



Use of Topramezone and Liberty[®] ULTRA in the Axant[™] Flex Cotton System

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Objectives

1. Examine season-long weed control using topramezone + Liberty ULTRA as part of an overall weed management system
2. Examine weed management and crop response following topramezone and Liberty ULTRA tank mixes using different spray adjuvants
3. Examine the influence of the addition of PSII inhibitors to topramezone on weed control
4. Examine topramezone + Liberty ULTRA tank mixes when applied to different weed sizes
5. Examine crop response following topramezone + Liberty ULTRA applied in different tank mix combinations, including insecticides and other herbicides
6. Examine weed management and crop response following topramezone + Liberty Ultra applied in different sequential order
7. Examine the influence of relative humidity on weed control before, at, and after applications of topramezone and Liberty ULTRA

The Problem



New Technologies

Axant™ Flex

Herbicide Tolerance Technology



We create chemistry

Glufosinate-P-Ammonium Group 10 Herbicide

SPECIMEN

Liberty® ULTRA

Herbicide – Powered by **Glu-L™** Technology

Liberty® ULTRA herbicide – Powered by Glu-L™ Technology is a nonselective herbicide that provides control of a broad spectrum of broadleaf and grassy weeds in LibertyLink or glufosinate-resistant crops.

Active Ingredient:

Glufosinate-P-Ammonium* 18.7%**

Other Ingredients: 81.3%

Total: 100.0%

* CAS Number 73777-50-1

** Equivalent to 1.76 pounds of active ingredient per U.S. gallon; equivalent to 1.61 pounds per U.S. gallon acid equivalent, as glufosinate-P.

EPA Reg. No. 7969-500

EPA Est. No.

KEEP OUT OF REACH OF CHILDREN

DANGER/PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

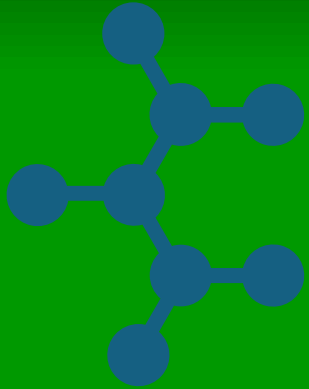
See full label for complete **First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty**, and state-specific crop and/or use site restrictions.

In case of an emergency endangering life or property involving this product, call day or night 1-800-832-HELP (4357).

Liberty[®] ULTRA Herbicide

**Racemic Glufosinate
Liberty Herbicide
Today**

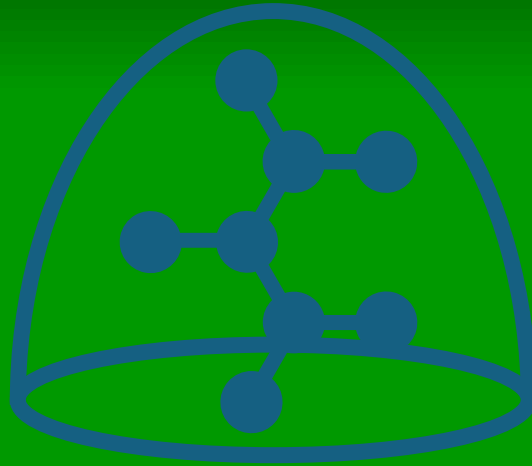
D-isomer



**Liberty 280
SL
Interline
Surmise 5**



**Glu-L
Technology**

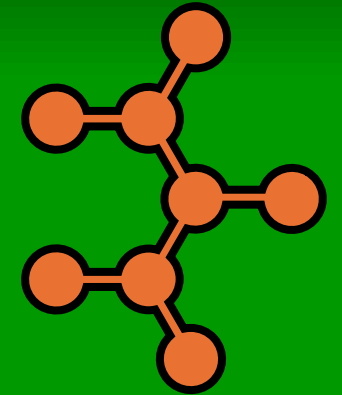
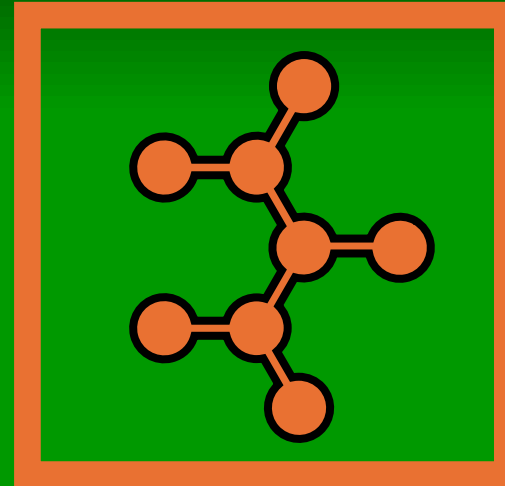


**Glu-L Technology isolates the D-
isomer and transforms it into
herbicidally active L-isomer**



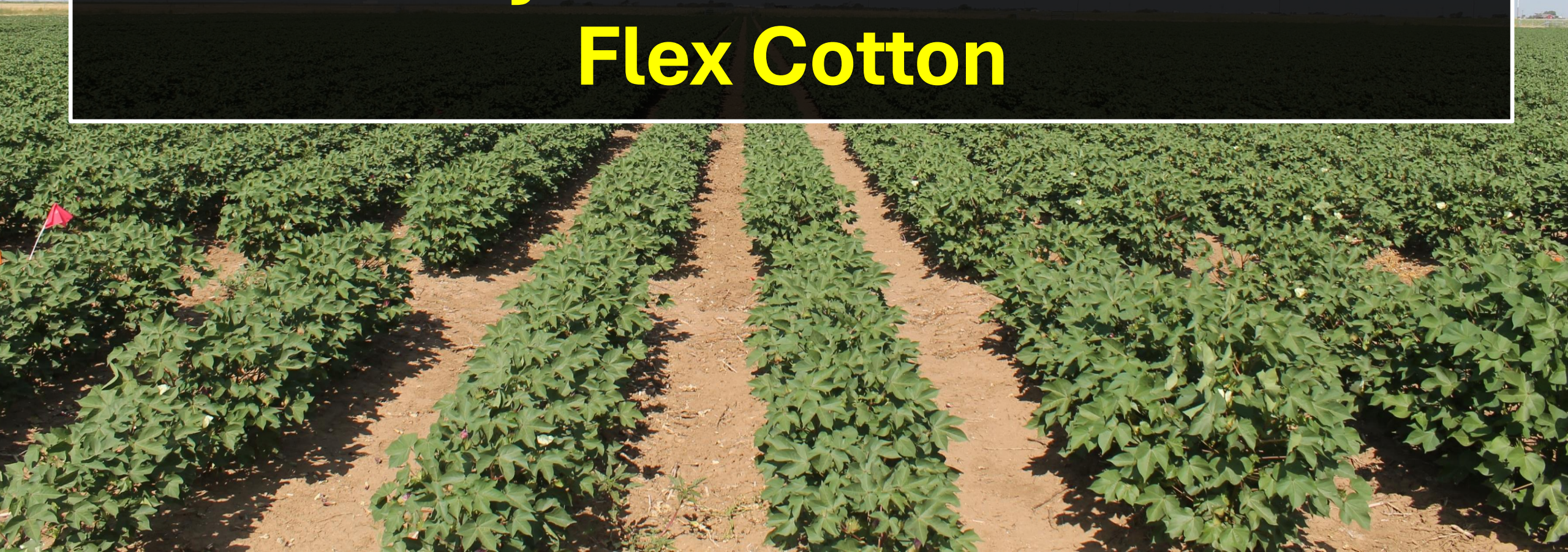
L-Glufosinate

Active
L-isomer



**Liberty
ULTRA**

**Evaluation of Different Herbicide
Programs Incorporating Topramezone
and Liberty® ULTRA POST in Axant™
Flex Cotton**



Herbicide Treatments

PRE Treatments (A)

- Axant ISO at 3 fl oz/a
- Cotoran at 32 fl oz/a
- Warrant at 48 fl oz/a
- Axant ISO at 3 fl oz/a + Cotoran at 32 fl oz/a
- Brake at 16 fl oz/a + Cotoran at 32 fl oz/a

EPOST Treatments (B)

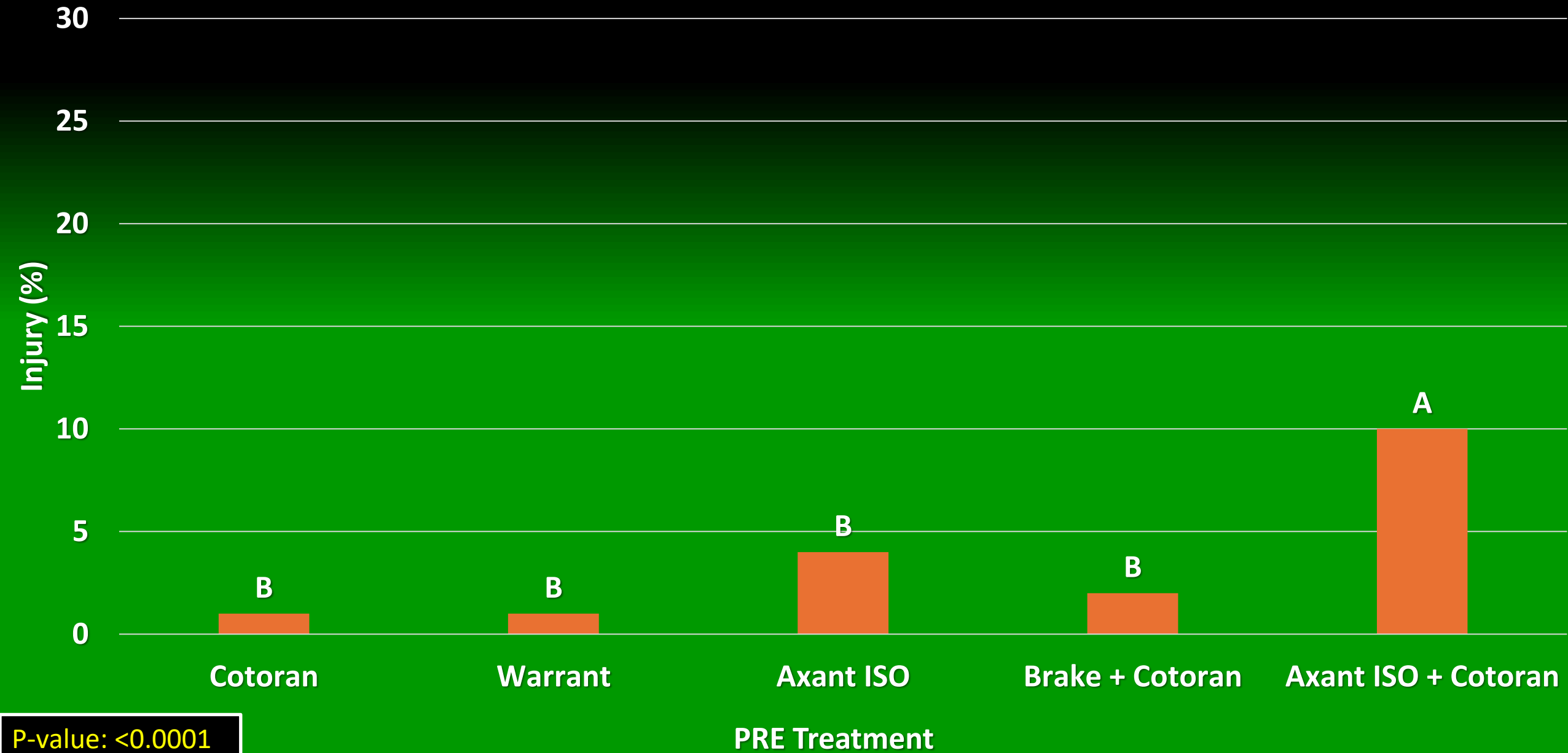
- Topramezone at 1 fl oz/a
- Liberty ULTRA at 29 fl oz/a
- Topramezone at 1 fl oz/a + Liberty ULTRA at 29 fl oz/a

