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Utility of BOLT Technology in Louisiana Soybean Production

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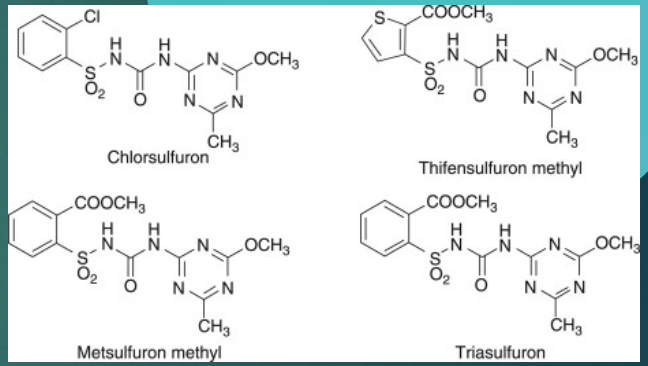
Sulfonylurea Herbicides

- Timeline:
  - Chemistry discovery in 1975 (50 yrs); 2,4-D in 1941 (34 yrs)
  - Chlorsulfuron (Glean) 1st commercialized in 1981
  - Chlorimuron (Classic) 1986
  - Metsulfuron (Ally and Escort) 1986
  - Thifensulfuron/Tribenuron (Harmony/Express) 1989
  - Rimsulfuron (Basis) 1994

- Characteristics:
  - Very potent acetolactate synthase (ALS) inhibitors inhibiting branch chain amino acid production (valine, leucine, isoleucine)
  - Active at very low rates (ounces or fractions of ounces per acre)
  - Broad spectrum weed control
  - Persistence is highly dependent on soil pH; degradation is faster in acidic soils (pH < 6.8) and slower in alkaline soils



Classic

Resolve

Permit

LeadOff

Sulfonylurea Tolerant Soybean (STS) Technology

- Timeline:
  - Developed in late 1980's by DuPont
  - W20 was first foundation source line developed from 'Williams" cultivar
  - ALS1 name given to allele conferring resistance
  - Germplasm released to breeding companies in late 1980"s
  - Introduced commercially in 1994
  - RR technology slowed expansion
  - RR resistance in 2000's increased interest

- Characteristics:
  - Non-GMO; Developed through conventional mutation breeding "native"
  - ALS1 alters coding region of ALS enzyme via a proline to serine amino acid base substitution; less susceptible to SU herbicide binding
  - Increased tolerance to Classic, Synchrony XP, Harmony SG, Ally, Finesse, Halomax, Permit Plus, LeadOff

Enlist E3® SOYBEANS

STS® herbicide tolerant trait

BOLT Soybean Technology

- Timeline:
  - Developed in early 2010's by DuPont Pioneer
  - W4-4 was first foundation source line
  - ALS2 name given to allele conferring enhanced resistance
  - Introduced commercially in 2015

- Characteristics:
  - Non-GMO; Developed through second round of conventional mutation breeding "native"
  - ALS2 alters coding region of ALS enzyme via a tryptophan to leucine amino acid base substitution; less susceptible to SU herbicide binding
  - ALS1&2 offer a synergistic increase in tolerance to SU herbicides over that of STS cultivars
  - Enhanced tolerance to Classic, Synchrony XP, Harmony SG, Ally, Finesse, Halomax, Permit Plus, LeadOff and other SU herbicicides

