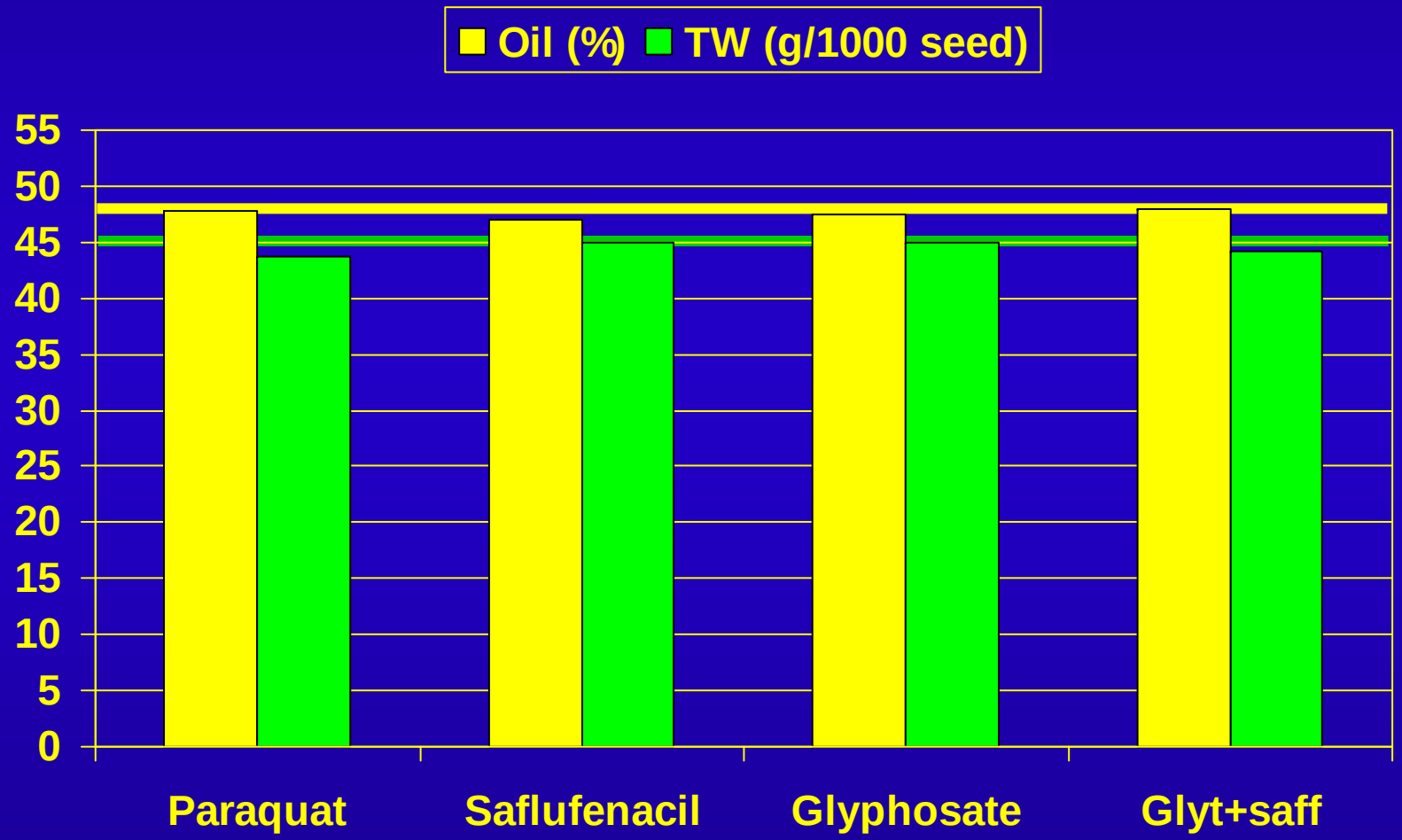
Treatments

- Control
- Factorial arrangement of application timing and herbicide
- Timing based on achene moisture
  - 50, 40, and 30%
- Herbicides
  - Paraquat, 6 oz ai/A
  - Saflufenacil, 0.71 oz ai/A
  - Glyphosate, 12 oz ae/A
  - Saff plus glyt, 0.36+12 oz ai/A