LPOST Treatments (C)

- Roundup Powermax 3 at 30 fl oz/a + Liberty ULTRA @ 29 fl oz/a

- All postemergence treatments contained AMS at 17.4 lb/100 gal
- topramezone treatments included COC @ 1% v/v

Cotton Injury at EPOST (B)



Palmer amaranth Control at EPOST (B)



Palmer amaranth Control at EPOST (B)



Palmer amaranth Control at EPOST (B)



Warrant



Axant ISO

Palmer amaranth Control at EPOST (B)



Axant ISO



Axant ISO + Cotoran

Palmer amaranth Control at EPOST (B)

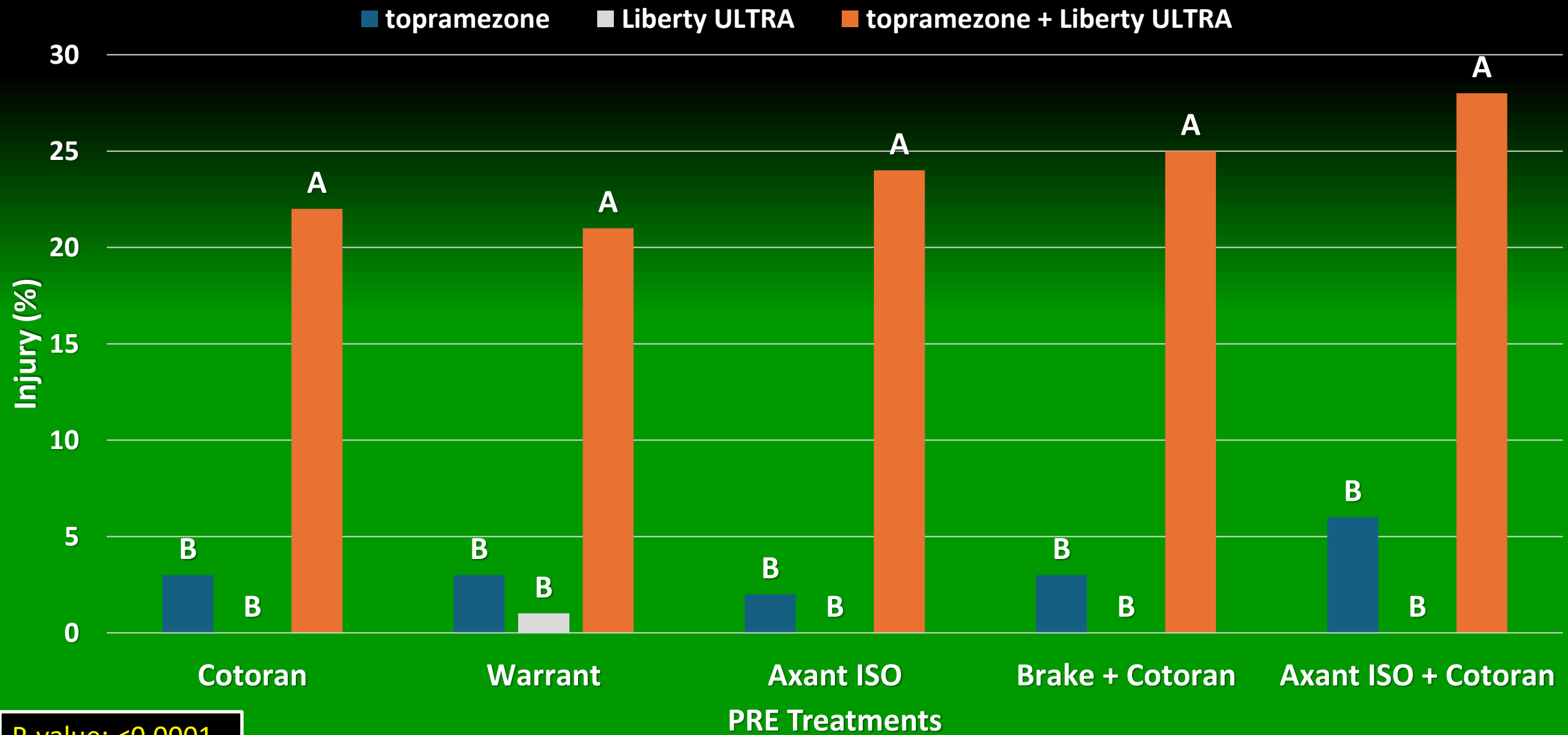


Brake + Cotoran



Axant ISO + Cotoran

Cotton Injury 14 DAB



Cotton Injury 14 DAB



Nontreated



Axant ISO + Cotoran fb TOP

Cotton Injury 14 DAB



Nontreated

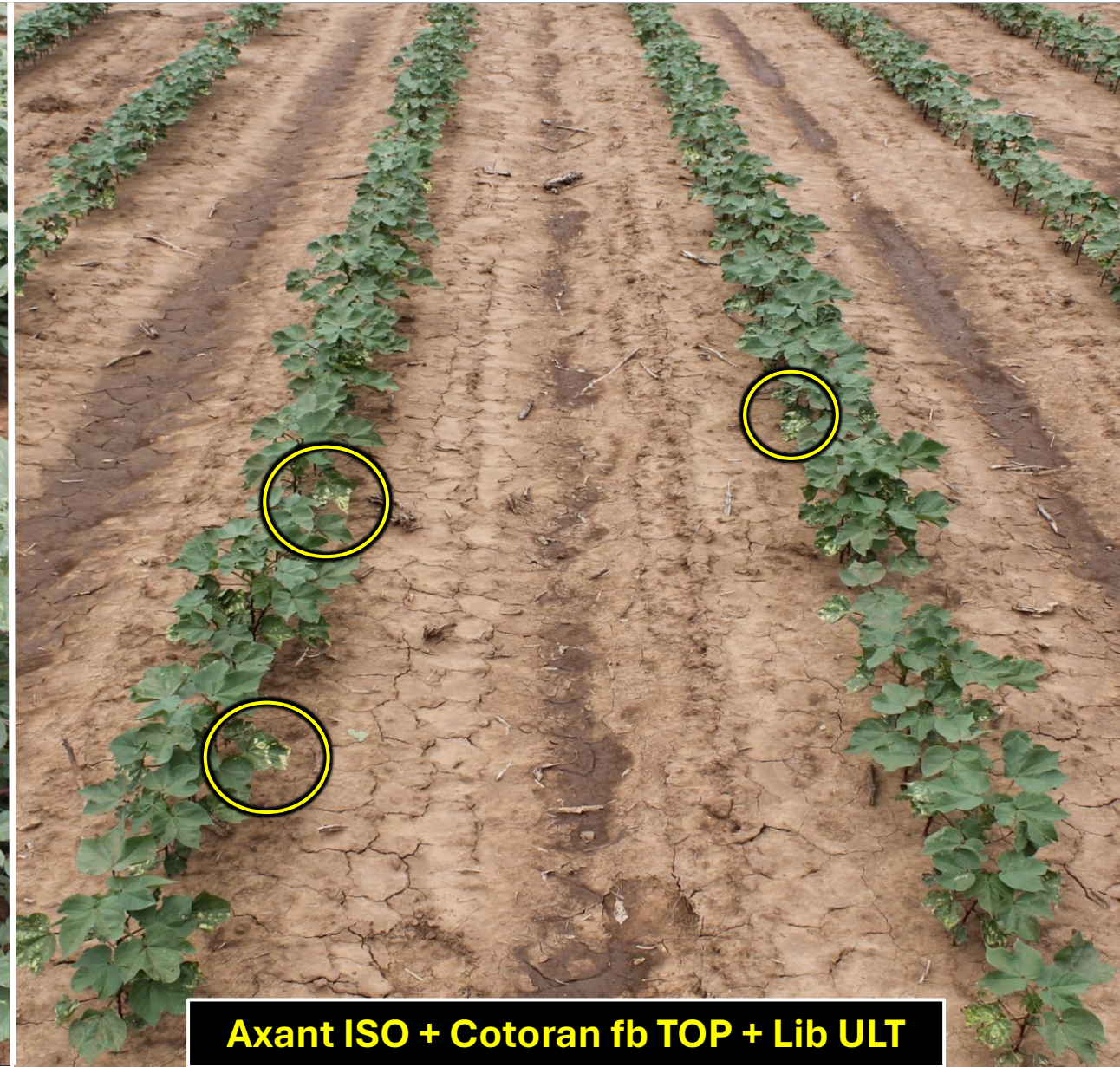


Axant ISO + Cotoran fb Lib ULT

Cotton Injury 14 DAB

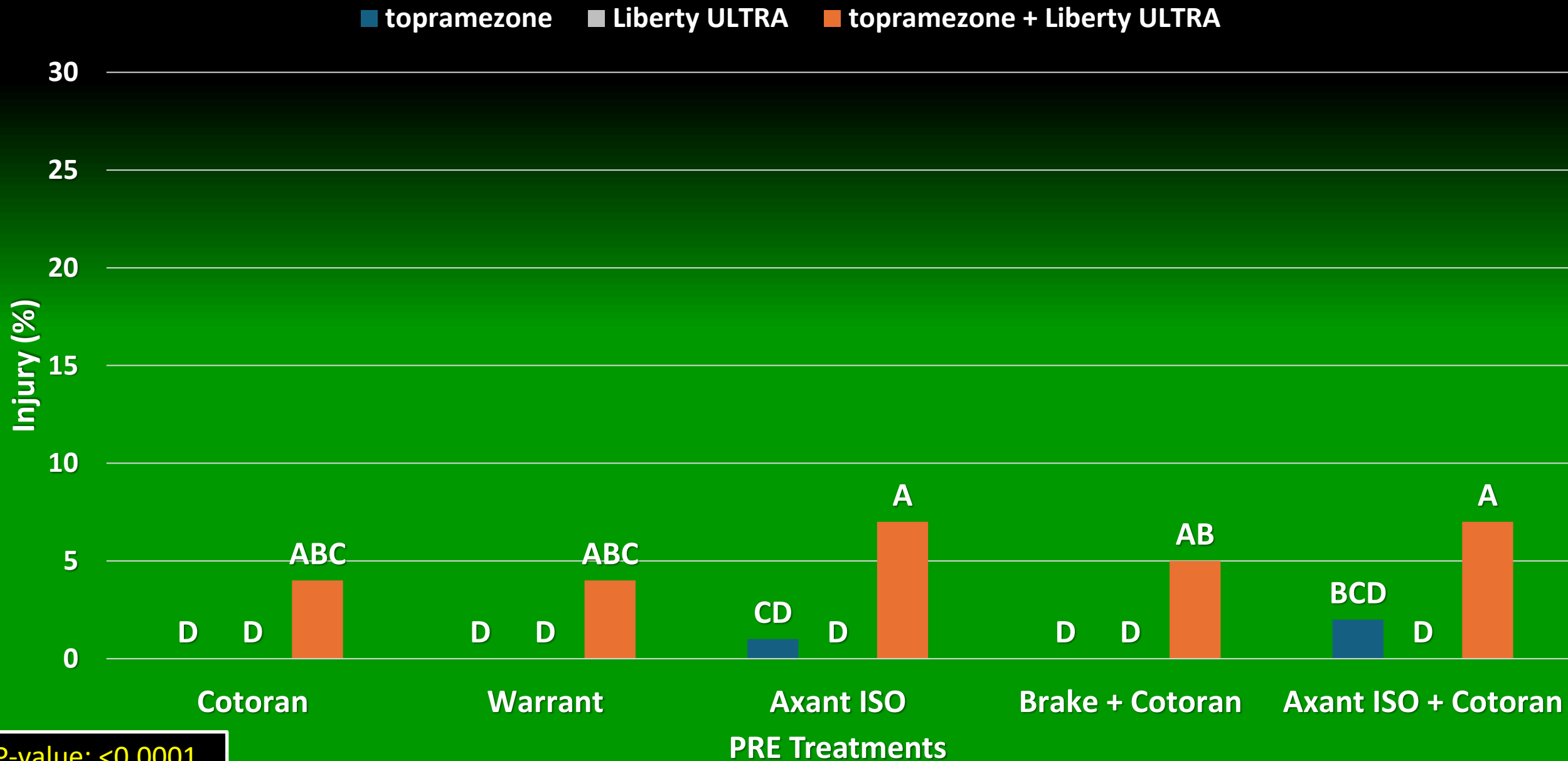


Nontreated



Axant ISO + Cotoran fb TOP + Lib ULT

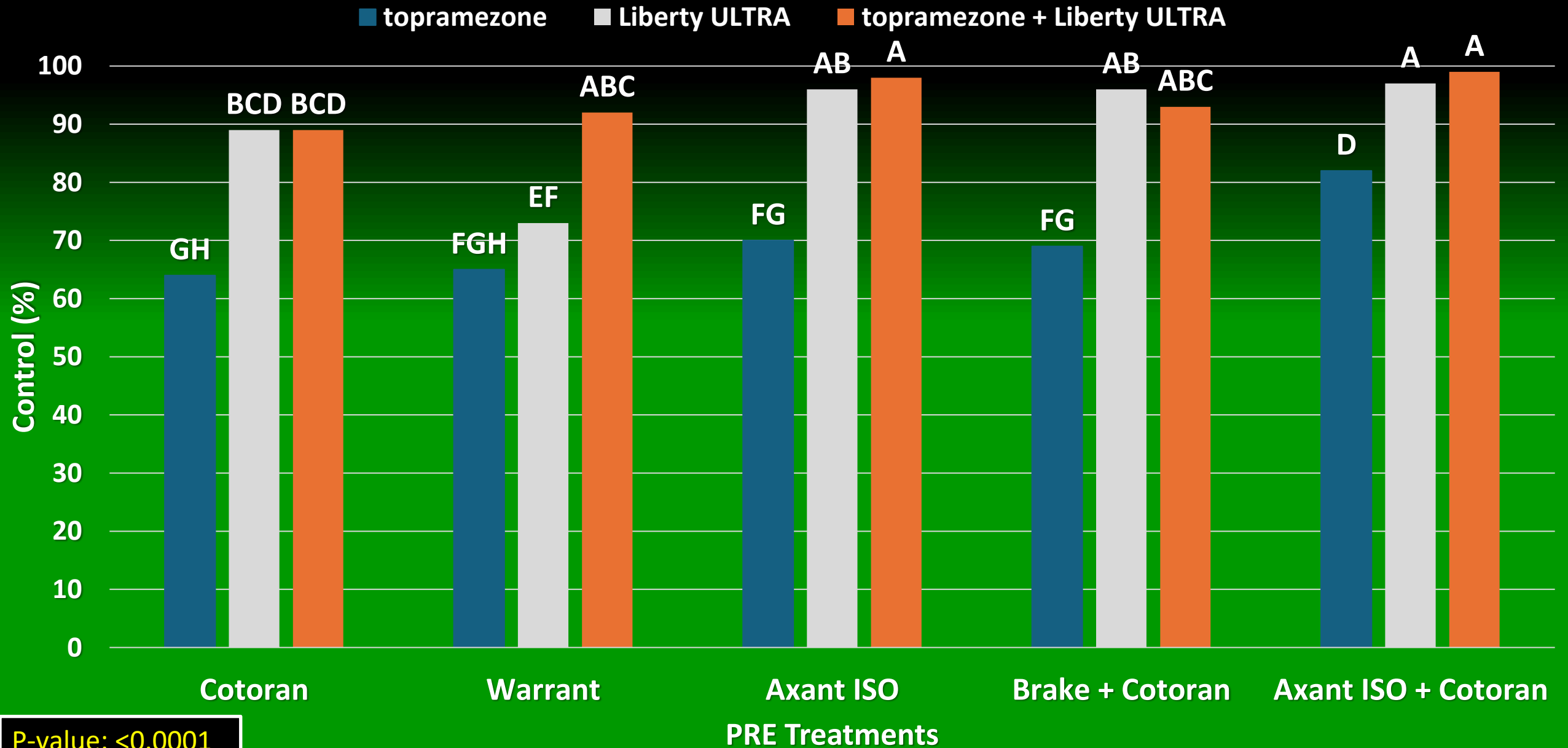
Cotton Injury 28 DAB



Cotton Injury 28 DAB



Palmer amaranth Control 14 DAB



Palmer amaranth Control 14 DAB



Nontreated



Axant ISO + Cotoran fb TOP

Palmer amaranth Control 14 DAB



Nontreated



Axant ISO + Cotoran fb Lib ULT

Palmer amaranth Control 14 DAB

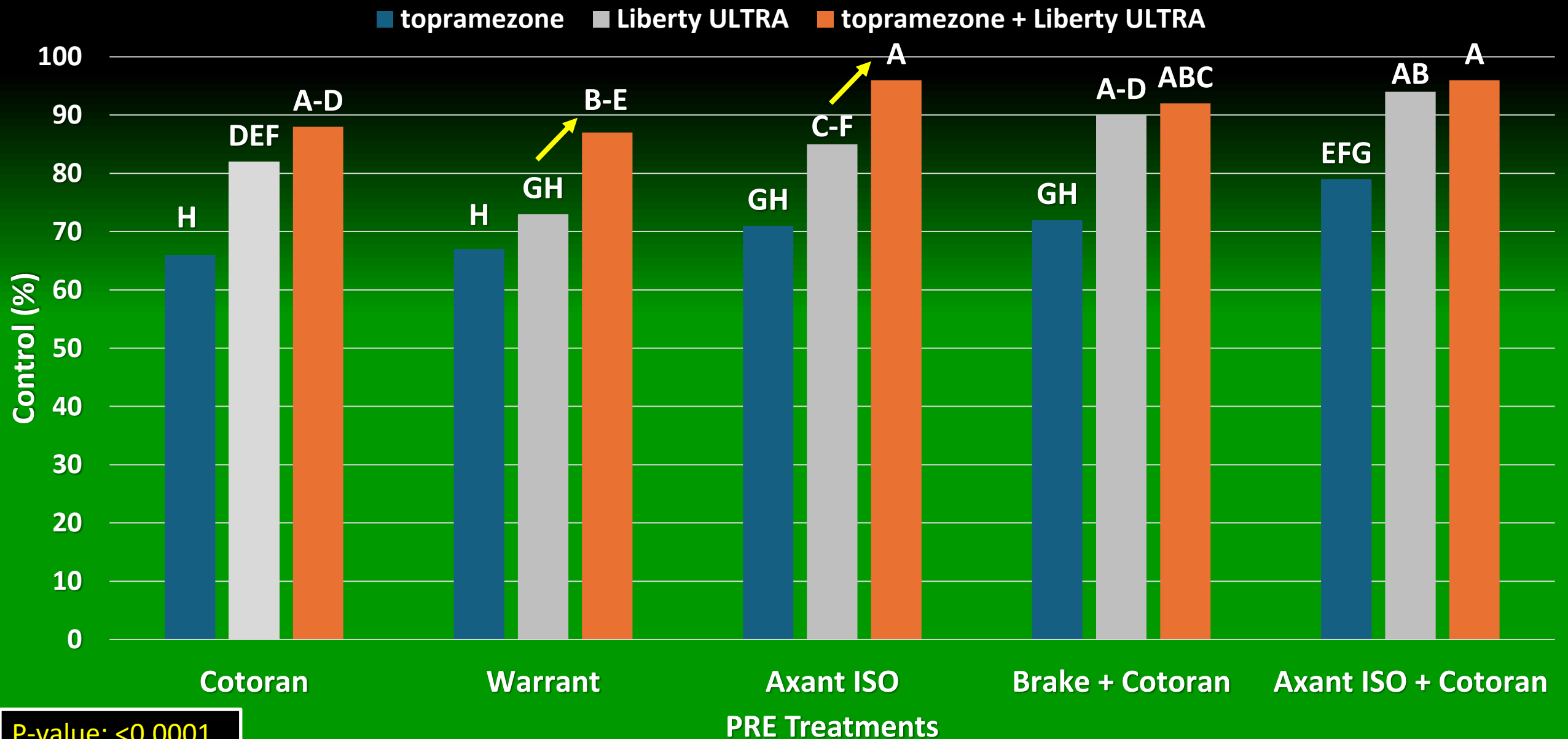


Nontreated



Axant ISO + Cotoran fb TOP + Lib ULT

Palmer amaranth Control 28 DAB



Palmer amaranth Control 28 DAB