BOLT

BOLT Soybean Technology

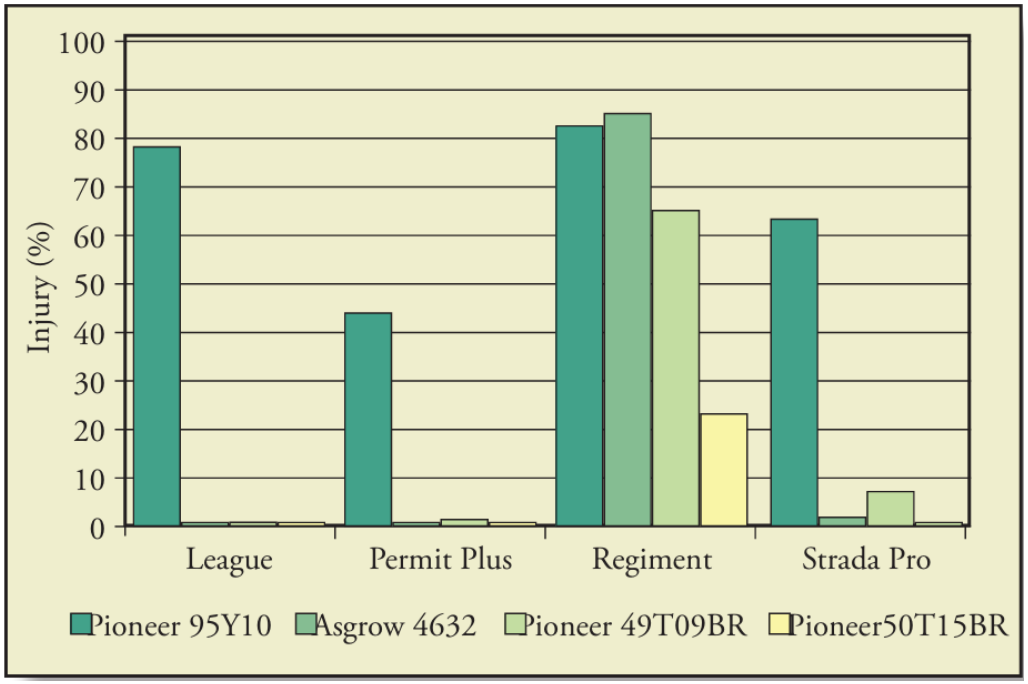
- Advantages over STS soybean:
  - Higher level of tolerance to SU herbicide like LeadOff, Finesse, Basis Blend, Classic, and Synchrony
  - LeadOff at 1.5-2.7 oz/A plant back for BOLT soybean is 0 d compared with 30 d for STS soybean
  - Basis Blend at 1.25 oz/A plant back for BOLT soybean is 0 d compared with 30 d for STS soybean
  - Basis Blend at >1.25-2.5 oz/A plant back for BOLT soybean is 0 d compared with 4 mo for STS soybean
  - Finesse at 0.2-0.5 oz/A plant back to BOLT soybean is 4 mo compared to 6 mo for STS soybean (18 mo for non-STS/BOLT soybean)
  - Classic, Permit Plus, Halomax (Teaweed and Yellow Nutsedge)


N61150

Response of BOLT Soybean Cultivars to Rice Herbicides

Jason Bond, Matthew Edwards, Jimmy Peeples, Ben Lawrence, Tyler Hydrick, and Tameka Phillips (2015)

Herbicide treatments were applied at 12.5% of the labeled rates of League (3.2 oz/ac), Permit Plus (0.75 oz/ ac), Regiment (0.67 oz/ac), and Strada Pro (2.5 oz/ac).



Impact of Reduced Rates of ALS-Inhibiting Rice Herbicides on BOLT Soybean Growth and Yield