Evaluations

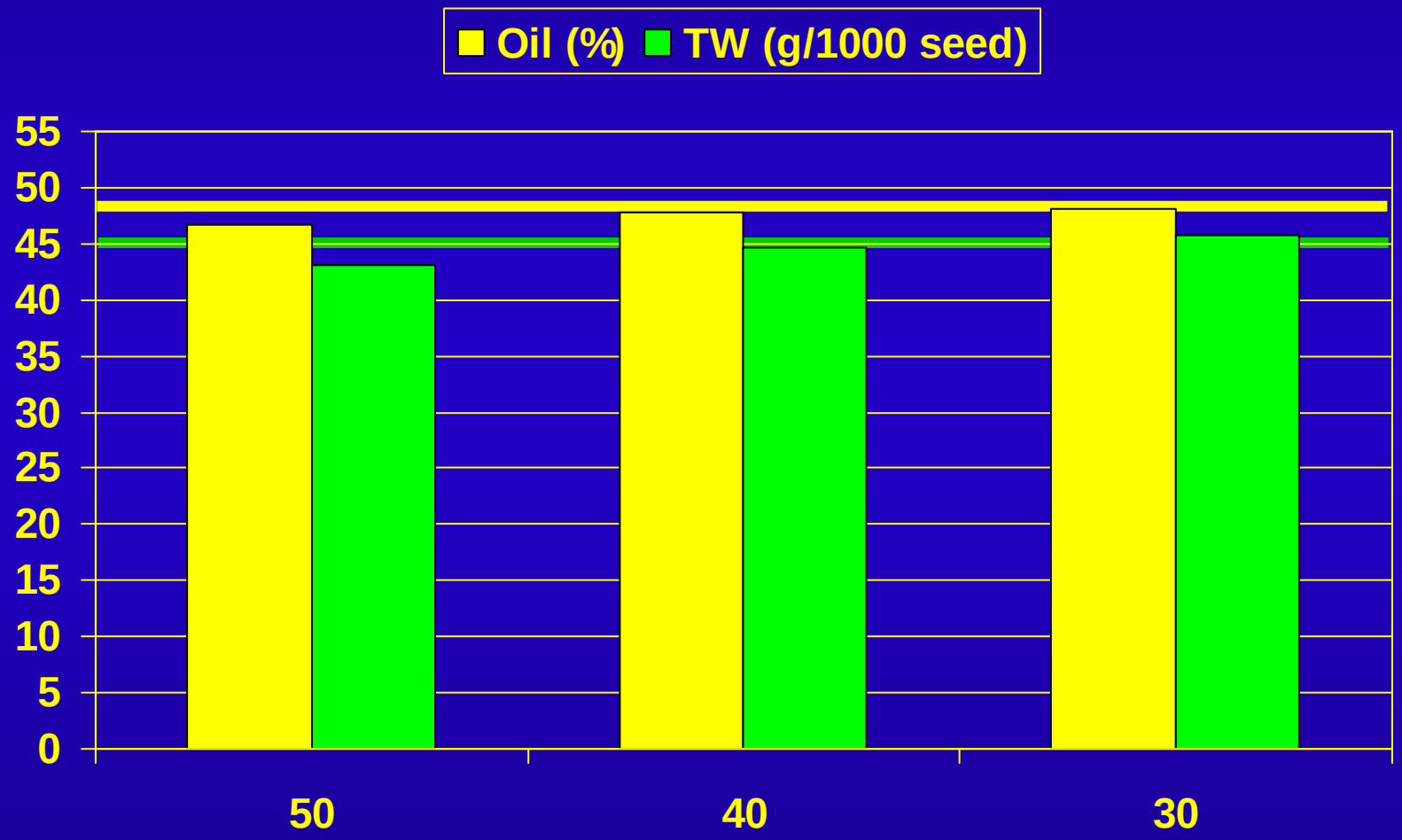
- Desiccation at four 7-day intervals
  - Stalk, receptacle, and seed
  - Visual and moisture content
- Seed yield and quality at 28 days
  - Yield
  - Weight per 1000
  - Oil content and composition
  - Germination