Nontreated



Warrant fb topramezone

Palmer amaranth Control 28 DAB



Nontreated



Warrant fb Liberty ULTRA

Palmer amaranth Control 28 DAB



Nontreated



Warrant fb topramezone + Liberty ULTRA

Palmer amaranth Control 28 DAB



Axant ISO + Cotoran fb topramezone



Warrant fb topramezone

Palmer amaranth Control 28 DAB



Axant ISO + Cotoran fb Liberty ULTRA



Warrant fb Liberty ULTRA

Palmer amaranth Control 28 DAB



Axant ISO + Cotoran fb topramezone + Liberty ULTRA



Warrant fb topramezone + Liberty ULTRA

Key Takeaways

- **Axant ISO + Cotoran** provided the greatest Palmer amaranth control; however, elicited the greatest crop injury at the EPOST (B) timing.
 - Axant ISO was the best single AI treatment
- The combination of topramezone + Liberty ULTRA was the most injurious treatment regardless of PRE 14 days after B application.
 - **Injury was not exceeding 10% by 28 days after B application**
- Liberty ULTRA performed well in 2024
- The addition of topramezone increased Palmer amaranth control in 1 herbicide program 14 days after B
 - Increased control in 2 programs 28 days after B
- **Starting clean with a highly effective PRE should be the cornerstone of all herbicide programs**
- **Integrating multiple sites of action into herbicide programs to slow the evolution of herbicide resistant weeds**

