

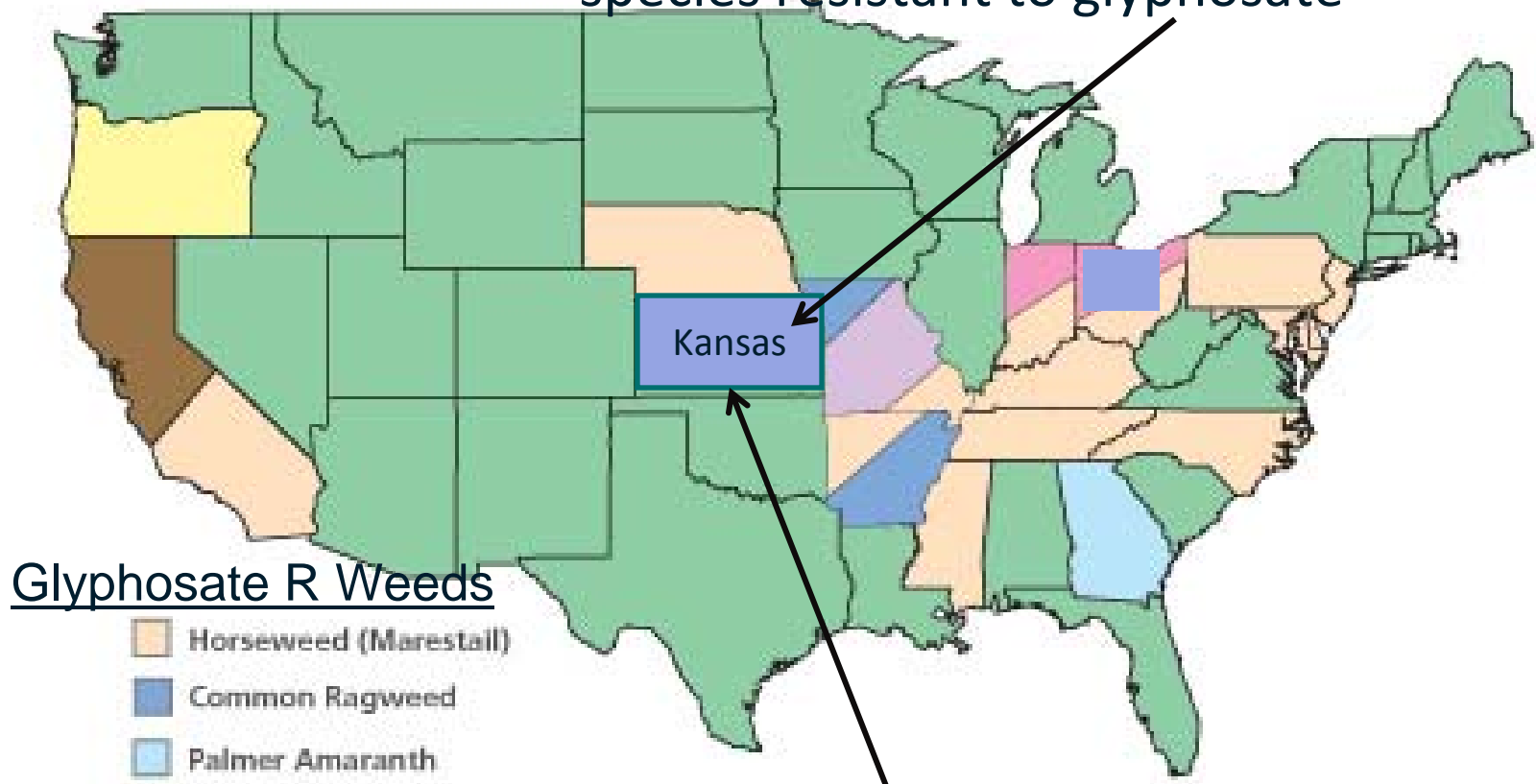
Sunflower Weed Control – Update and Issues

Rich Zollinger
NDSU Extension Weed Specialist

2013 NSA Research Forum

1. Brief overview of herbicide resistant weeds
2. Clearfield Plus sunflower
3. IR-4 pyroxasulfone/snfl registration
4. Results of regional pyroxasulfone “Round Robin” study (NSA funded)

Kansas, 2011 - first state to confirm five species resistant to glyphosate



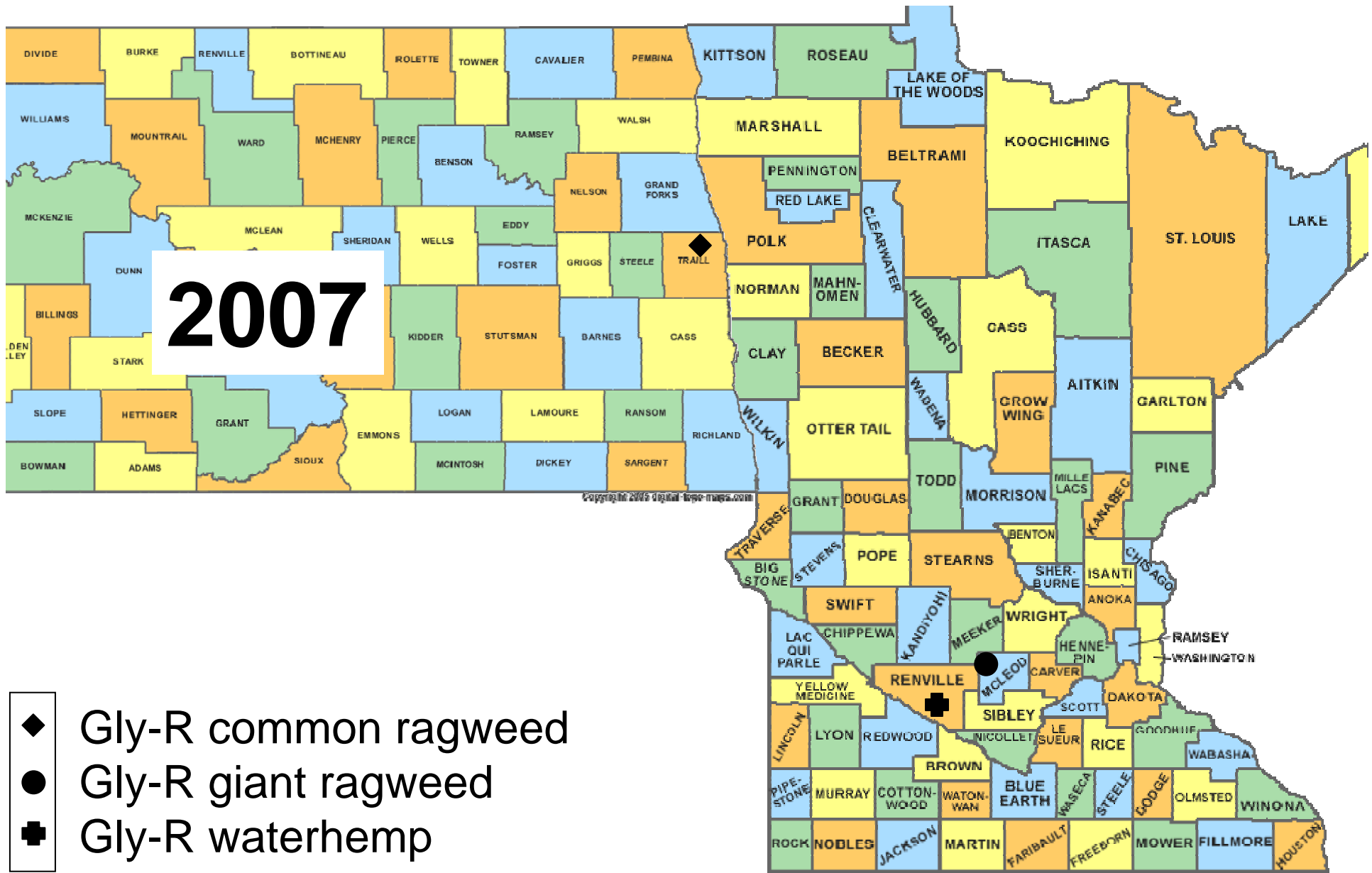
Glyphosate R Weeds

-  Horseweed (Marestail)
-  Common Ragweed
-  Palmer Amaranth
-  Common Waterhemp
-  Giant Ragweed
-  Rigid Ryegrass
-  Italian Ryegrass