Herbicide Effect on Seed Quality 2007



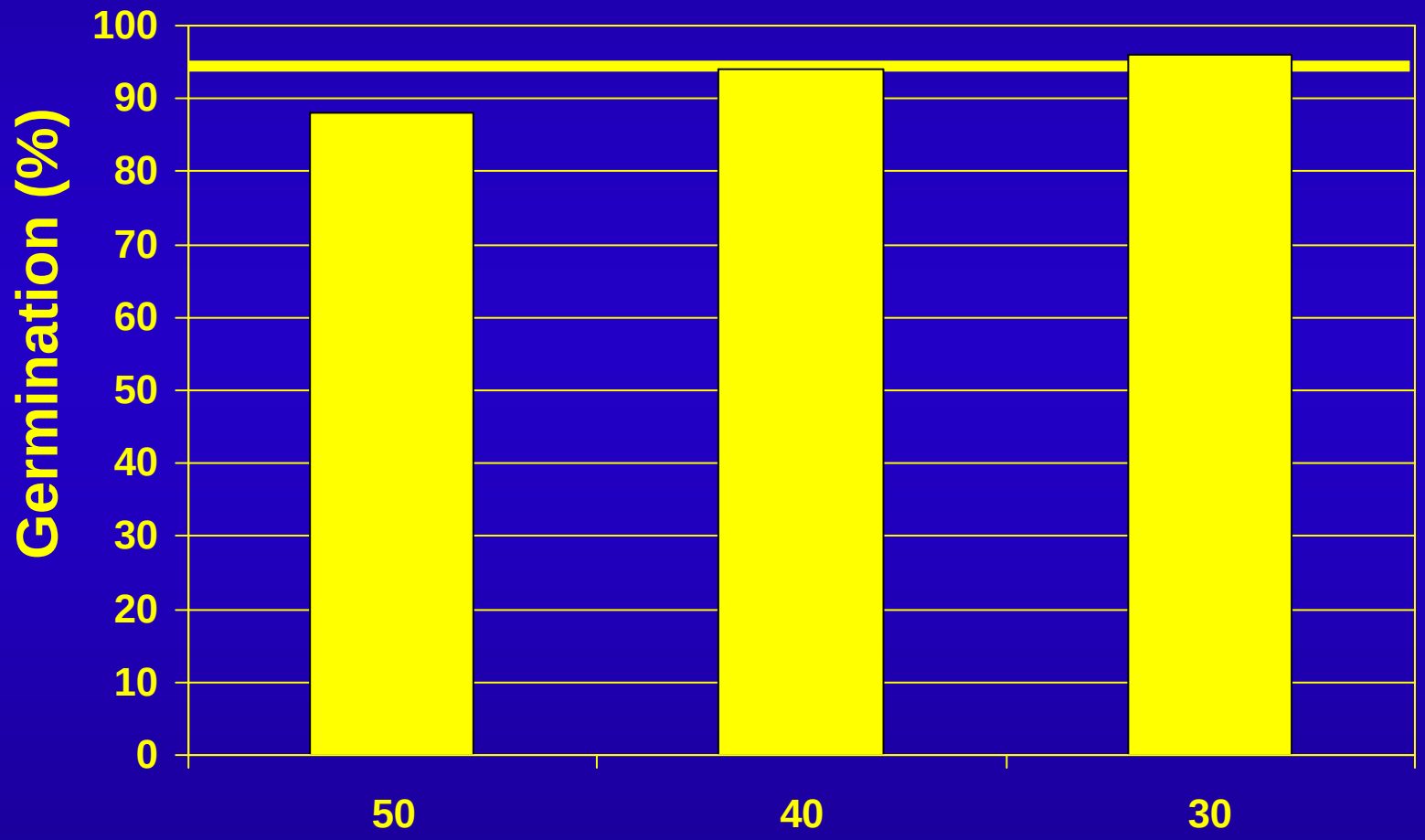
$LSD_{0.05}$ = ns, ns

Timing Effect on Seed Quality 2007



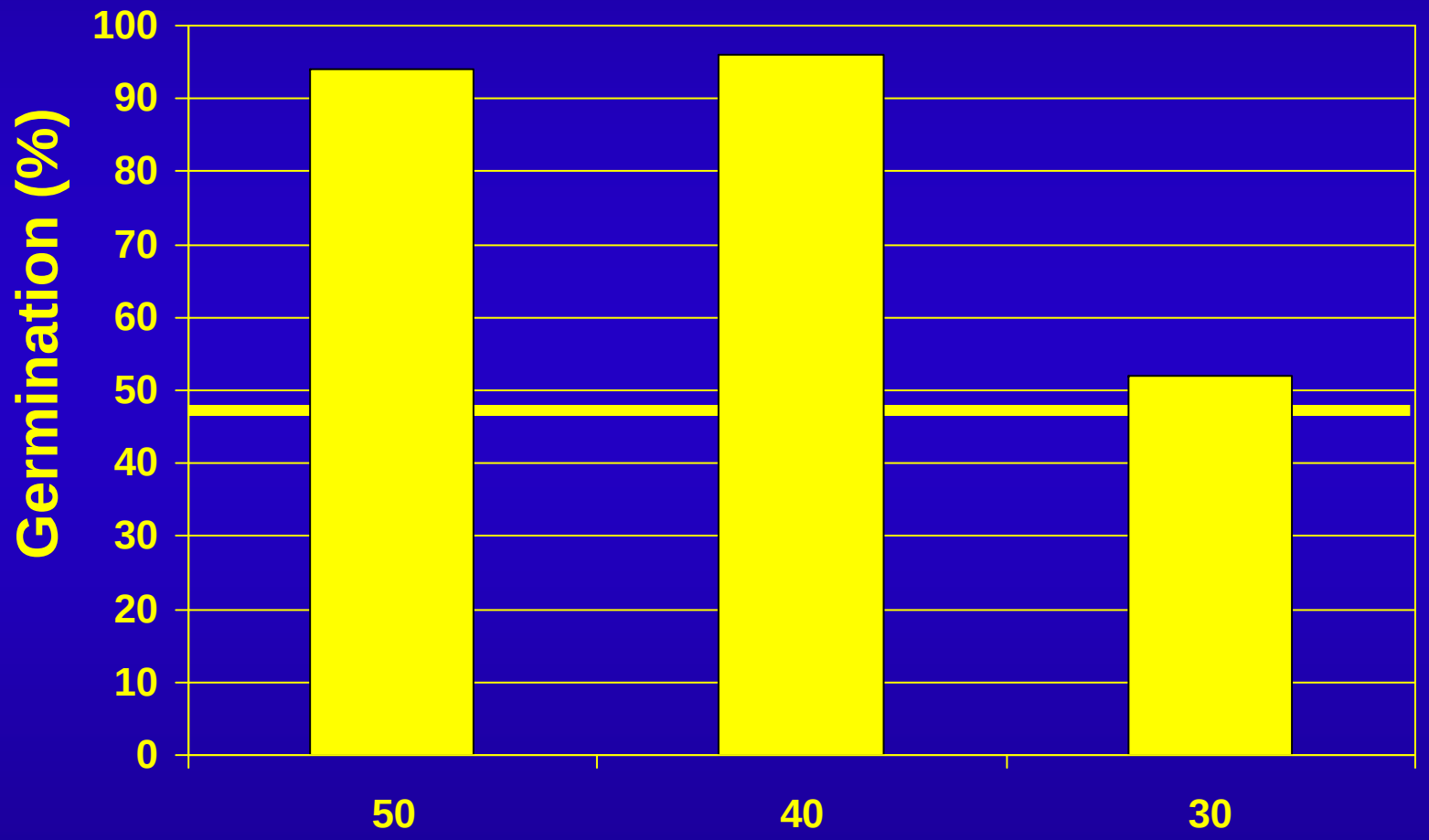
$LSD_{0.05}$ = 0.7, 1.3

Timing Effect on Germination, Minot 2007



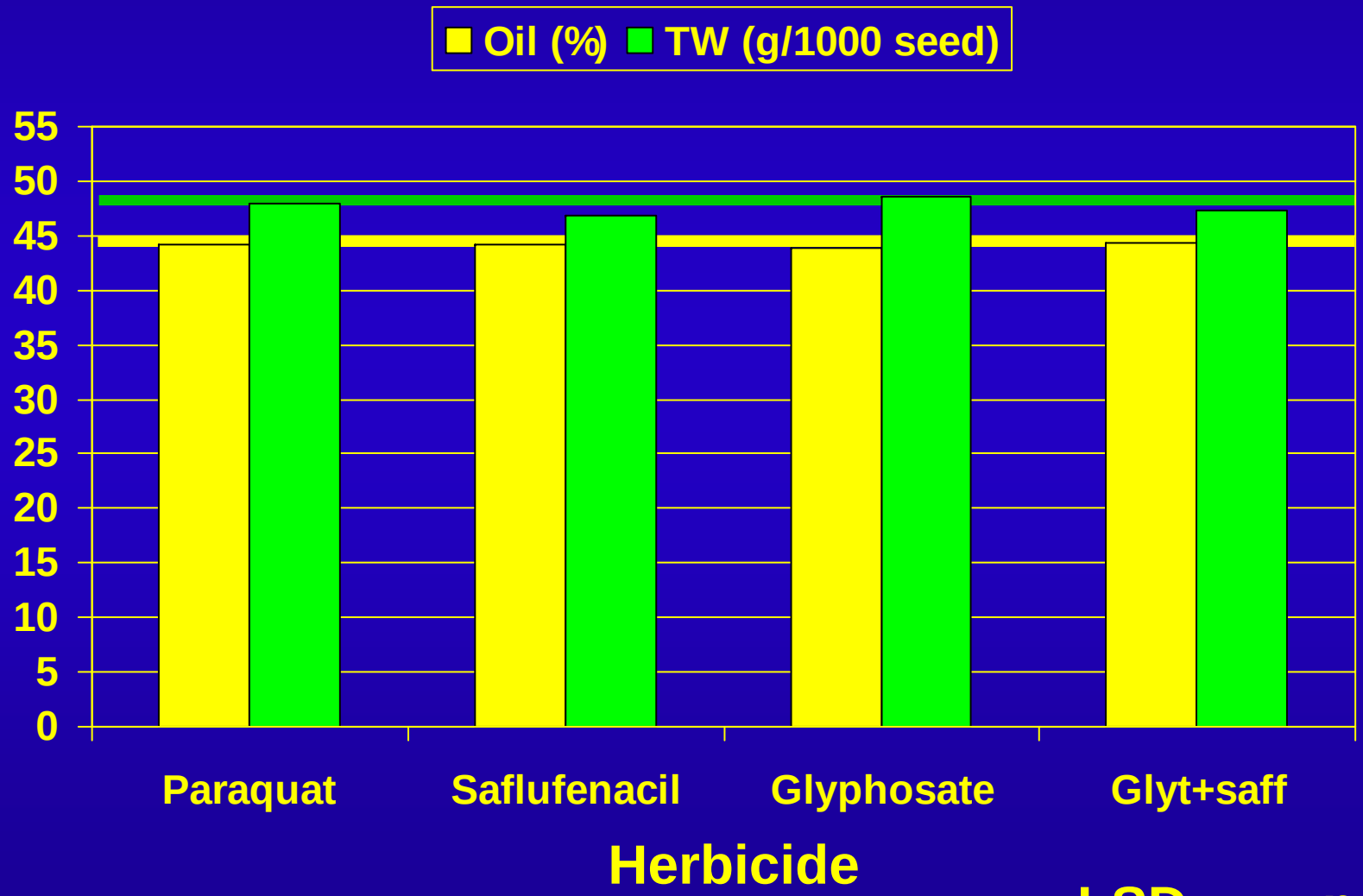
$LSD_{0.05} = 3$

Timing Effect on Germination, Fargo 2007



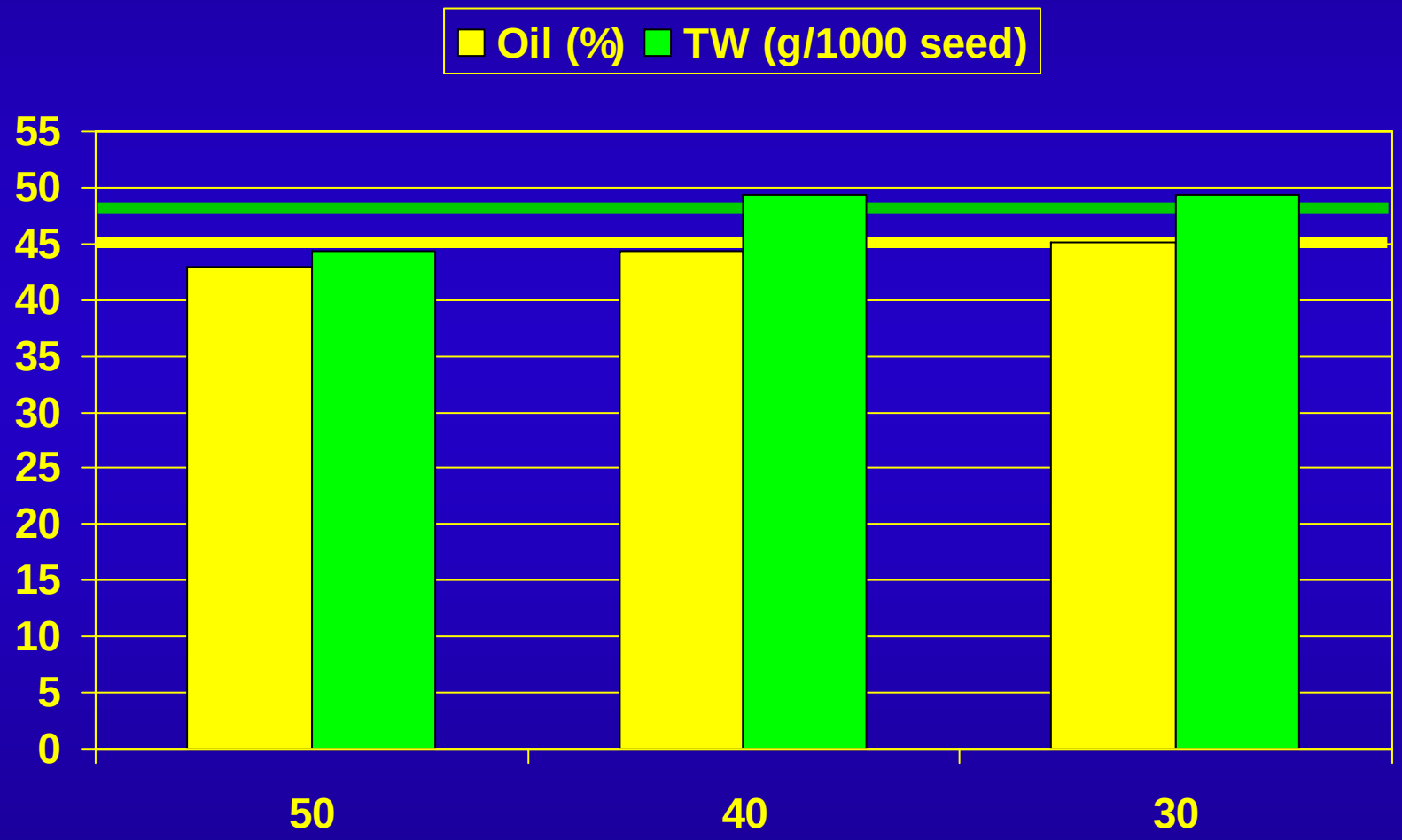