Influence of Adjuvants with Topramezone and Liberty ULTRA on Axant™ Flex Cotton Response



Herbicide Treatments

Treatments Evaluated

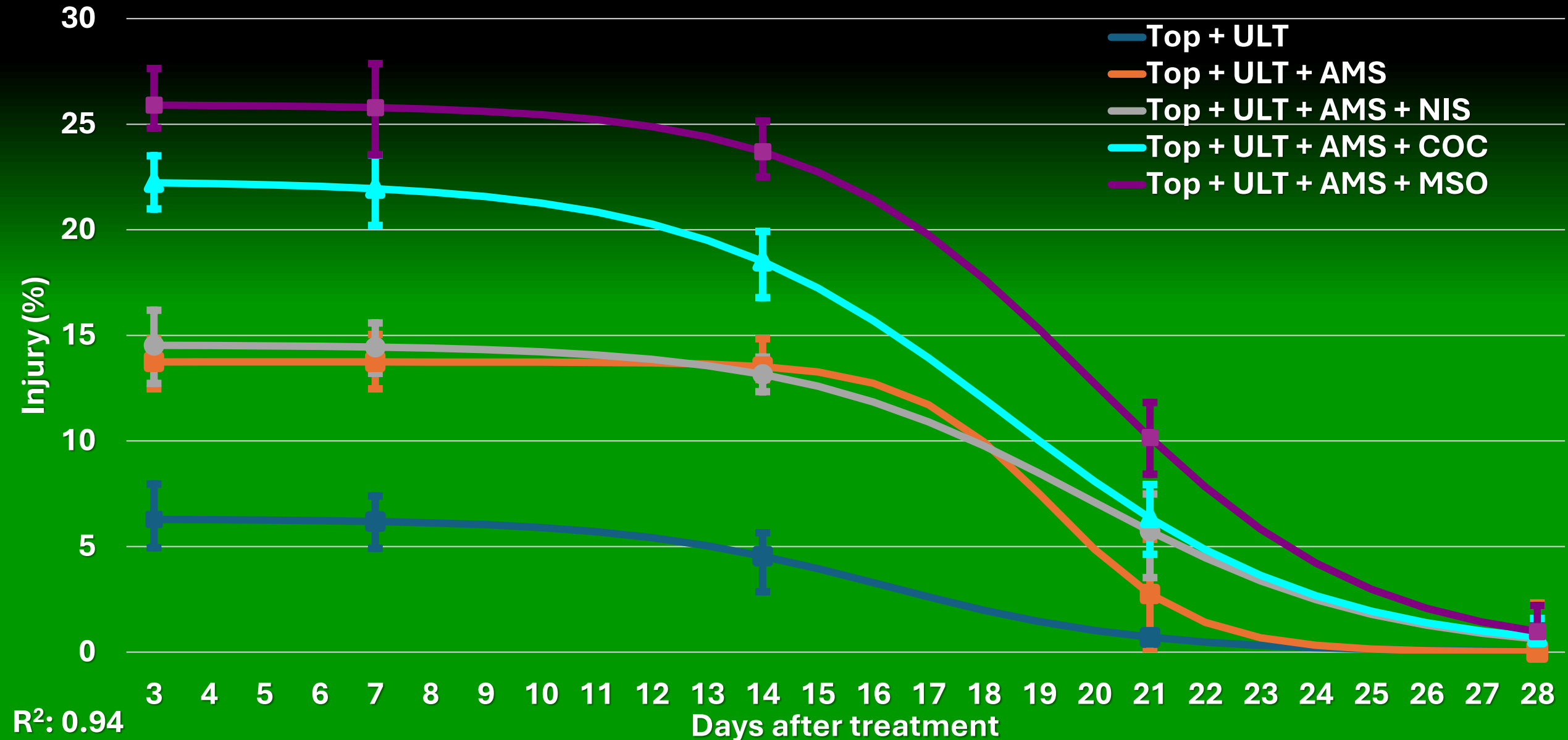
1. Topramezone (Top) at 1 fl oz/a + Liberty ULTRA (ULT) at 29 fl oz/a
2. Topramezone at 1 fl oz/a + Liberty ULTRA at 29 fl oz/a + AMS at 17.4 lb/100 gal
3. Topramezone at 1 fl oz/a + Liberty ULTRA at 29 fl oz/a + AMS @ 17.4 lb/100 gal + NIS at 0.25% v/v
4. Topramezone @ 1 fl oz/a + Liberty ULTRA @ 29 fl oz/a + AMS @ 17.4 lb/100 gal + COC at 1% v/v
5. Topramezone @ 1 fl oz/a + Liberty ULTRA @ 29 fl oz/a + AMS @ 17.4 lb/100 gal + MSO at 1% v/v