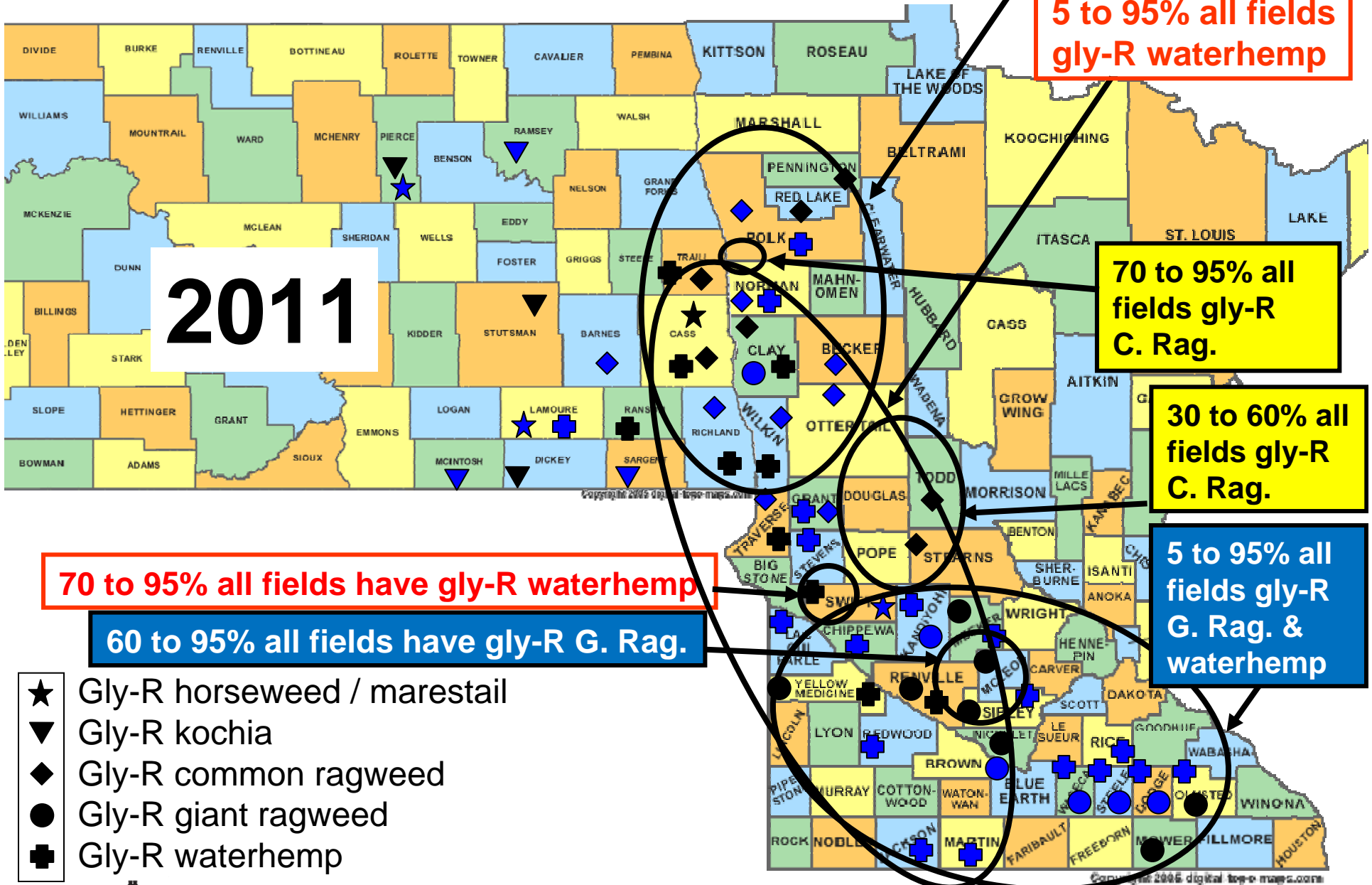
1. Common ragweed
2. Giant ragweed
3. Marestail (horseweed).
4. Waterhemp
5. Kochia

Source: I. Heap, International Survey of Herbicide Resistant Weeds, Jan. 2007, www.weedscience.org.

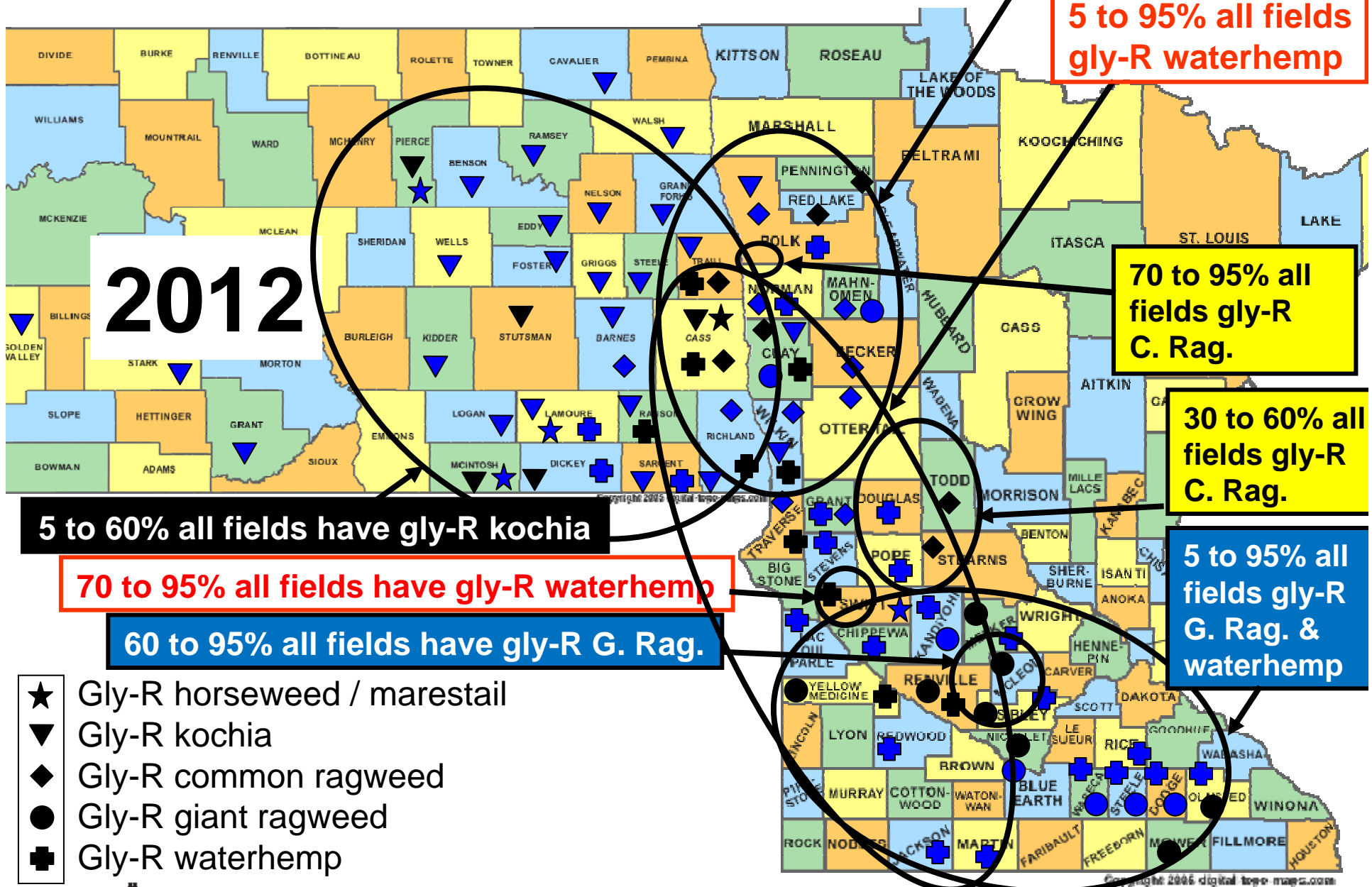
Areas and counties of ND and MN having confirmed and suspected glyphosate-resistant weeds



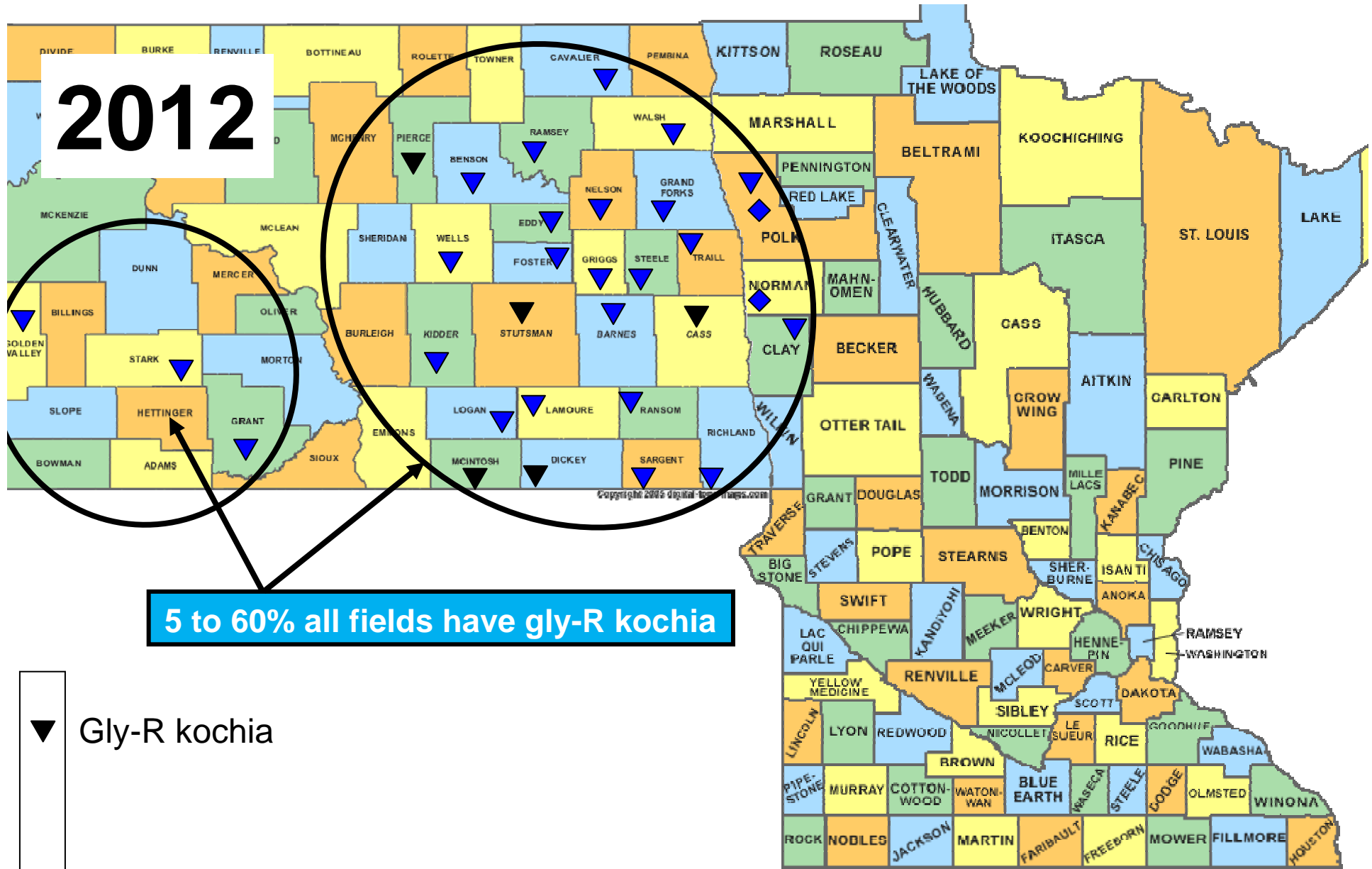
Areas and counties of ND and MN having 5 to 50% soybean fields gly-R C. Rag. confirmed and suspected glyphosate-resistant weeds



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Areas and counties of ND and MN having confirmed and suspected glyphosate-resistant weeds



Mother Nature's Revenge: Herbicide Resistant Kochia



Result

Individual prescription weed control!