$LSD_{0.05}$ = 3

Herbicide Effect on Seed Quality 2008 (Fargo, Brookings, and Hays)



$LSD_{0.05}$ = ns, ns

Timing Effect on Seed Quality 2008 (Brookings and Hays)



$LSD_{0.05}$ = NS, NS

Fatty Acid Composition of 2007 Oilseed Sunflower

- No change
  - Palmitic
  - Stearic, oleic, linoleic
  - Arachidic, gondic
  - Behenic
  - Lignoceric

Desiccation
6 DAT

Control

Paraquat or saflufenacil

Trt with glyphosate

Moisture Retention in Receptacle

Receptacle Moisture Often Determines Harvest

Days Earlier Harvest than Control in 2007

Desiccant	Minot, ND	Fargo, ND	Brookings, SD	Hays, KS
50%				
Paraquat	37	14	5	6
Saflufenacil	32	12	2	6
Glyphosate	31	14	8	3
Glyt+saff	35	15	4	6
40%				
Paraquat	25	11	0	5
Saflufenacil	27	7	-1	5
Glyphosate	17	9	0	3
Glyt+saff	26	12	0	5
30%				
Paraquat	8	7	-2	1
Saflufenacil	9	6	0	2
Glyphosate	3	8	-2	1
Glyt+saff	7	5	-1	0

Days Earlier Harvest than Control in 2008

Desiccant	Fargo, ND	Brookings, SD	Hays, KS
50%			
Paraquat		12	18
Saflufenacil		10	14
Glyphosate		11	17
Glyt+saff		5	13
40%			
Paraquat		6	10
Saflufenacil		7	15
Glyphosate		8	11
Glyt+saff		4	13
30%			
Paraquat	8	3	4
Saflufenacil	3	2	3
Glyphosate	6	3	3
Glyt+saff	6	1	0