Application Timings

- 4-leaf and 8-leaf

Note: A nontreated check was included for comparison

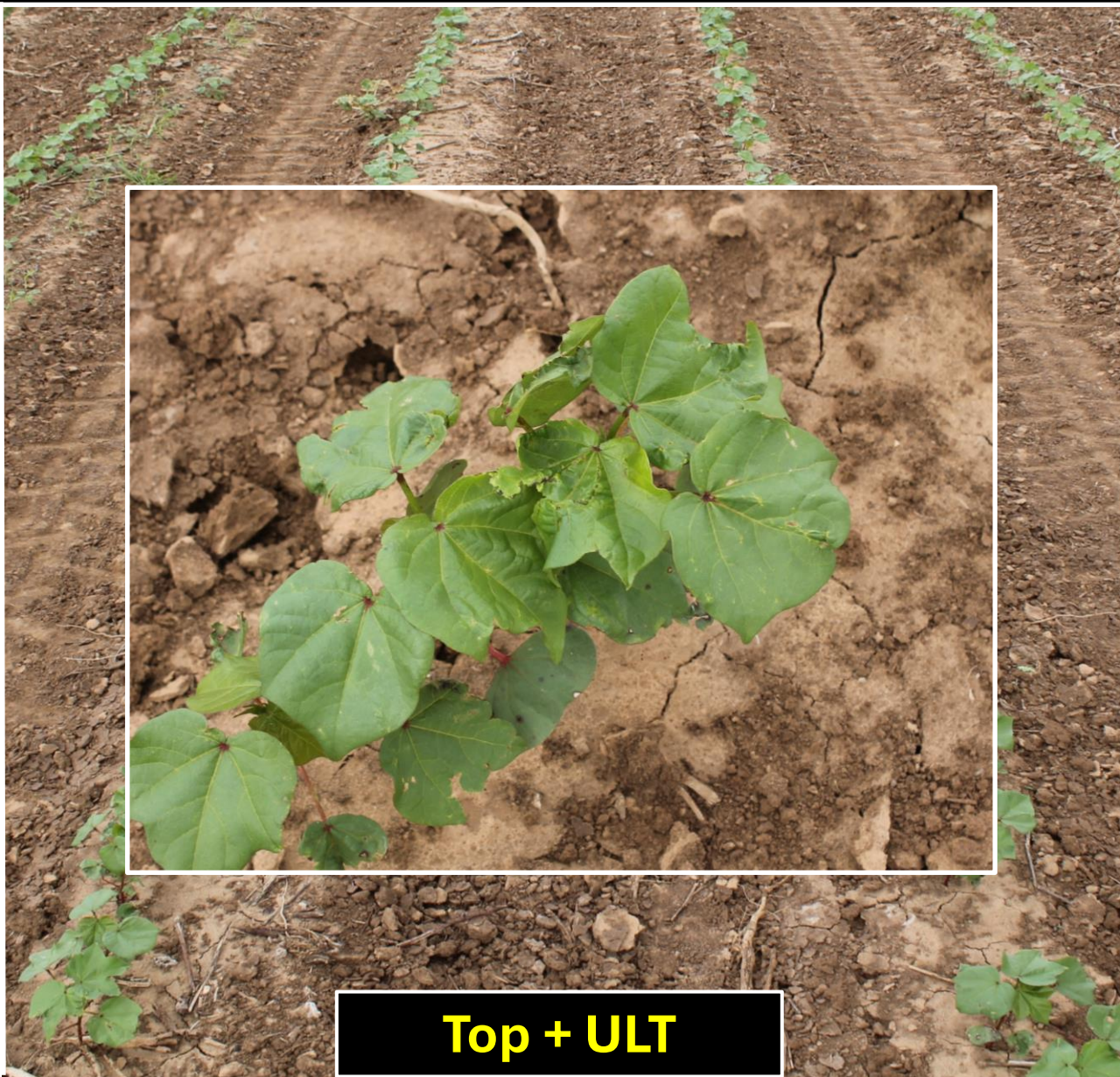
Cotton Injury 4-If Application Timing



Cotton Injury 7 Days after Treatment



Nontreated

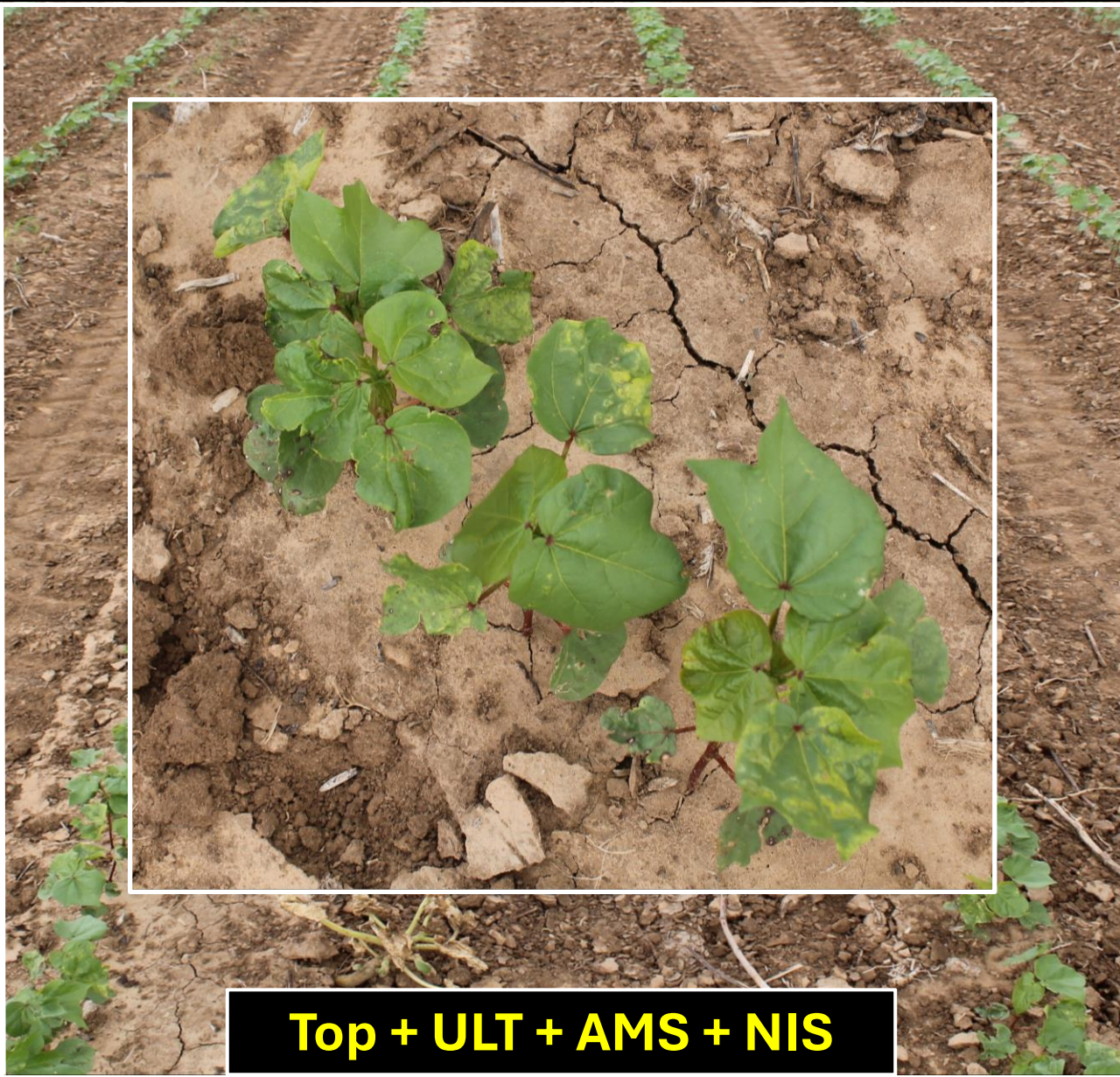


Top + ULT

Cotton Injury 7 Days after Treatment



Nontreated

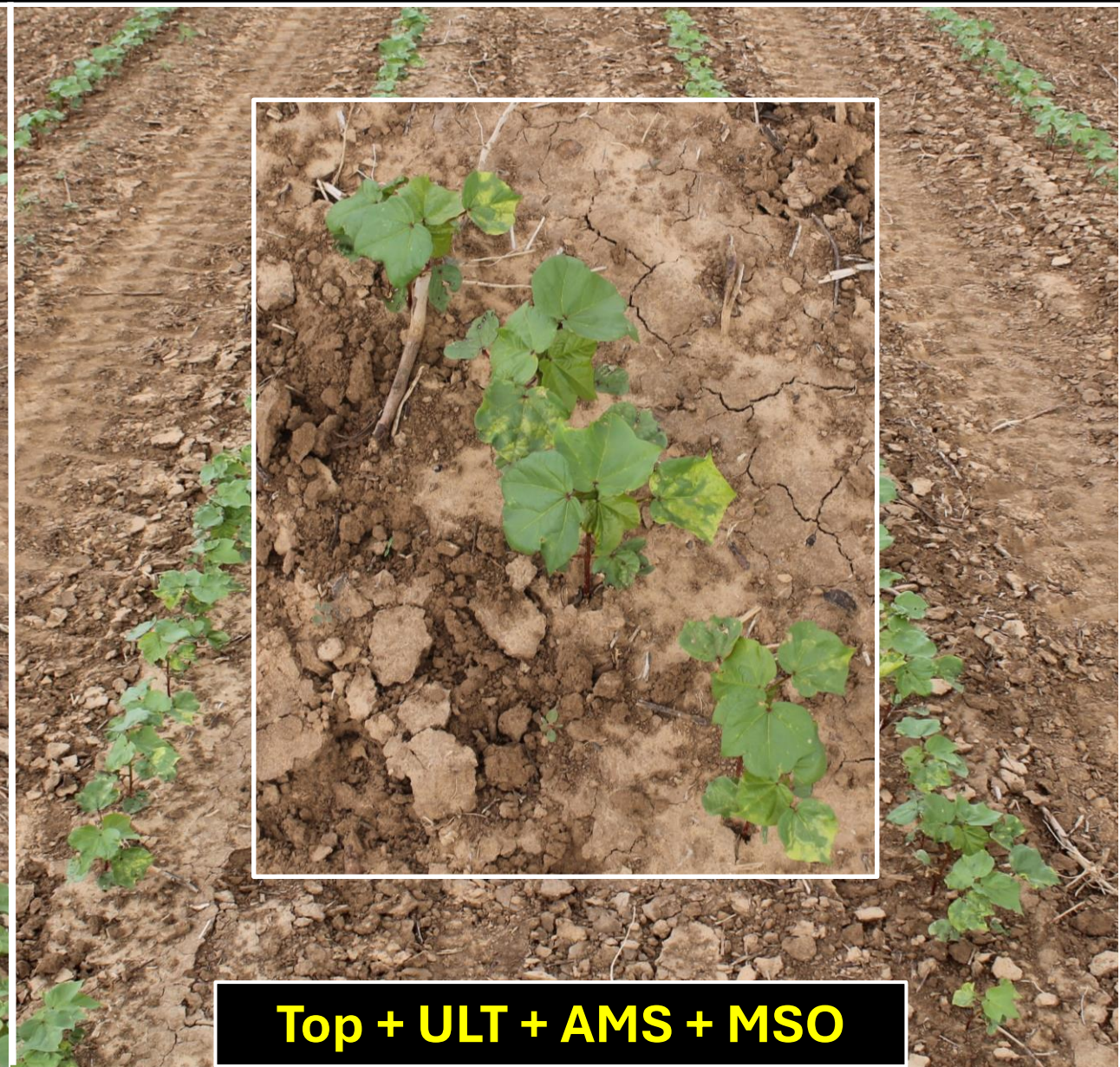


Top + ULT + AMS + NIS

Cotton Injury 7 Days after Treatment



Nontreated

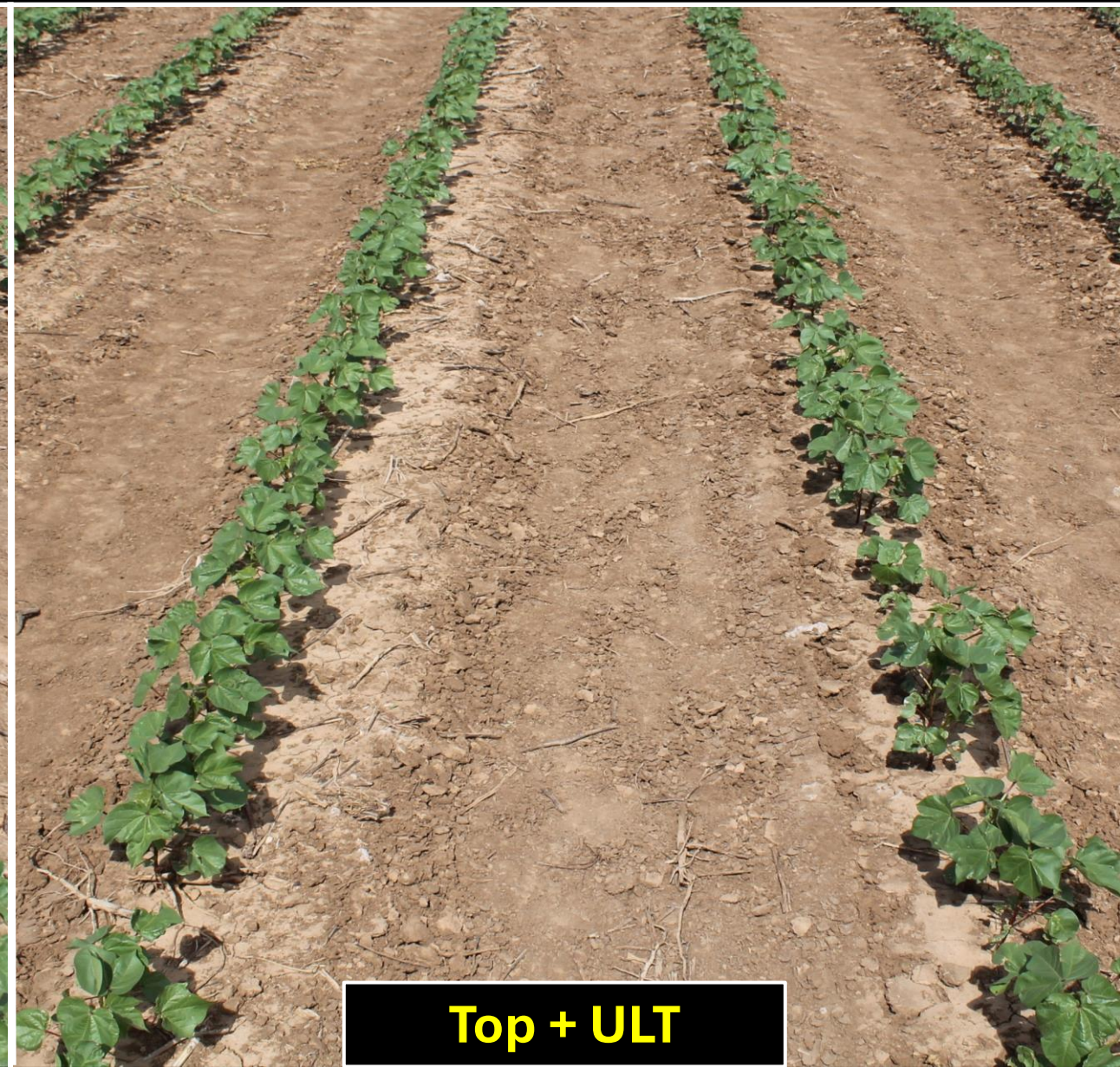


Top + ULT + AMS + MSO