- 1.5 hour office visits to develop



weed management strategies



Clearfield Plus sunflower

HERBICIDE RESISTANT SUNFLOWER

Refer to page 36 for additional herbicides to use in conventional or herbicide resistant sunflower.

Clearfield Sunflower

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
Beyond (imazamox)	4 fl oz (0.5 oz)	Annual broadleaf weeds including wild mustard and black nightshade. No ALS-resistant kochia control.	EPOST. Sunflower: 2 to 8-leaf stage. Broadleaf weeds: Less than 3 inches tall. Grass weeds: Less than 4 to 5 leaves.	Apply only to Clearfield sunflower varieties. Add NIS at 0.25% v/v + UAN at 2.5% v/v. MSO and oil adjuvants are not prohibited but may increase activity and cause temporary crop injury. Refer to label for weeds controlled, adjuvant use, and tank-mix options. A3 A5-7 E10 J4 X1 Y1-2 Y15 Pages: 106-107, 112-113
	4 to 6 fl oz (0.5 to 0.75 oz)			Apply only to Clearfield Plus sunflower varieties. Clearfield Plus sunflower has increased tolerance to imazamox that allows higher herbicide rates and use of more effective MSO adjuvants. Add MSO at 1 to 1.5 pt/A + UAN at 2.5% v/v or AMS at 12 to 15 lbs/100 gal.

Pyroxasulfone (Kumiai)

How is pyroxasulfone different than other acetanilide herbicides (Dual, Outlook)?

1. Active ingredient owned by Kumiai

2. Kumiai allow marketing to

BASF = Zidua (pyroxasulfone)

Valent = Fierce (pyroxasulfone + Valor)

FMC = Anthem (pyroxasulfone + Cadet)

NSA Research Summary

- KIH-485/pyroxasulfone
- NSA Research Timeline:
 - 2004-2005 – researchers saw selectivity
 - 2006 – NSA funded standard protocol
 - 2007 – Study repeated for validation
 - 2008 – KIH-485 + Spartan

06-07 Weed Control Summary

- Weeds controlled (80-99%):

Grasses

foxtail

crabgrass

wild oat

Jap. brome

Downy brome

Broadleaf weeds

pigweed

lambsquarters

kochia

nightshade

buckwheat

pigweed/amaranth

velvetleaf

puncture vine

Russian thistle

c. ragweed

marshelder

prostrate spurge

Pyroxasulfone Snfl Registration

Timeline made to Kumiai:

Product: Pyroxasulfone

2008 Apply for ND Minor Use Funds

2009 IR-4 residue trials

2010-11 Possible Section 18

2013 Section 18 or..... Section 3

Pyroxasulfone Snfl Registration

Dec 2011 Approved by Kumiai

Jan 2012 Apply ND Minor Use Funds

- IR-4 bid for pyrox/snfl registration = \$172k
- Requested ~100k from NDDOA
- Request rejected:
 - No matching funds

Pyroxasulfone Snfl Registration

Sept 2012 - "A" ranking IR-4 Food Use Wrkshp

"John Sandbakken walks on water"

IR-4 bid \$175,000

Matching funds:

Kumiai = \$ 45,000

Canada = \$ 30,000

Total = \$100,000

Requested: NDDOA = \$ 50,000

IR-4 = \$ 50,000

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Requested: NDDOA = \$ 50,000 (\$20,000)

IR-4 = \$ 50,000

Pyroxasulfone on Sunflower, 2011, Horace and Buffalo, ND

NDSU graduate student: Justin Mack

Treatments:

<u>Pyrox (PRE)</u>	fb	<u>Beyond</u>
100, 200, 400 g/ha		4 fl oz/A

<u>Pyrox (PRE)</u>	fb	<u>Pyrox (POST)</u>	+	<u>Beyond</u>
100		200, 400 g/ha		4 fl oz/A
200		200, 400 g/ha		4 fl oz/A
400 g/ha		100, 200, 400 g/ha		4 fl oz/A

Results:

Pyroxasulfone on Sunflower, 2011, Horace and Buffalo, ND

Treatments:

<u>Pyrox (PRE)</u>	fb	<u>Beyond</u>
100, 200, 400 g/ha		4 fl oz/A

<u>Pyrox (PRE)</u>	fb	<u>Pyrox (POST)</u>	+	<u>Beyond</u>
100		200, 400 g/ha		4 fl oz/A
200		200, 400 g/ha		4 fl oz/A
400 g/ha		100, 200, 400 g/ha		4 fl oz/A

Results:

All PRE =

Snfl injury

0%

PRE fb POST =

7 DAT

14 DAT

28 DAT

16-41%

0-5%

0% injury

Plant height =

N/A

Delay flowering =

N/A

Yield =

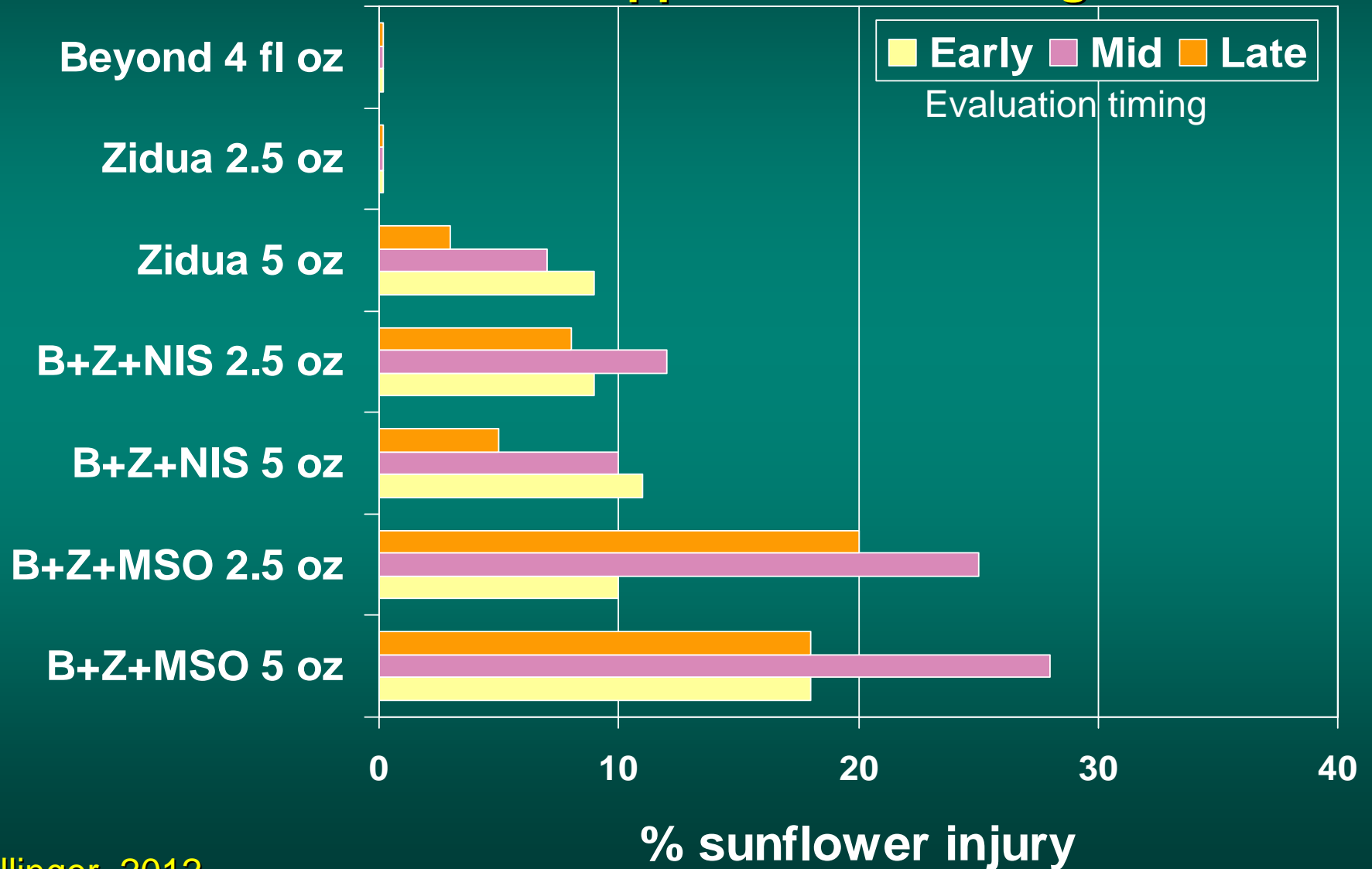
N/A

2012 NSA Funded Research

- Regional Sunflower Herbicide Study
 - Mike Moechnig SDSU, Brookings, SD
 - Curtis Thompson KSU, Garden City, KS
 - Phil Stahlman KSU, Hayes, KS
 - Brian Jenks NDSU, Minot, ND
 - Rich Zollinger NDSU, Fargo