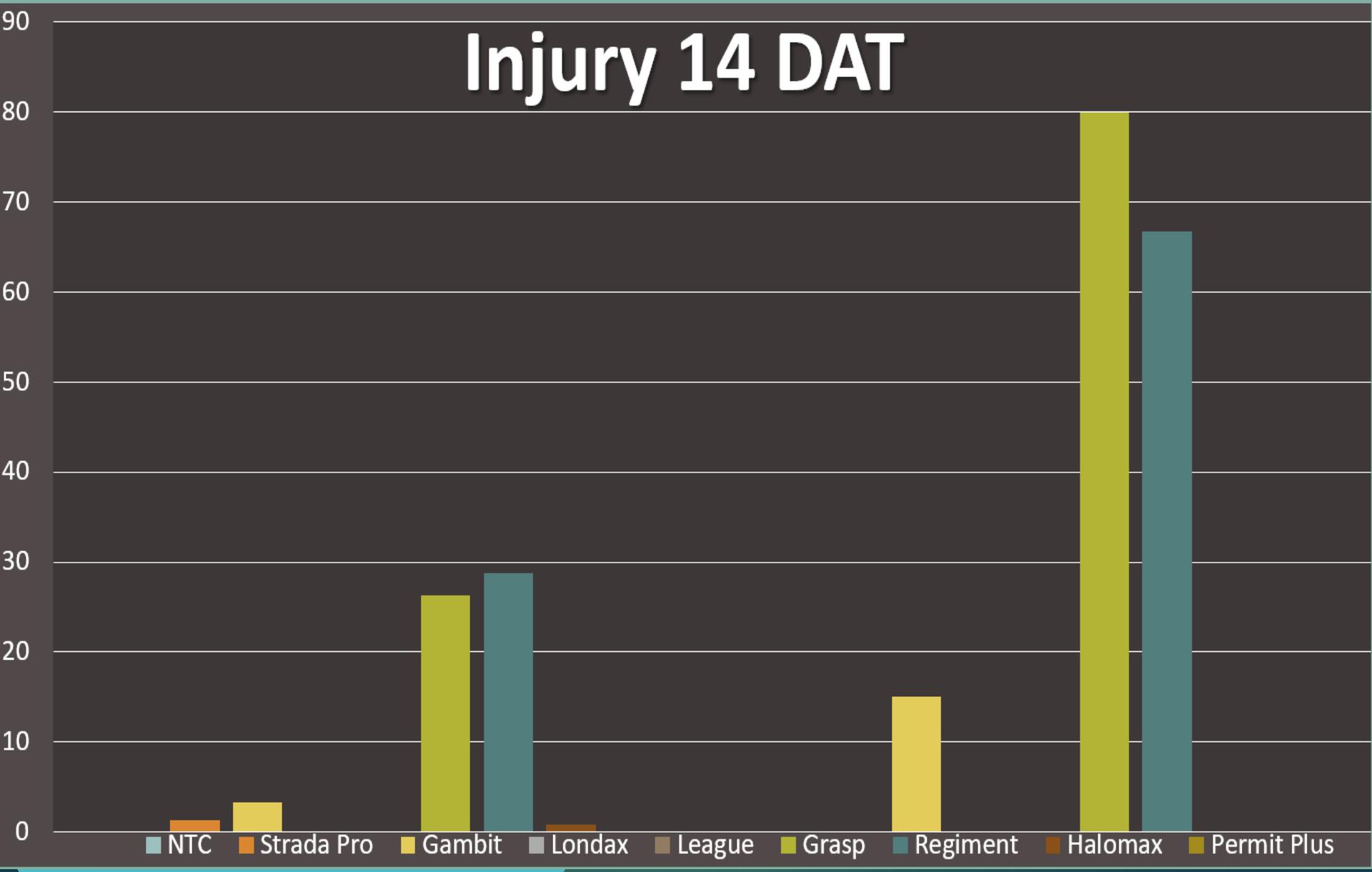
D.K. Miller, P. Jha, R.C. Scott

- St. Joseph, LA (P47Z15BE; Treated 6-8)
- Ronoke, AR (P48Z70BLX; Treated 6-23)
- V2-V3 growth stage; 0.125 of 1x use rate

- Nontreated Control
- Strada Pro @ 0.31 oz/A
- Gambit @ 0.25 oz/A
- Londax @ 0.2 oz/A
- League @ 0.8 oz/A
- Grasp @ 0.29 oz/A
- Regiment @ 0.1 oz/A
- Halomax @ 0.17 oz/A
- Permit Plus @ 0.094 oz/A