Cotton Injury 14 Days after Treatment



Nontreated

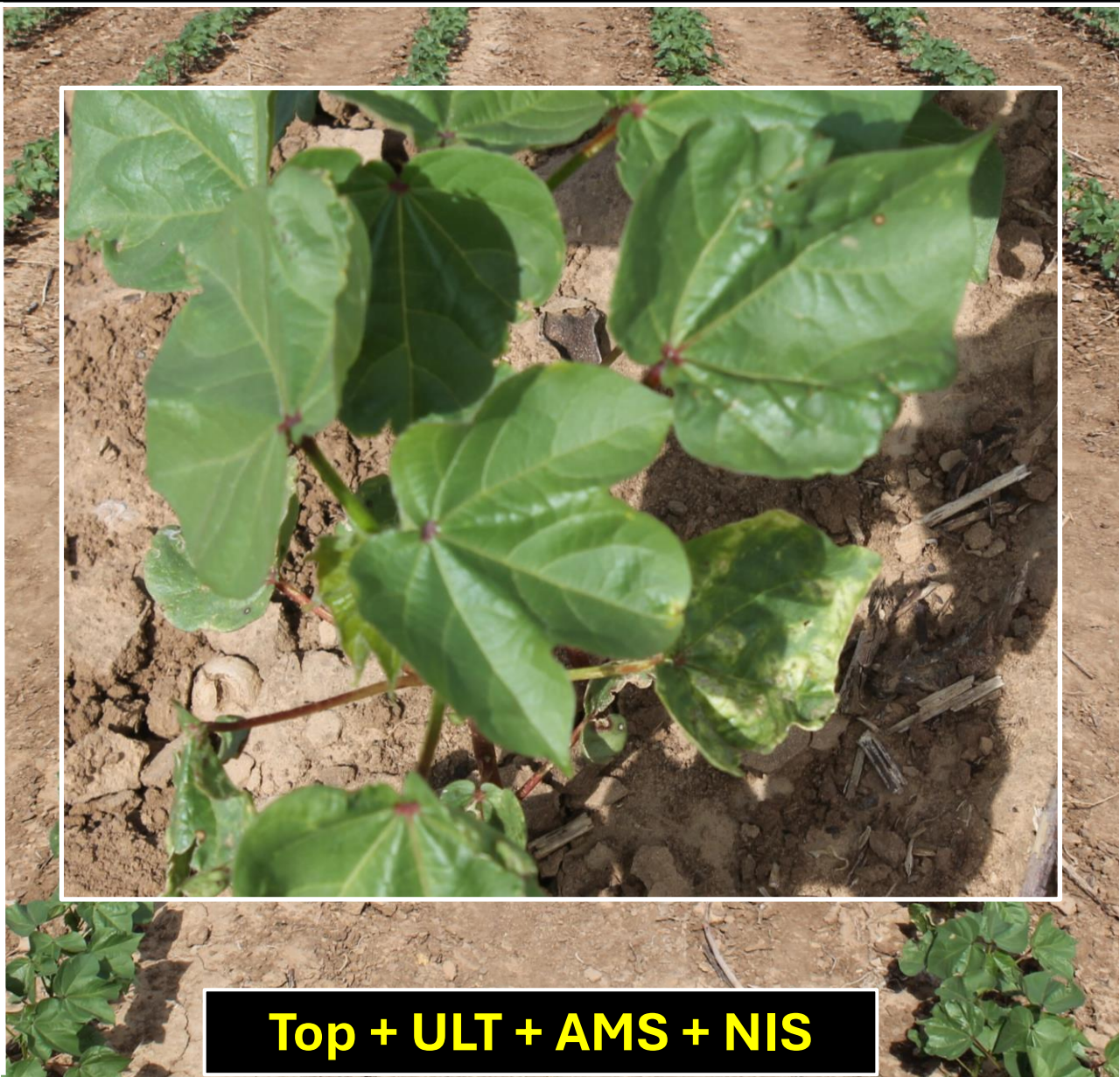


Top + ULT

Cotton Injury 14 Days after Treatment



Nontreated

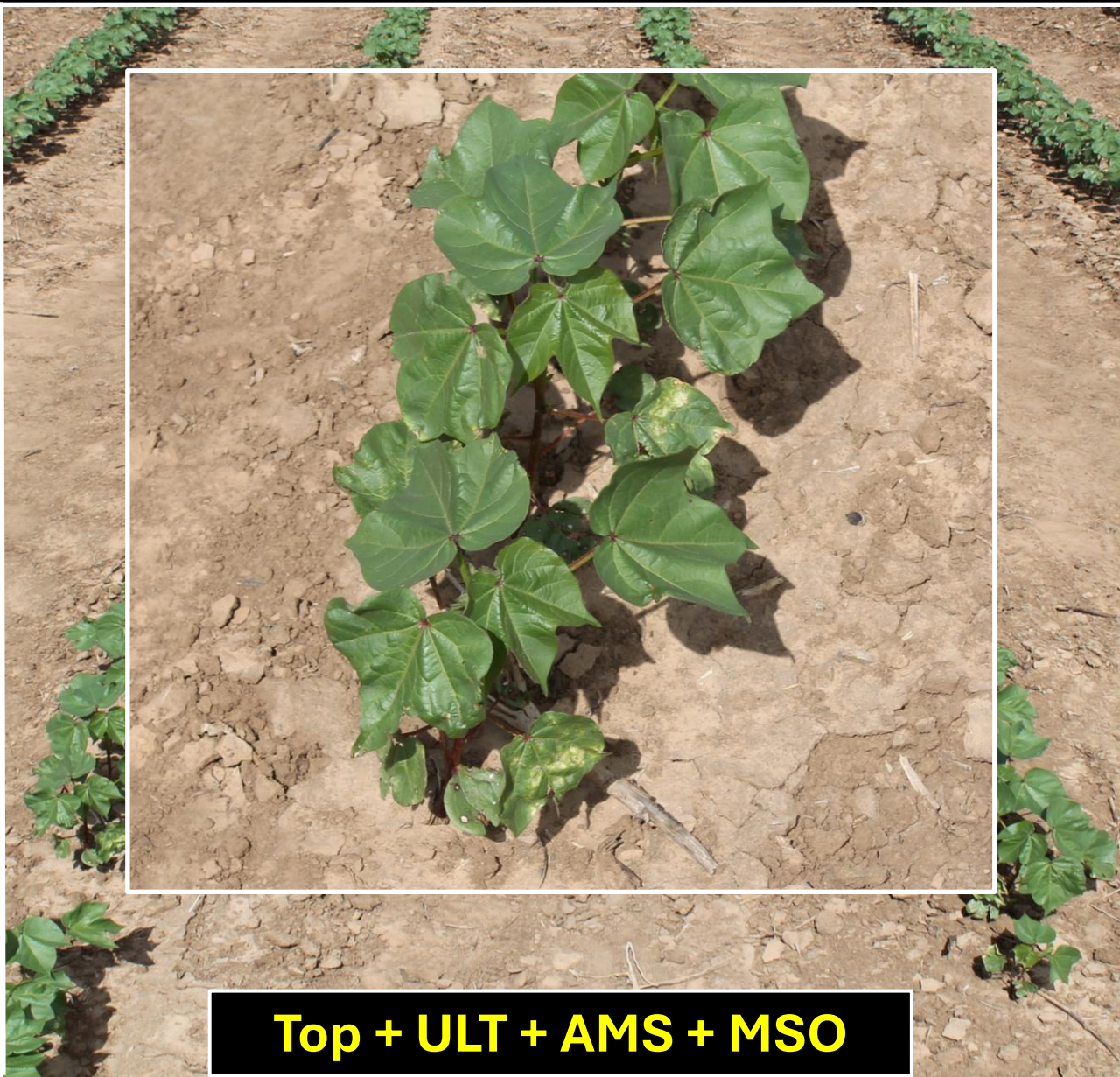


Top + ULT + AMS + NIS

Cotton Injury 14 Days after Treatment

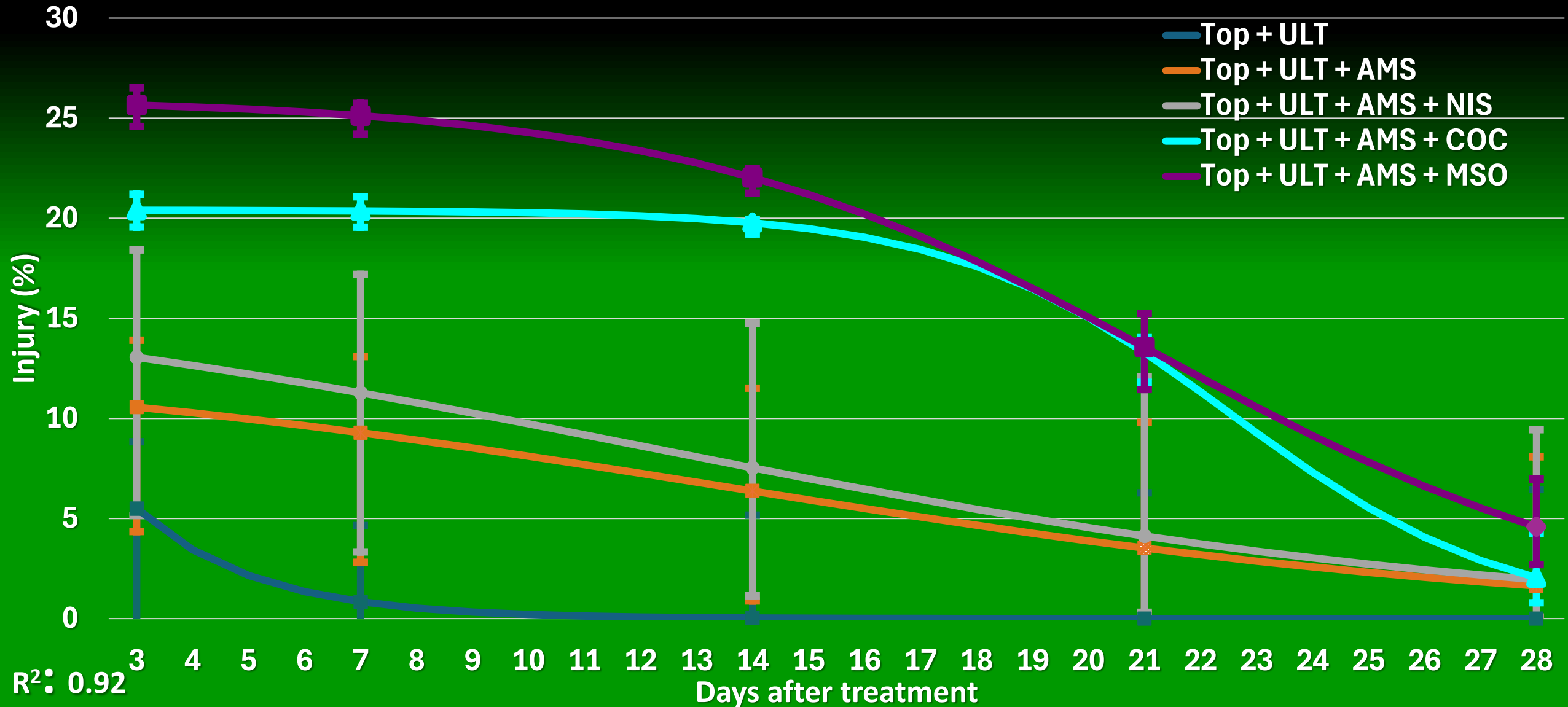


Nontreated



Top + ULT + AMS + MSO

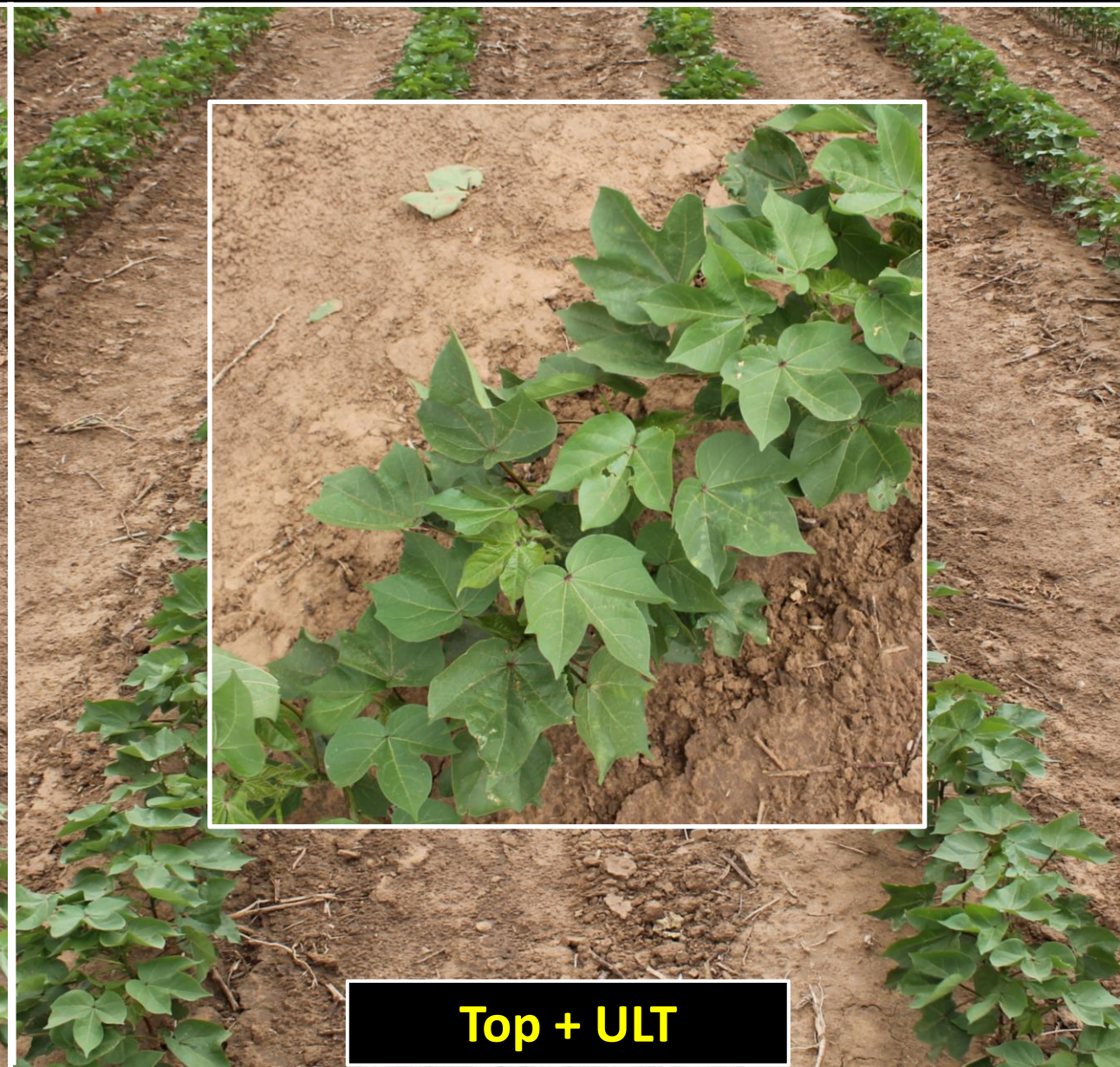
Cotton Injury 8-If Application Timing



Cotton Injury 7 Days after Treatment



Nontreated

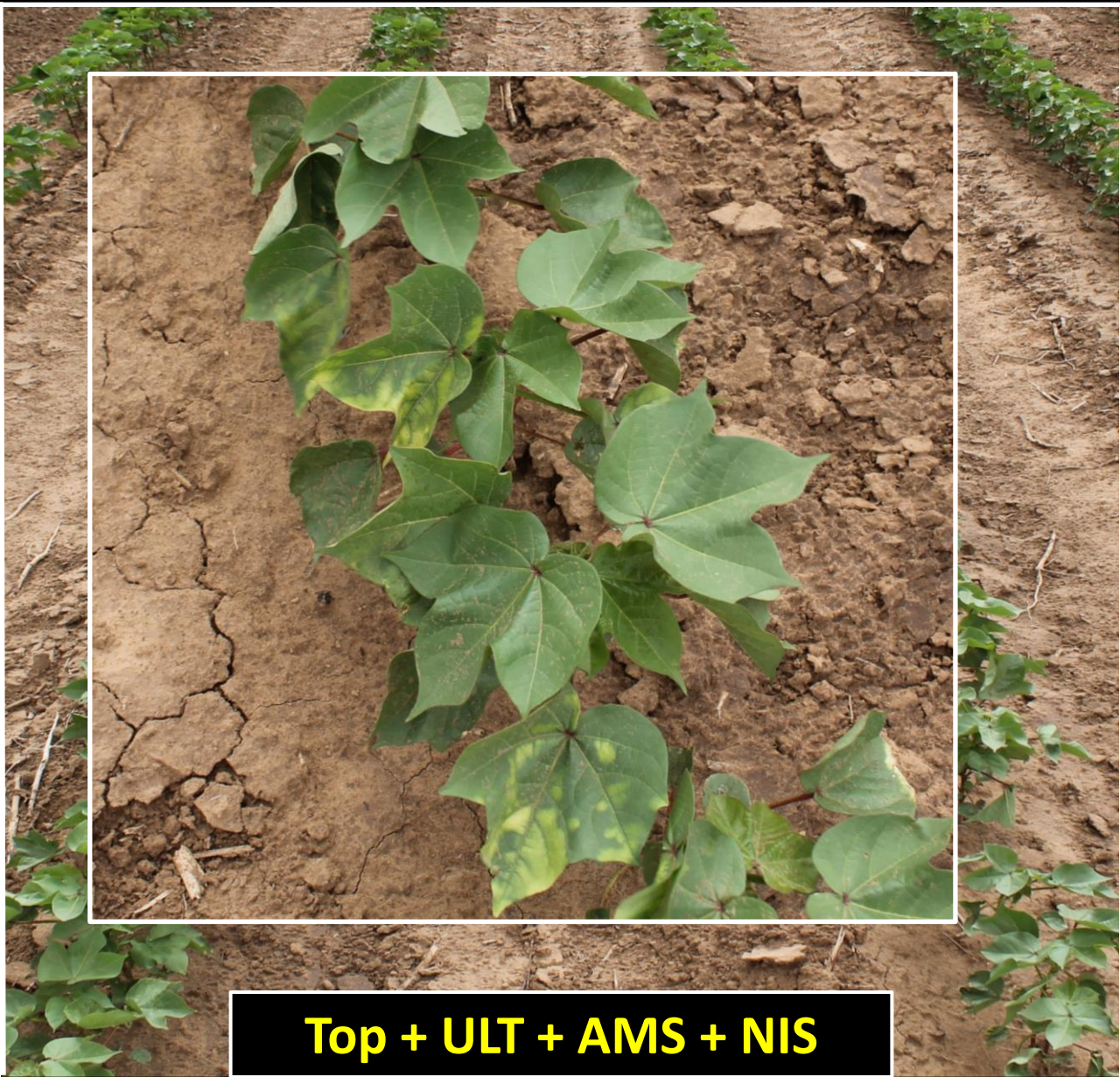


Top + ULT