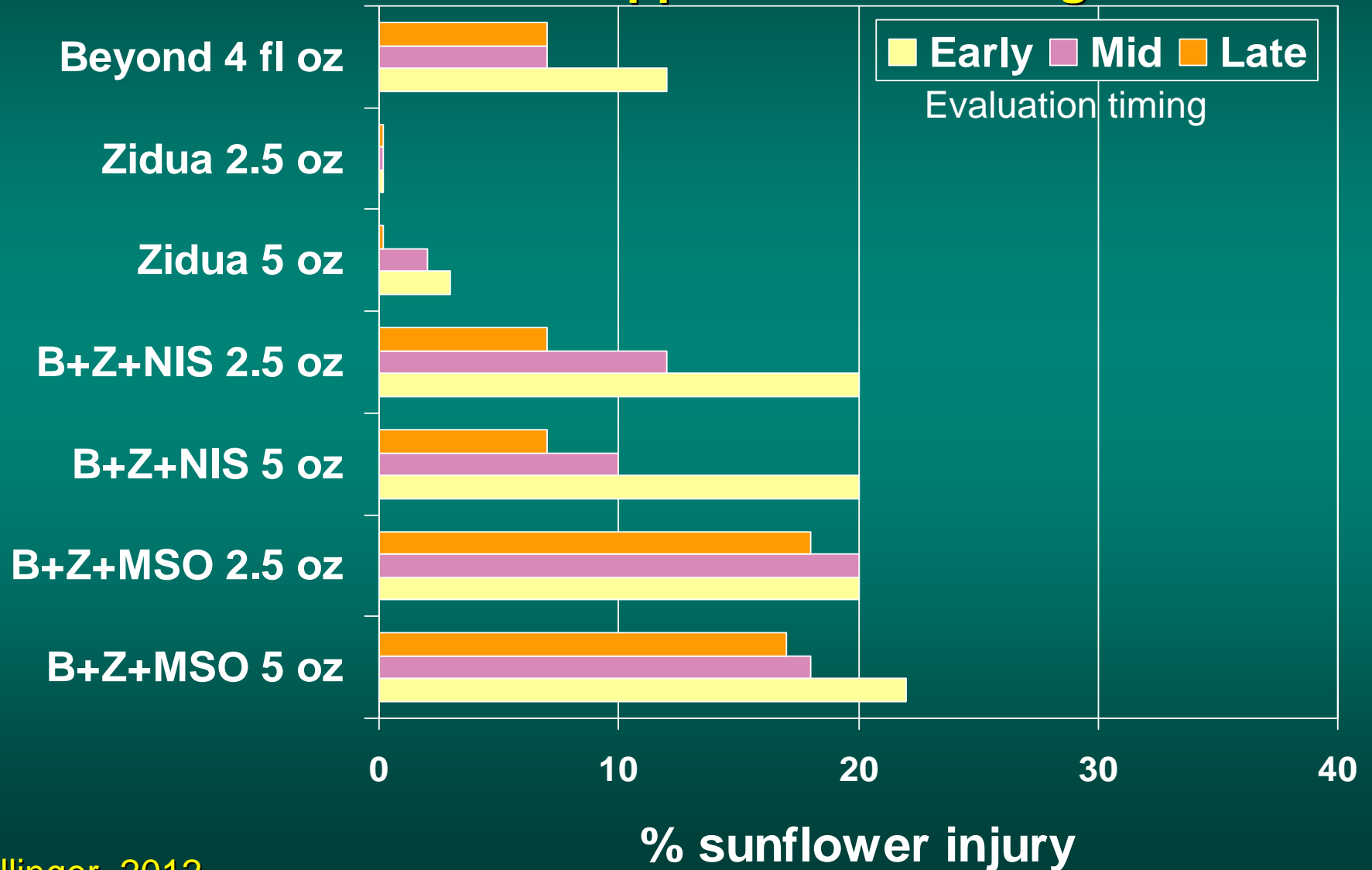
Sunflower injury - Valley City, ND

Applied at 2-leaf stage



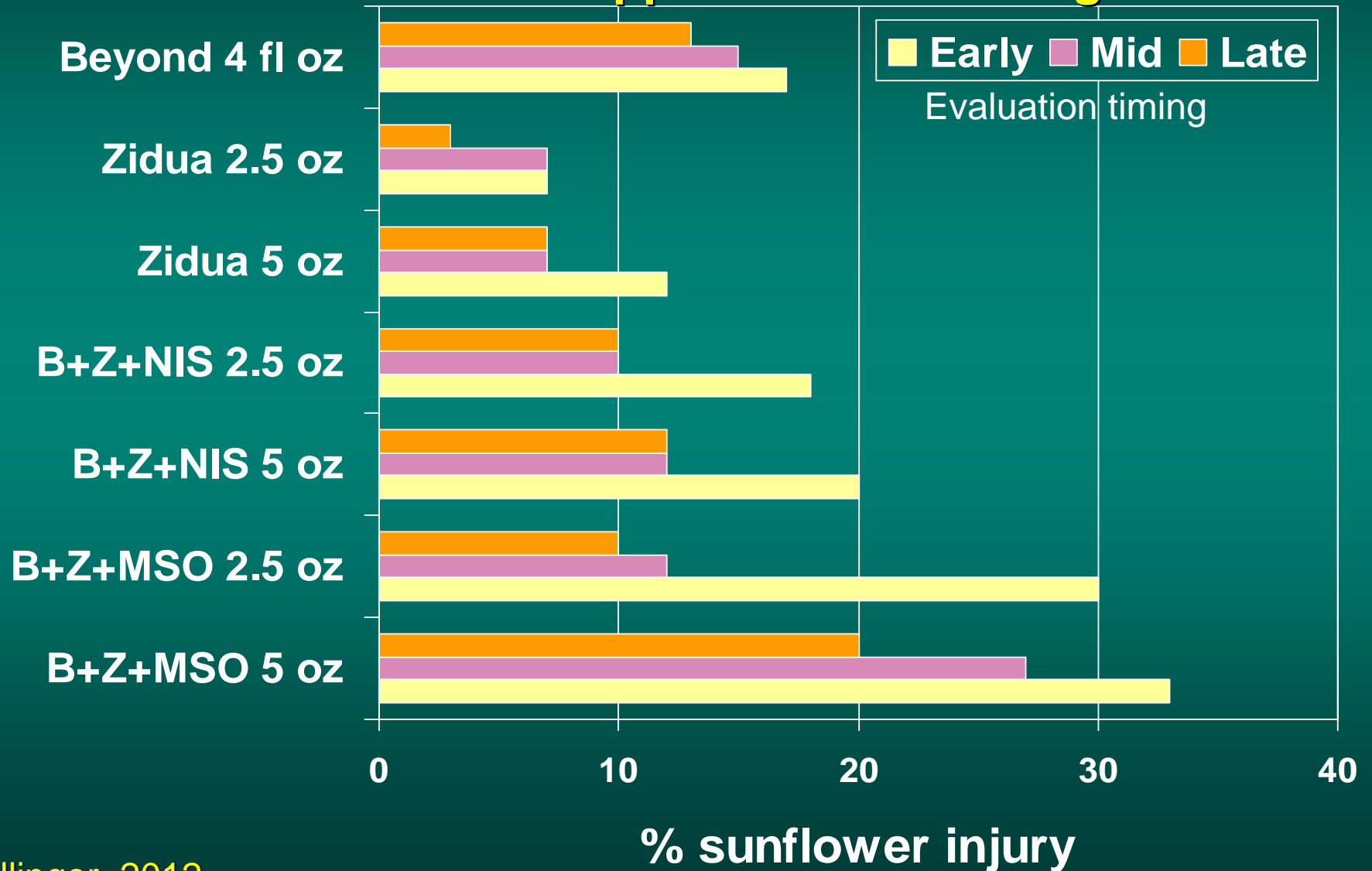
Sunflower injury - Valley City, ND

Applied at 6-leaf stage



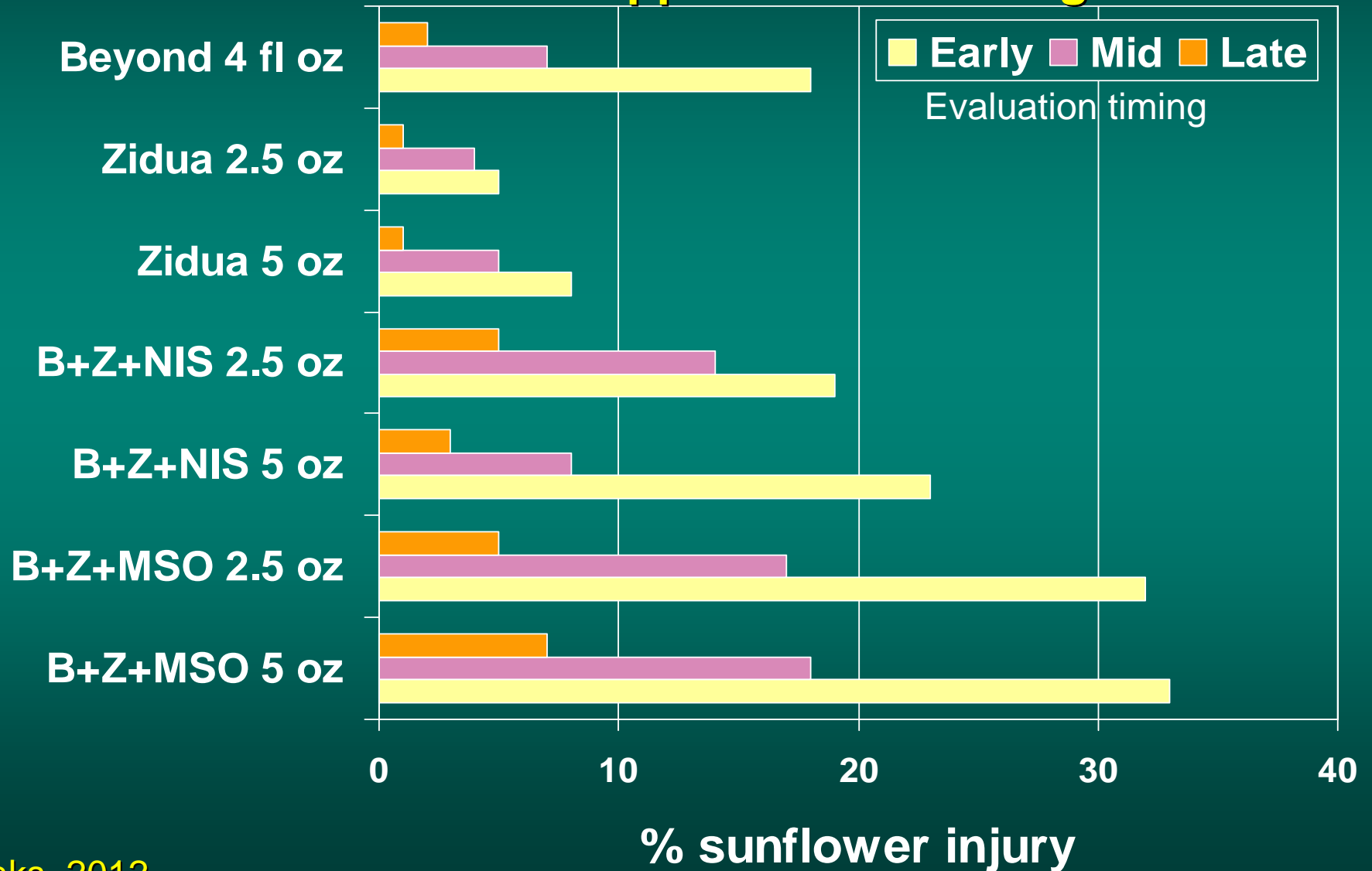
Sunflower injury - Valley City, ND

Applied at 10-leaf stage