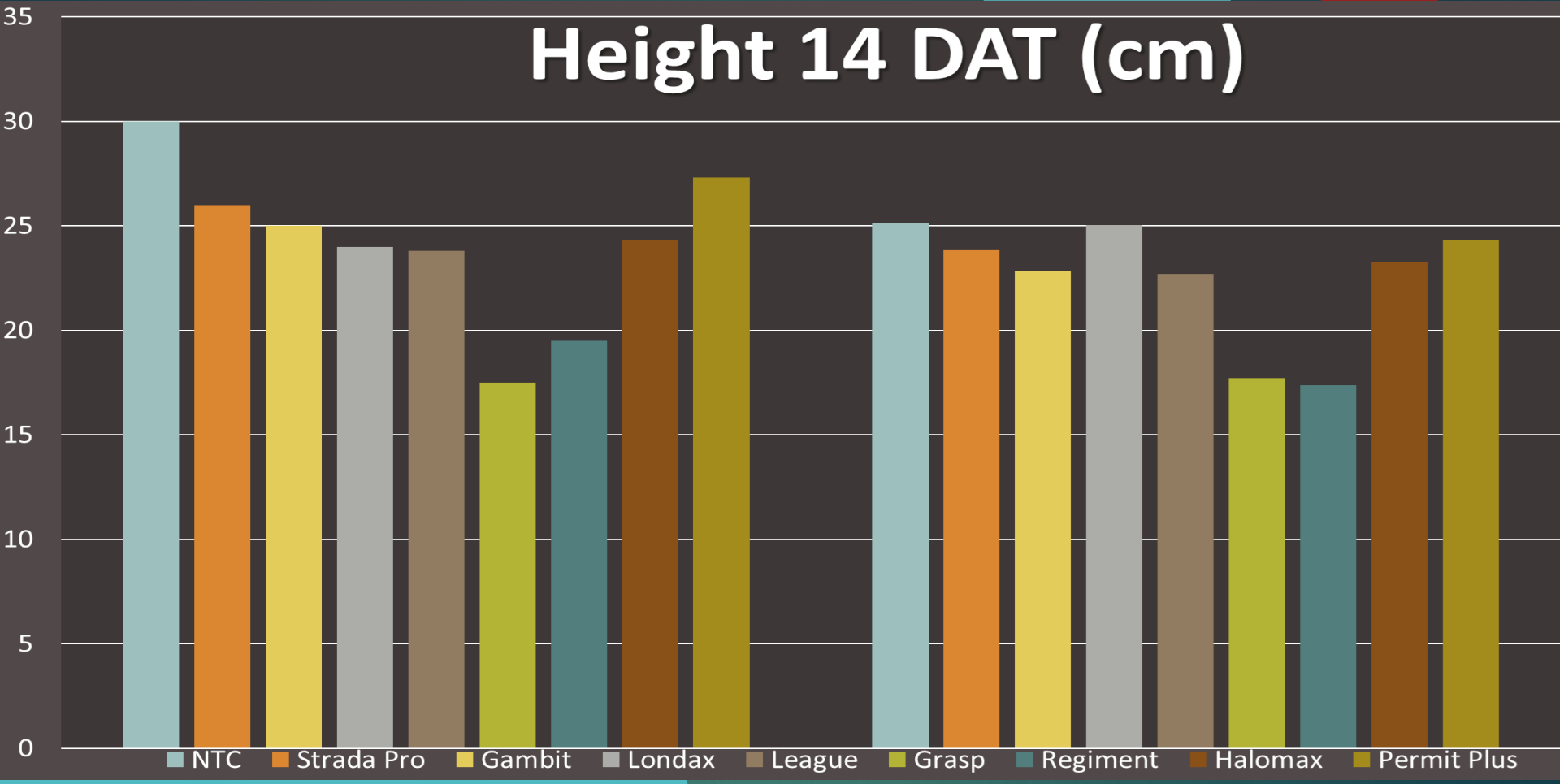
- Adjuvants were included per label recommendation/requirement