Cotton Injury 7 Days after Treatment



Nontreated

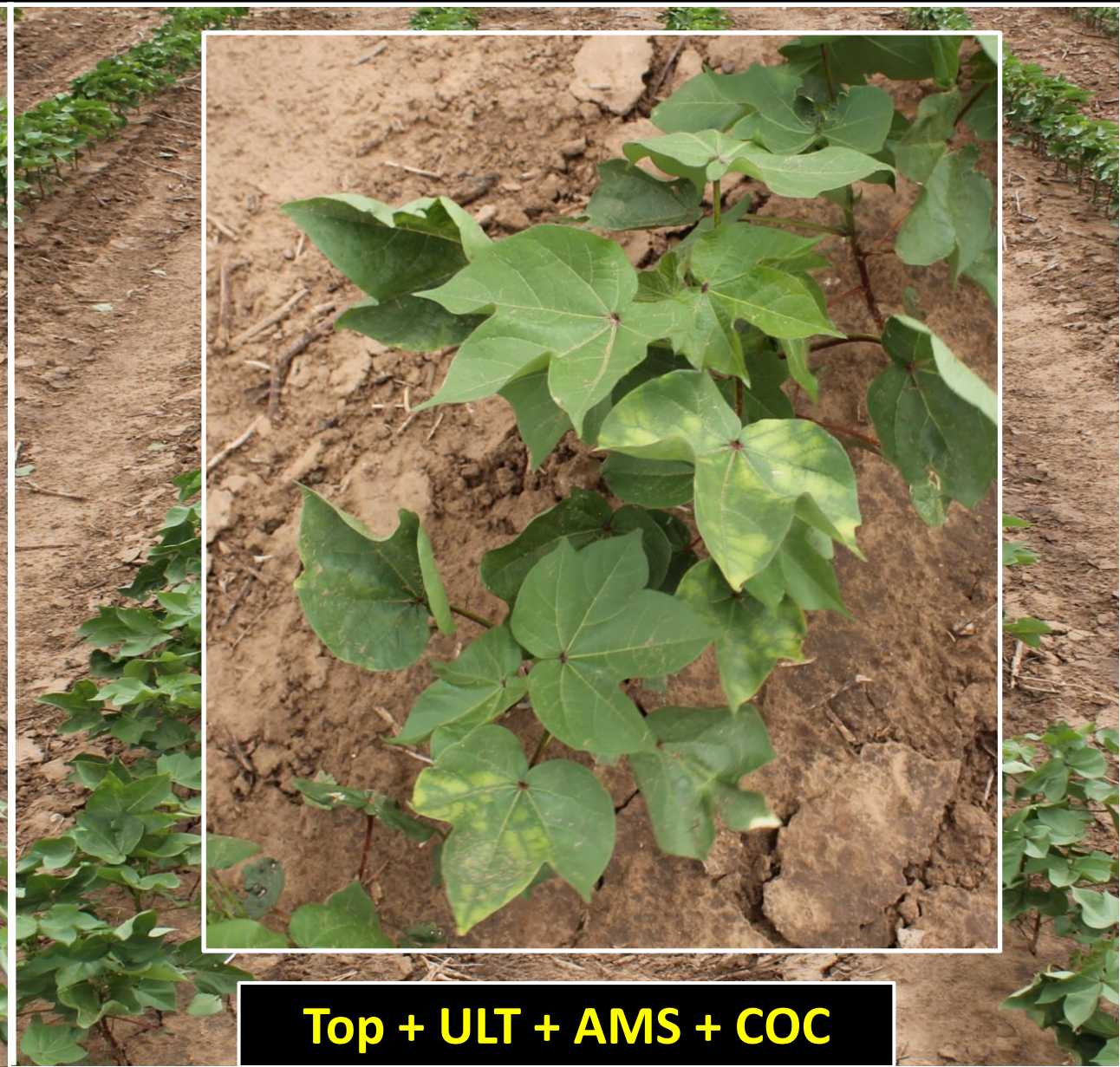


Top + ULT + AMS + NIS

Cotton Injury 7 Days after Treatment

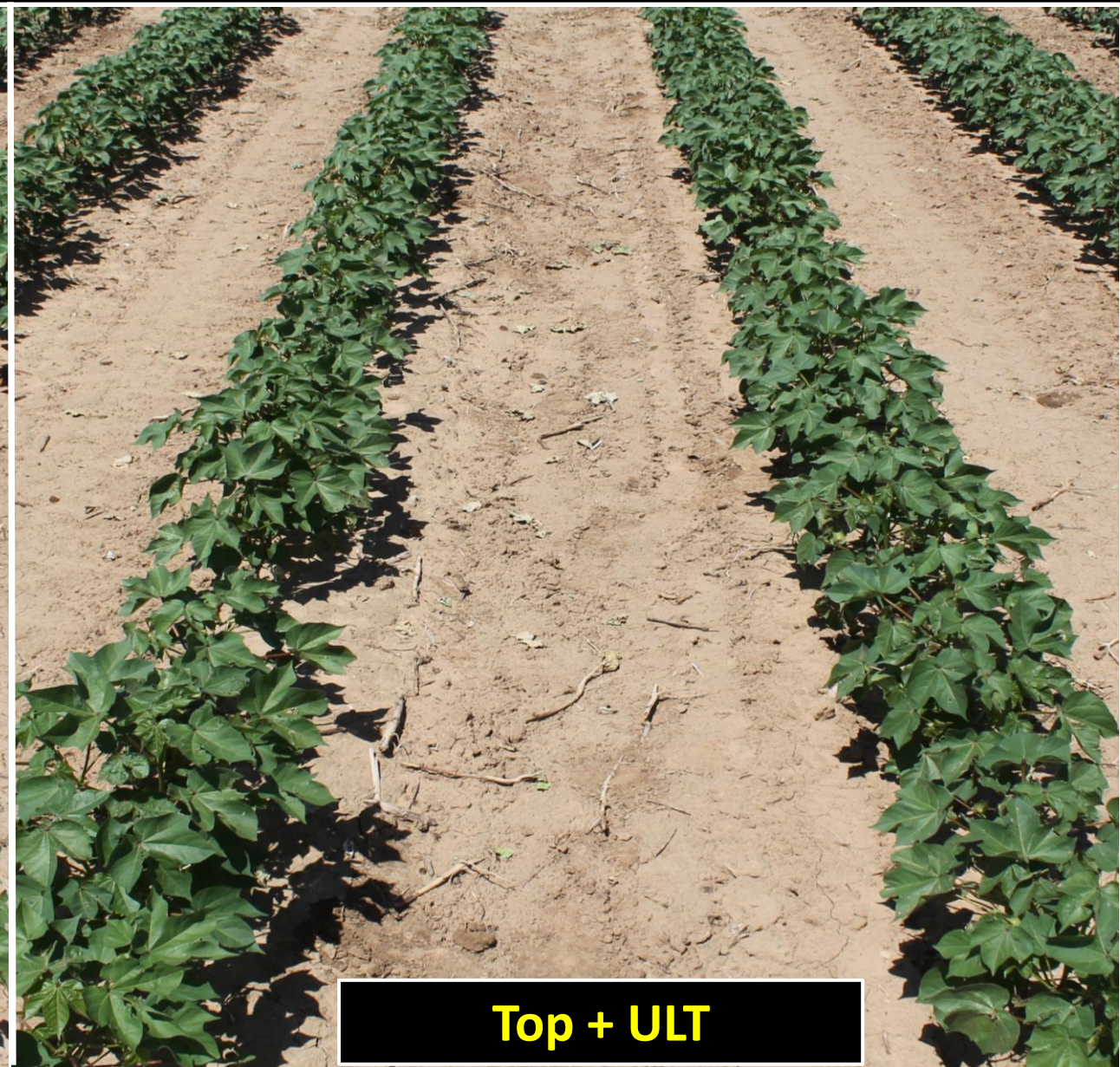


Nontreated



Top + ULT + AMS + COC

Cotton Injury 14 Days after Treatment



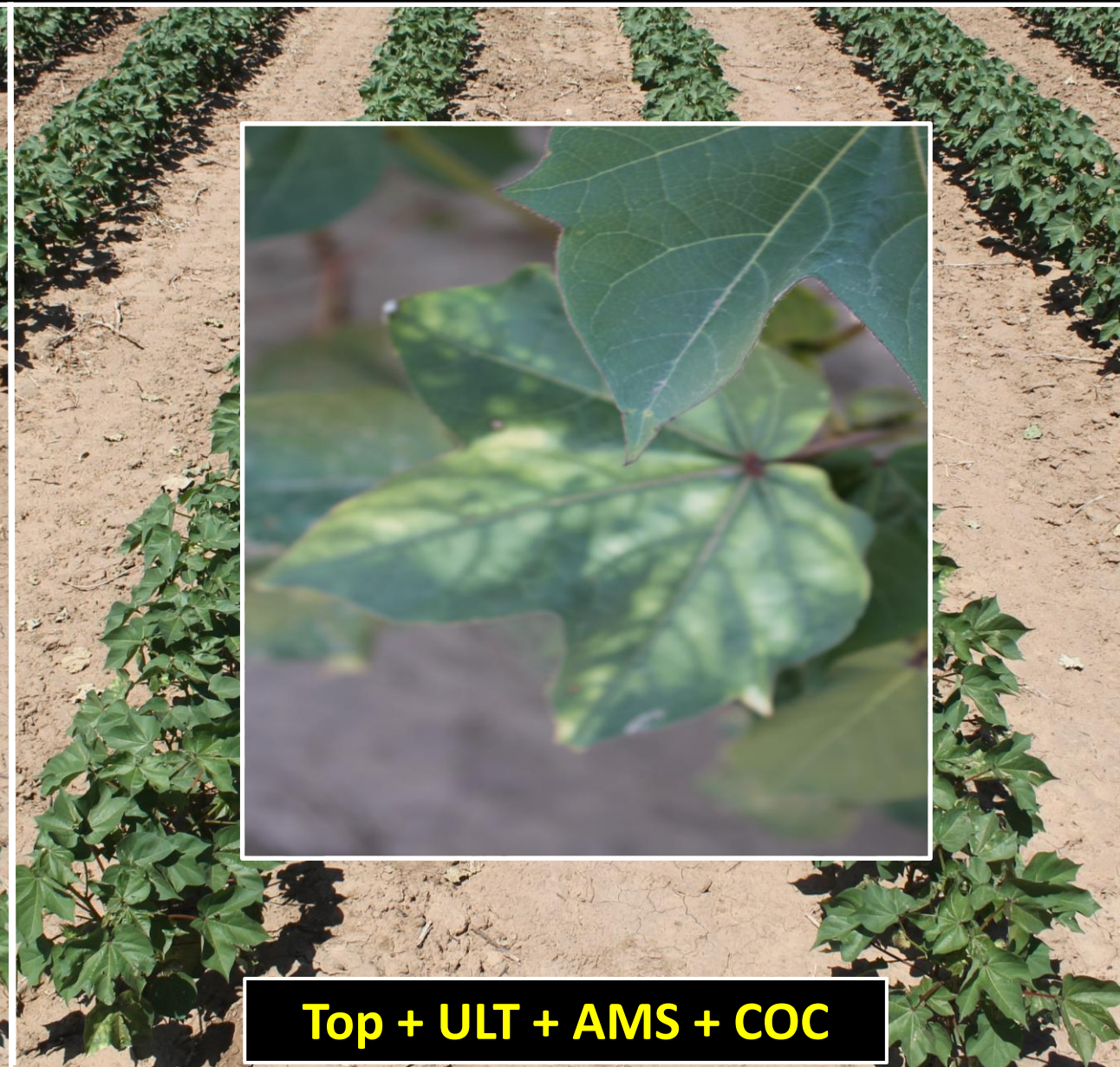
Cotton Injury 14 Days after Treatment



Cotton Injury 14 Days after Treatment



Nontreated



Top + ULT + AMS + COC

Key Takeaways

- Cotton injury was observed as **early as 3 days (d)** after application
- Adjuvants **increased cotton injury** 3 d after treatment when applied at the 4 and 8-lf application timings
 - The addition of **MSO and AMS** was the most injurious treatment
- Cotton **recovered** from the early-season injury by 28 d after treatment
- Seedcotton yields was **not reduced** relative to the nontreated control regardless of application timing and herbicide treatments
- Need to investigate if adjuvant selection impacts weed control

Questions?

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