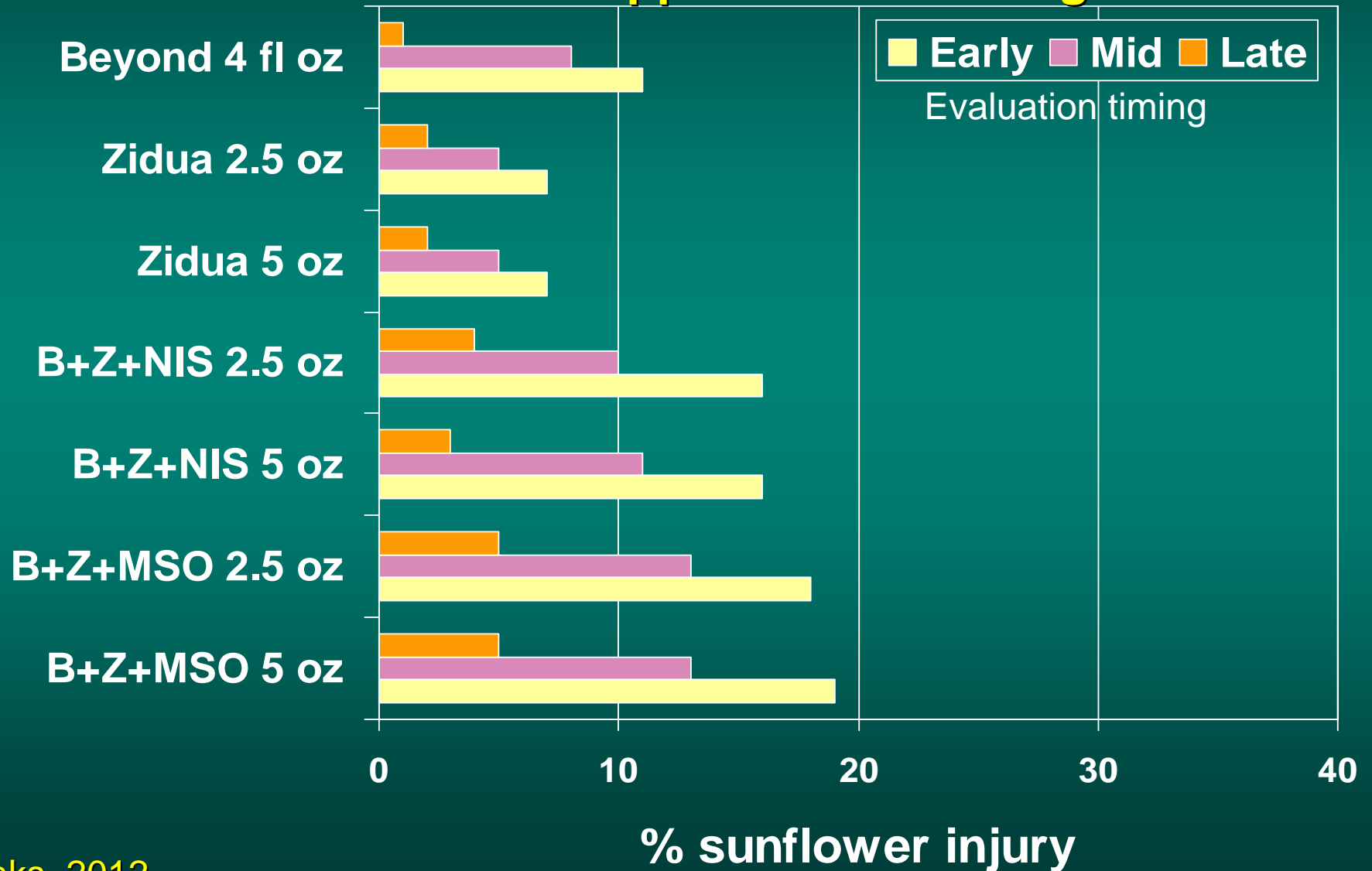
Sunflower injury – Minot, ND

Applied at 2-leaf stage



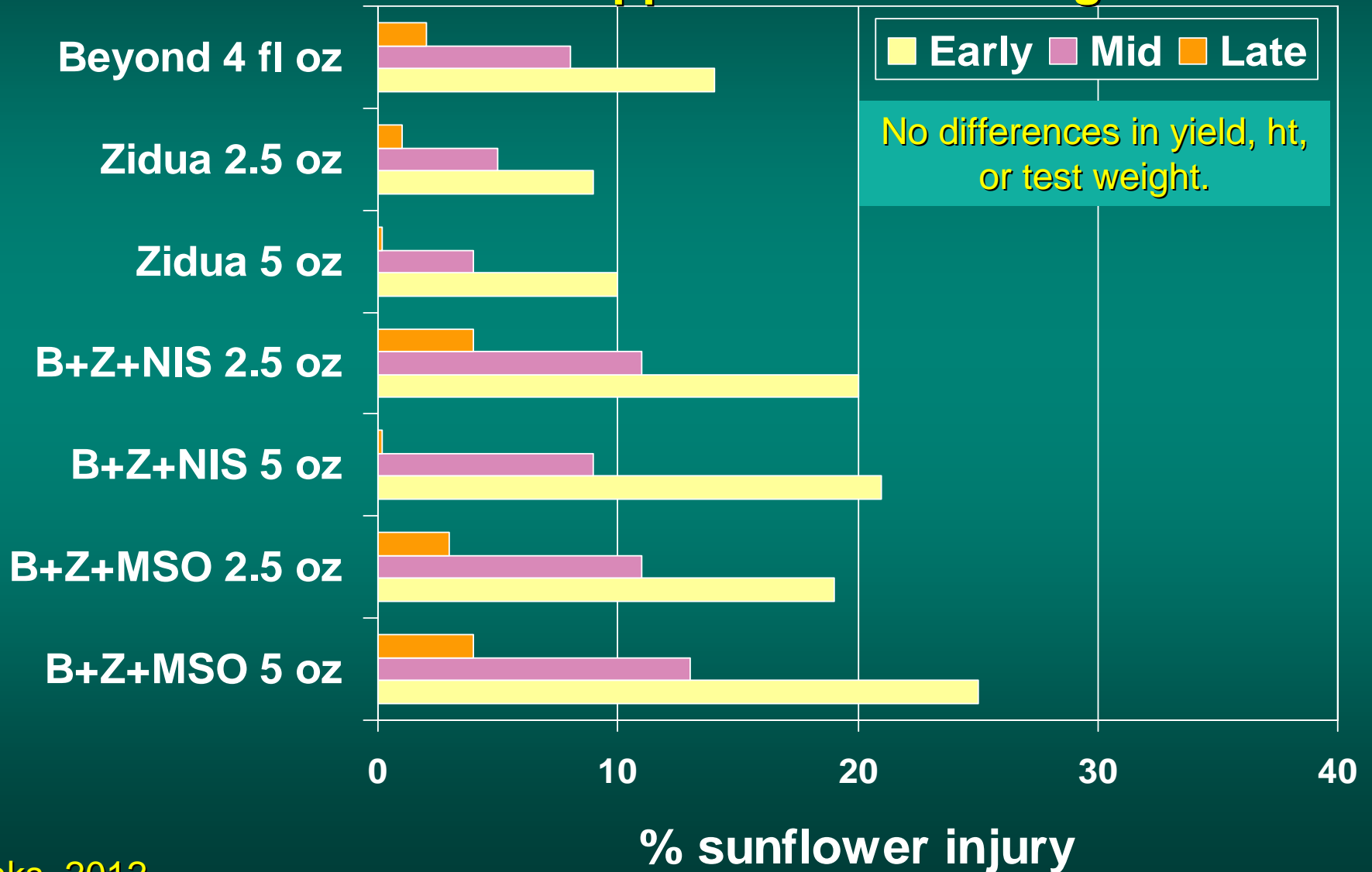
Sunflower injury – Minot, ND

Applied at 6-leaf stage



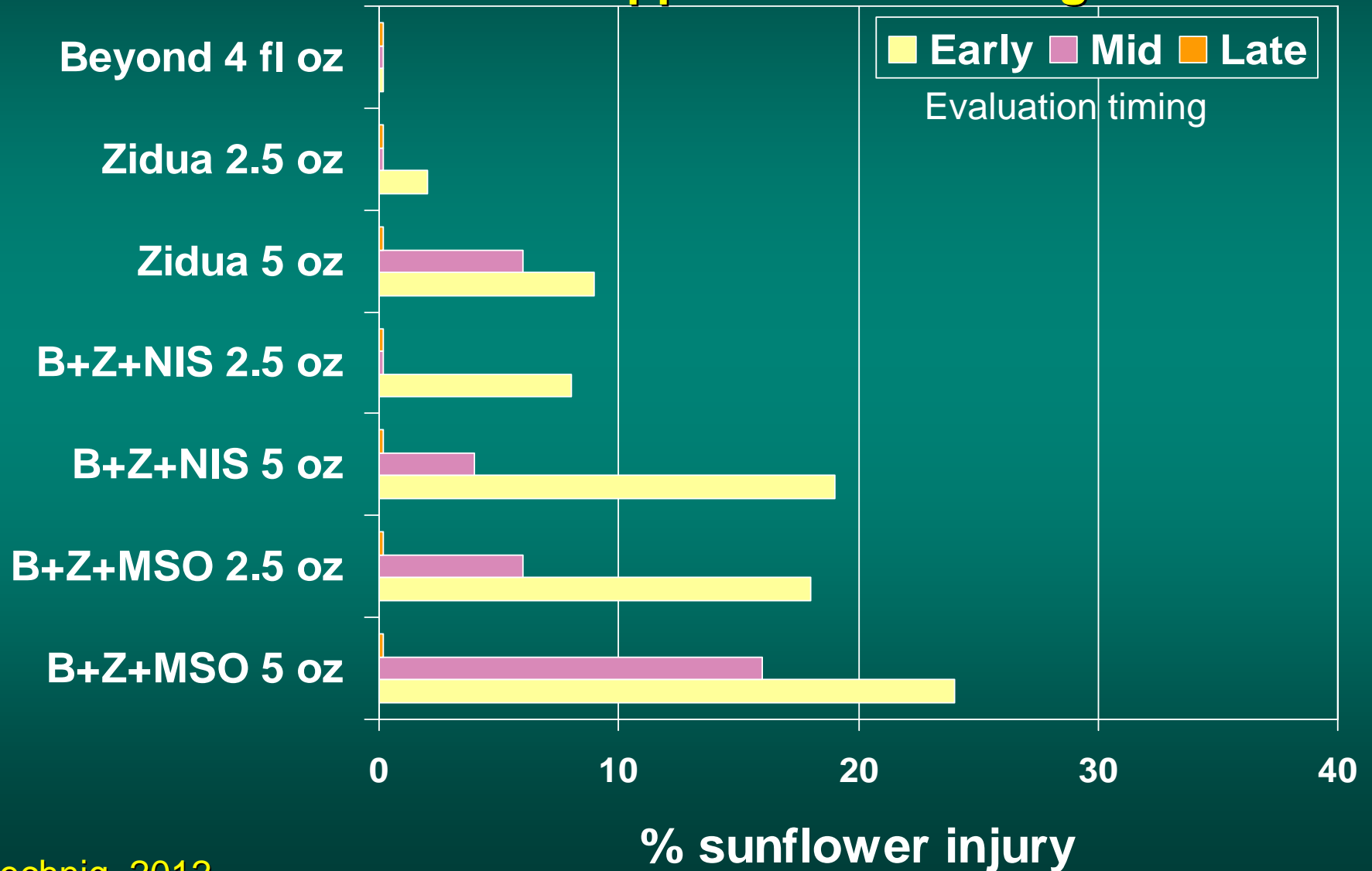
Sunflower injury – Minot, ND

Applied at 10-leaf stage