- Visual injury 14, & 28 DAT; height at 14 & 28 DAT & at harvest; yield



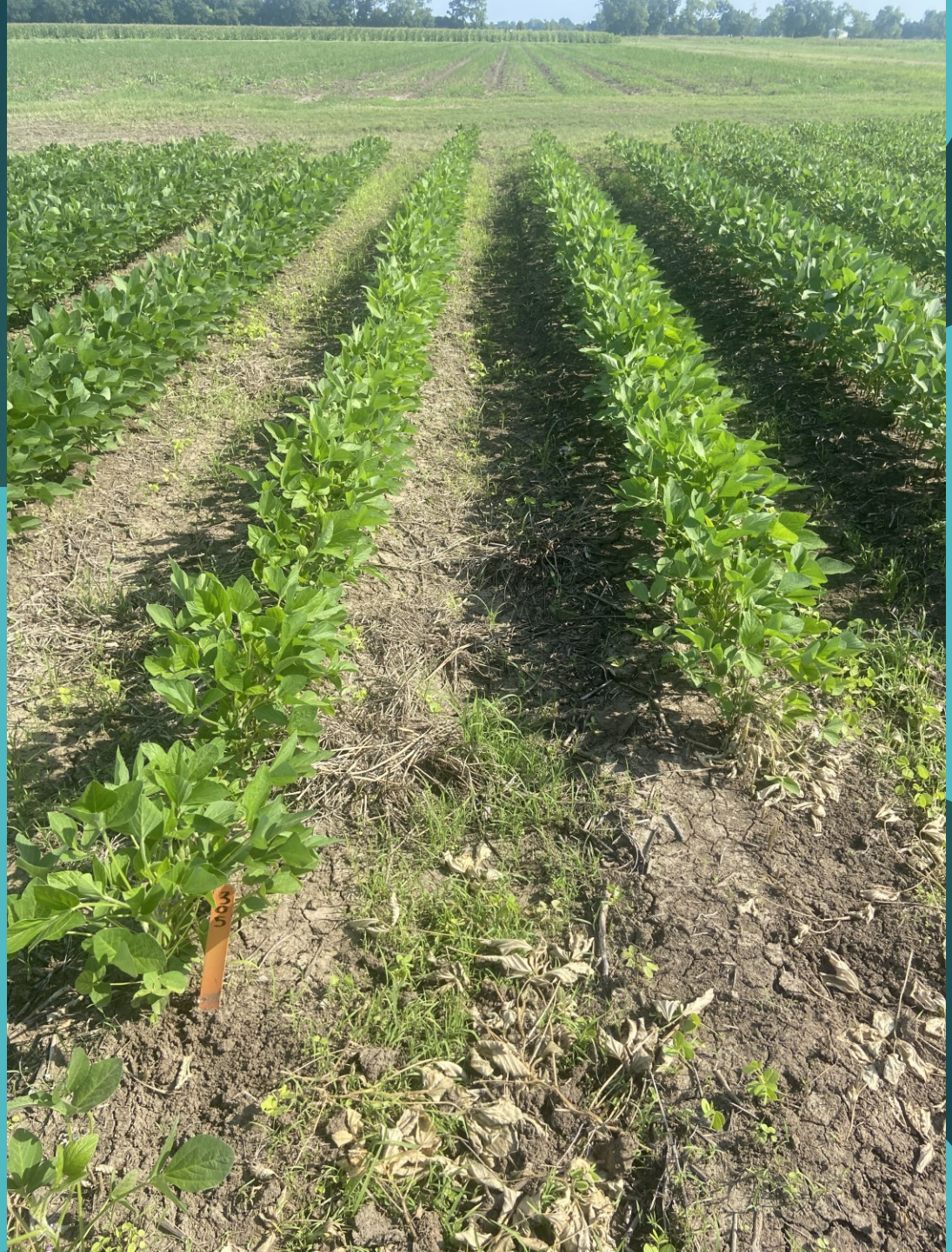
At Lonoke, Grasp and Regiment resulted in equivalent injury of 26 and 29%, respectively, while all other treatments injured soybean no greater than 3%.