Summary

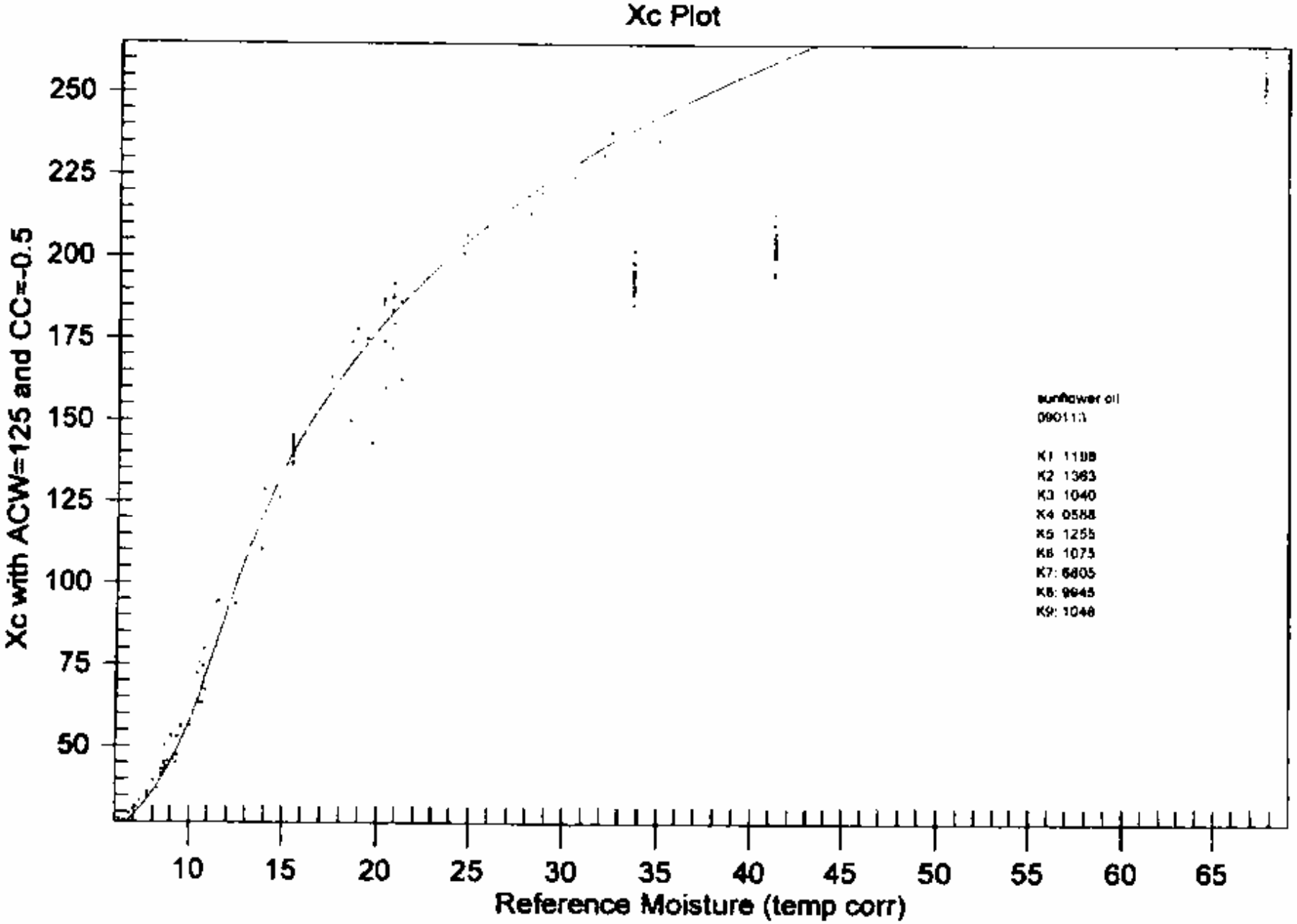
- Chemical desiccation as early as 50% achene moisture
  - Can reduce field drying time
  - Did not reduce yield
- Desiccation benefit varied by location and year
- Herbicide did not affect achene test weight or oil content
- Application at 50% moisture tended to slightly reduce size and oil content

Evaluations to Come

- Germination of oilseed sunflower
- Oil composition of oilseed sunflower
- Confection sunflower size
- Confection sunflower weight

The authors thank the NSA for support of this project.

Moisture Curve Calibration for Testing Equipment



Thank you for your kind attention