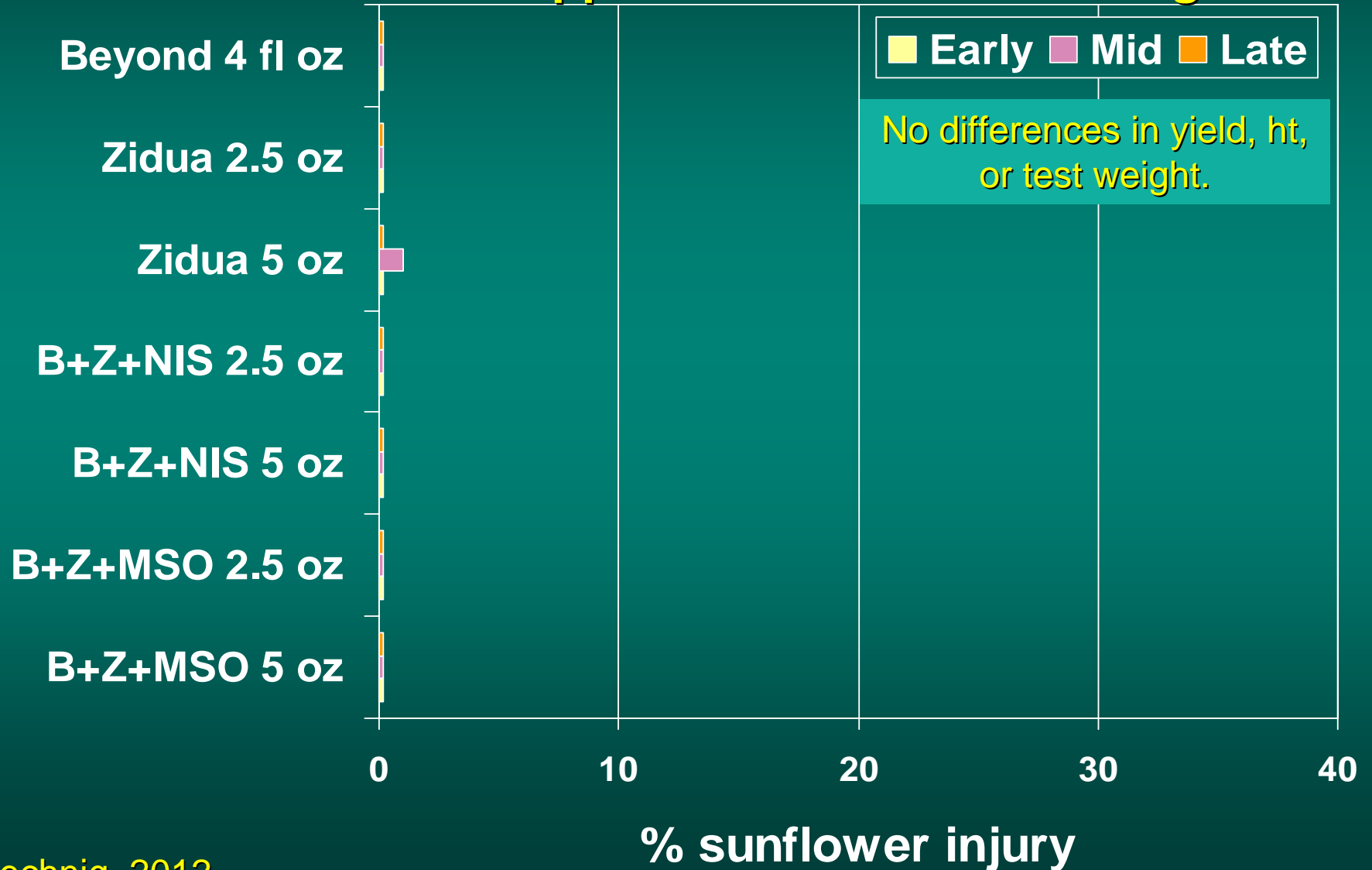
Sunflower injury – Brookings, SD

Applied at 2-leaf stage



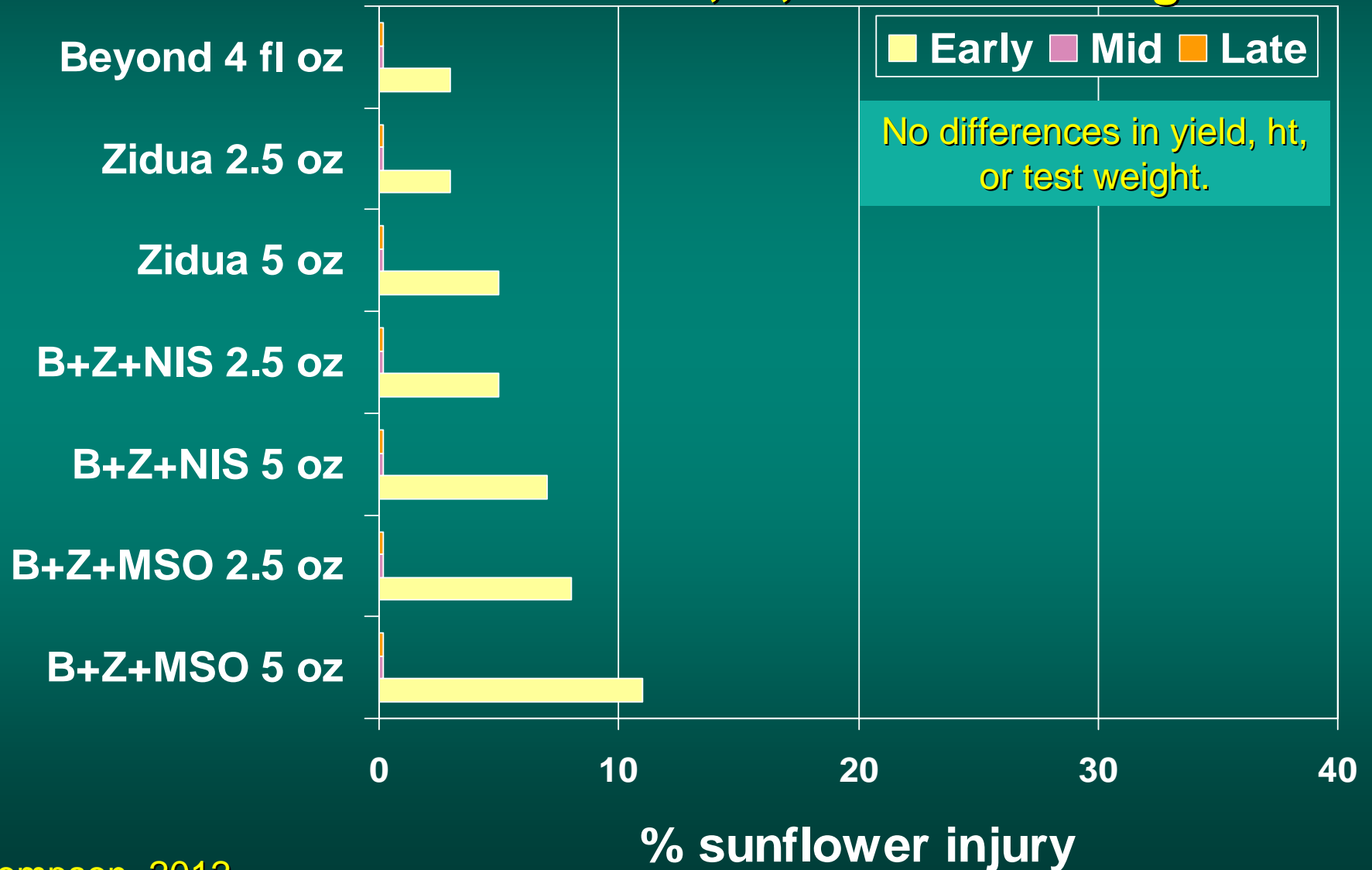
Sunflower injury – Brookings, SD

Applied at 6- and 10-leaf stage



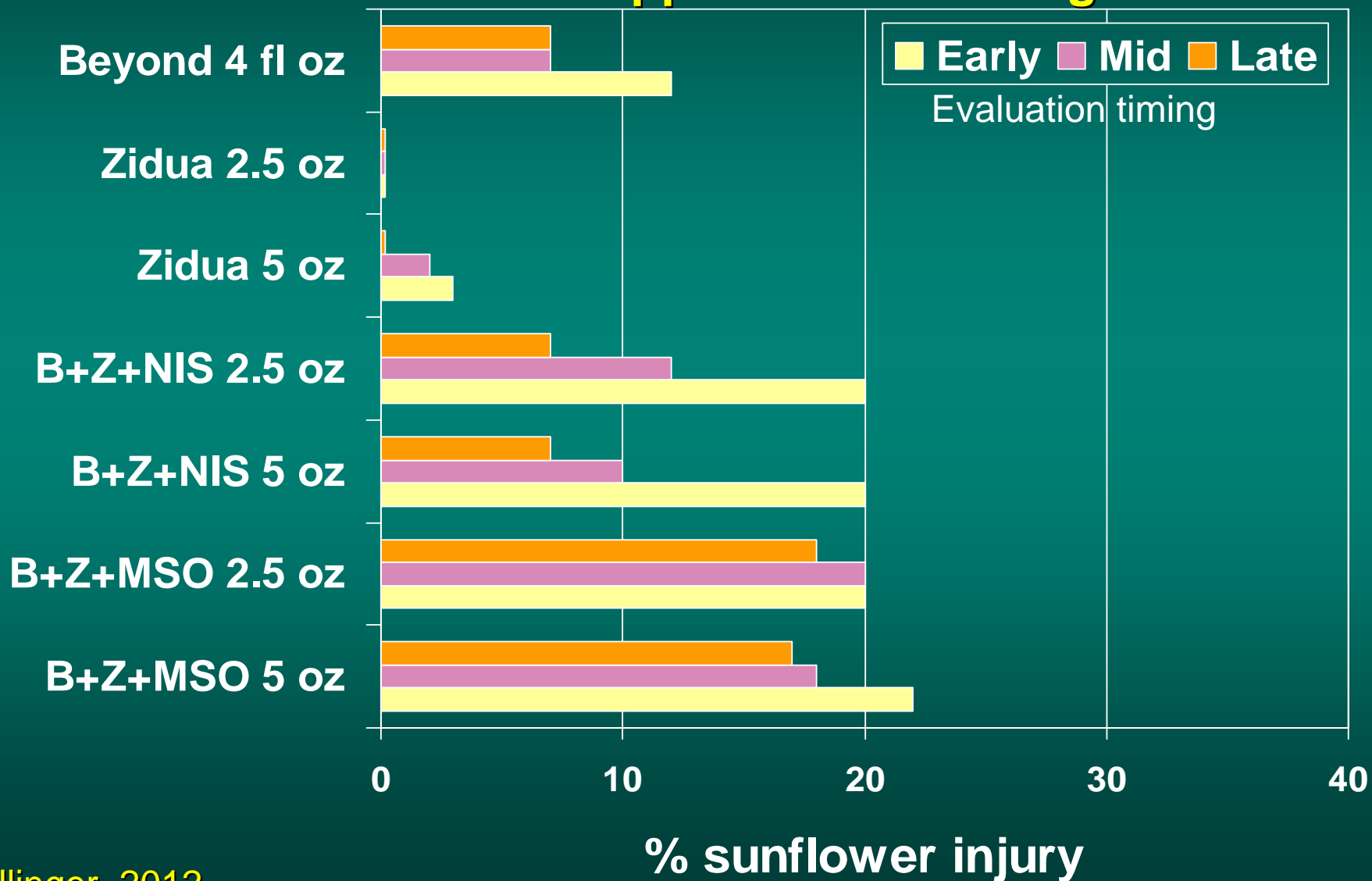
Sunflower injury – Manhattan, KS

Ave of 2-, 6-, and 10-leaf stage