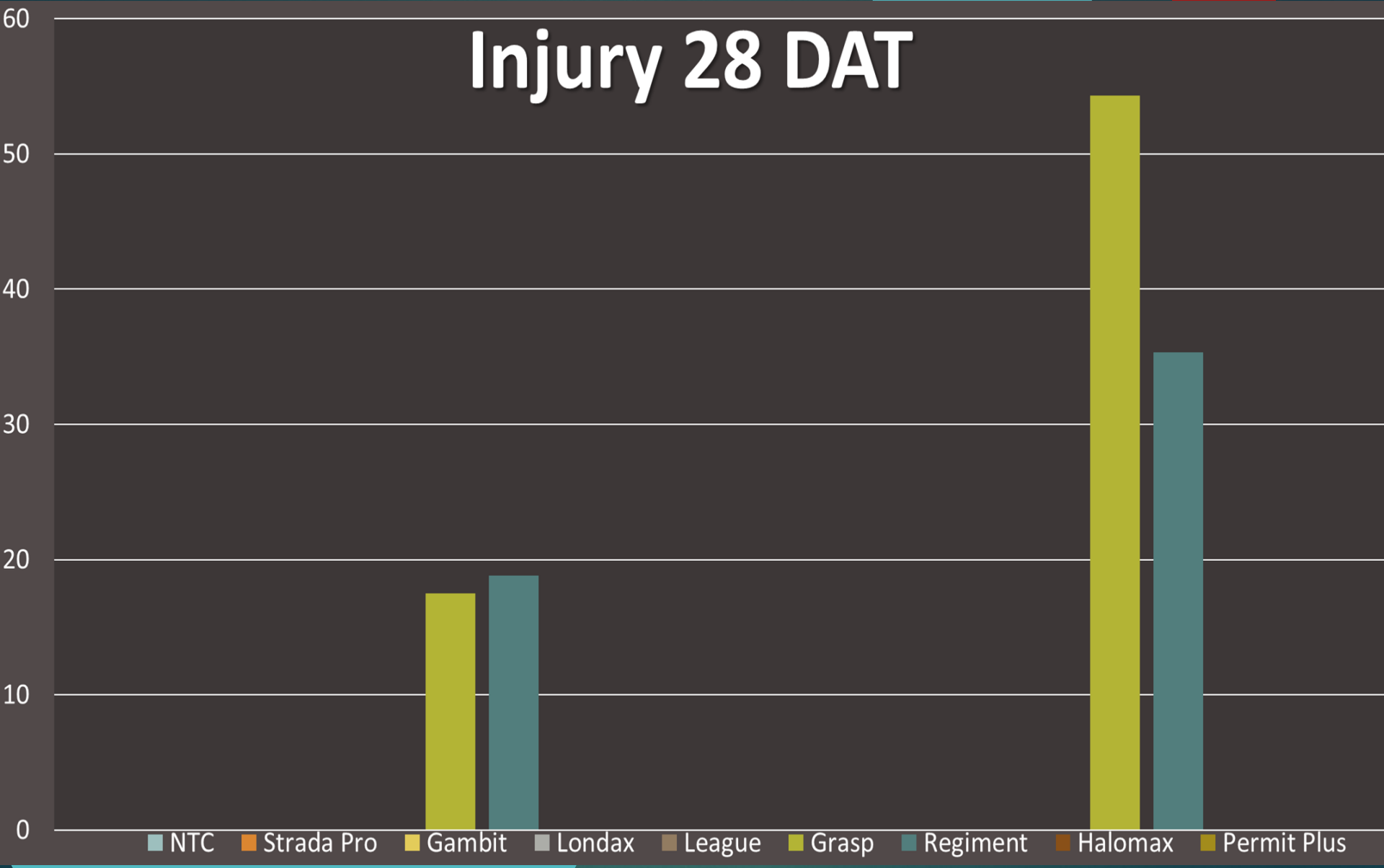
At St Joseph, significant and differing injury of 15, 80, and 67% was observed with Gambit, Grasp, and Regiment, respectively, while all other treatments resulted in no injury.