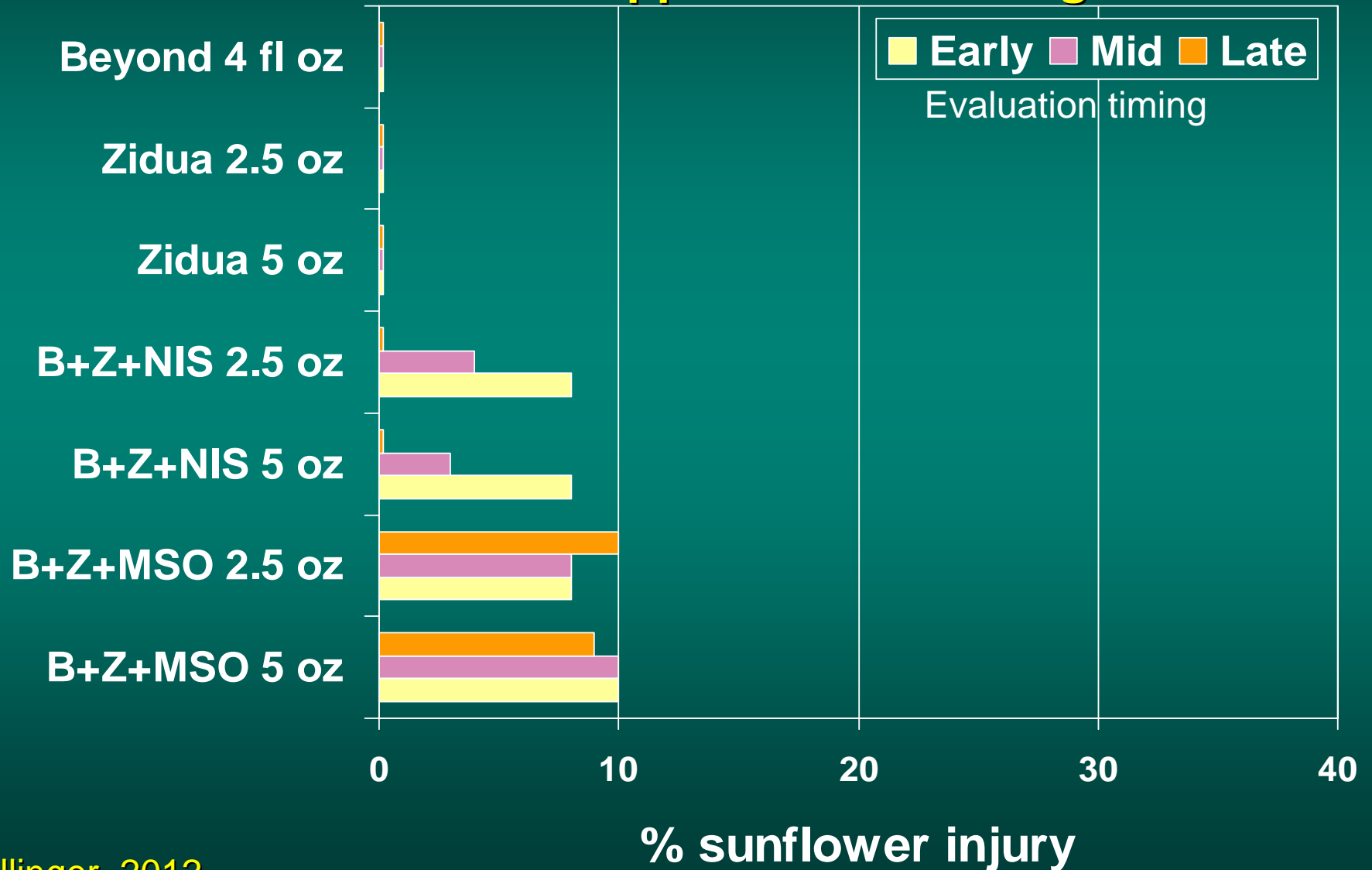
Sunflower injury - Valley City, ND

Applied at 6-leaf stage



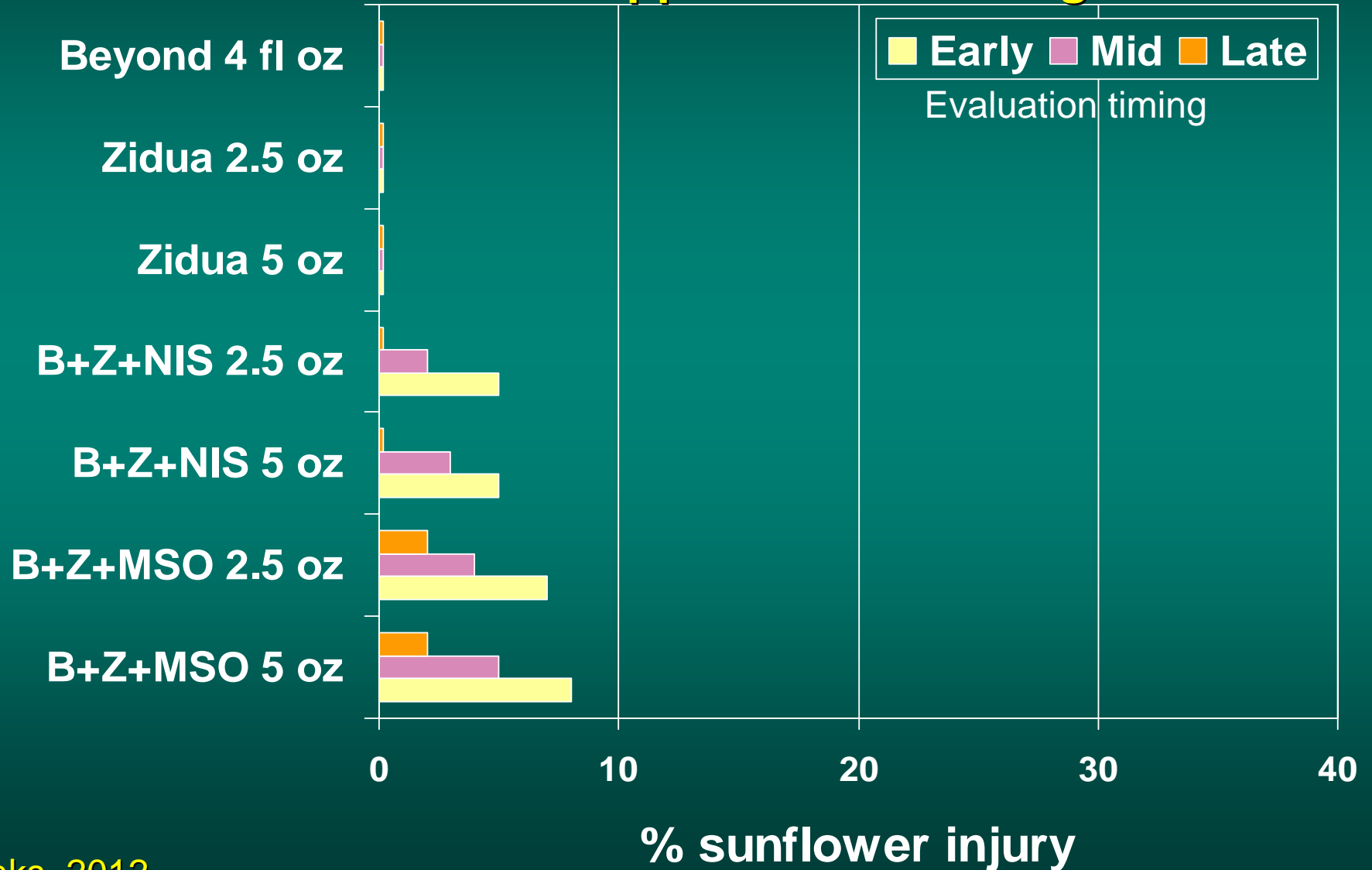
Sunflower injury - Valley City, ND

Applied at 6-leaf stage



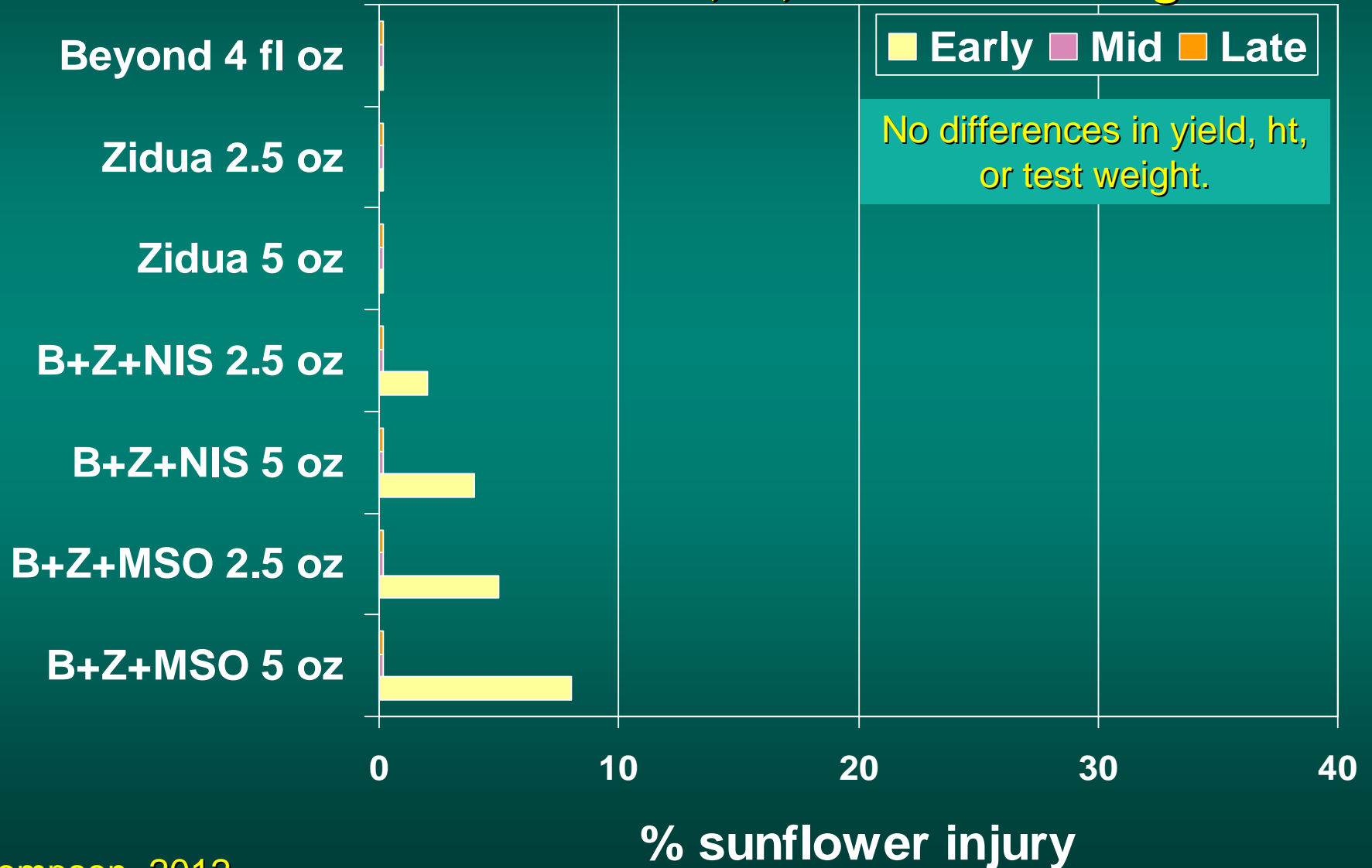
Sunflower injury – Minot, ND

Applied at 6-leaf stage



Sunflower injury – Manhattan, KS

Ave of 2-, 6-, and 10-leaf stage



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1. Clearfield Plus sunflower 😊

2. IR-4 pyroxasulfone/snfl registration 😊

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Area
C7

beef hot dog

50¢

IKEA FOOD

Not actual size



WINNING AT DISAPPOINTMENT