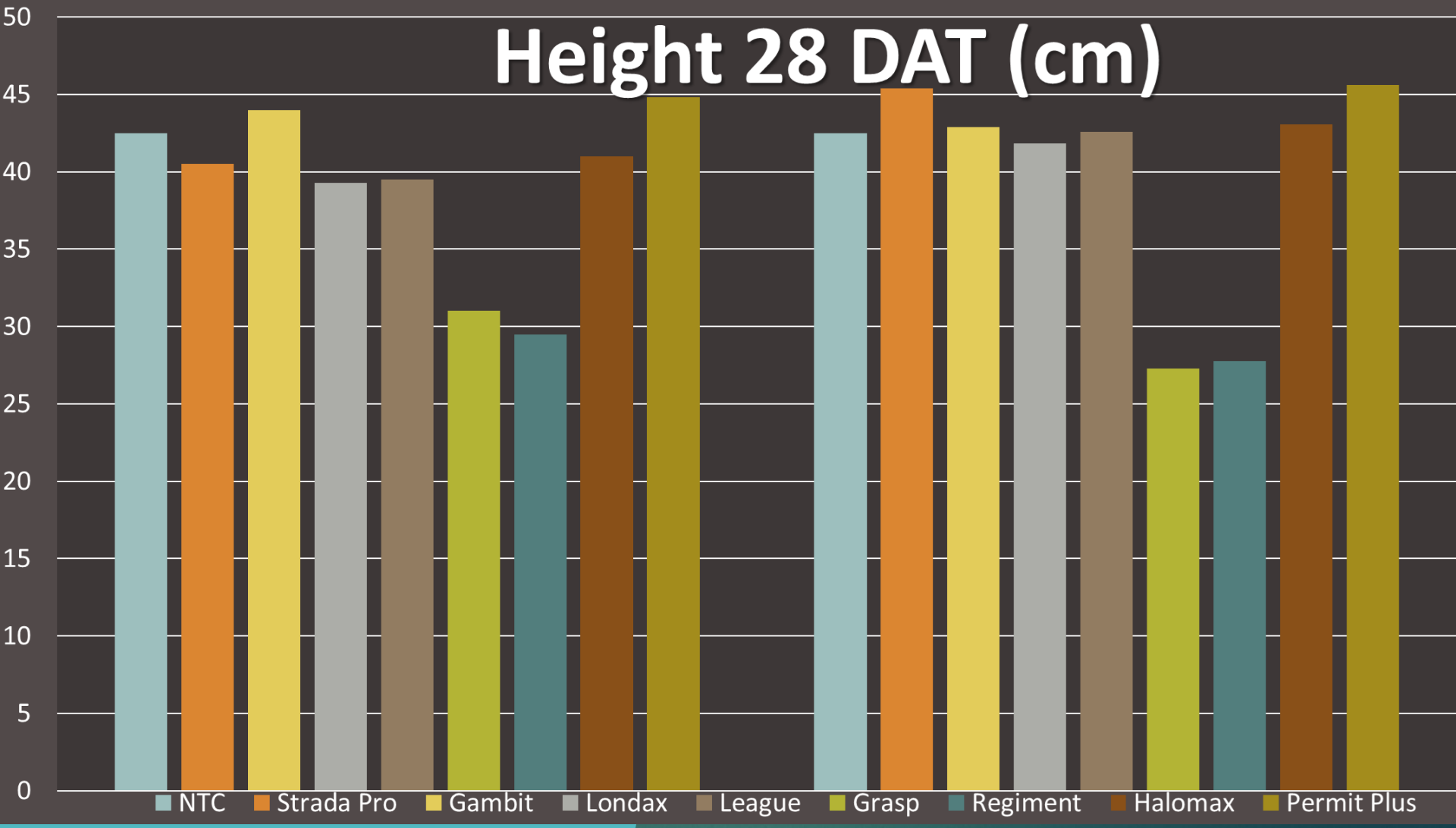
At Lonoke, soybean height was significantly reduced by all herbicides except Permit Plus in comparison to the nontreated control. Grasp and Regiment reduced height equally at 38% while others reduced height equally at 18%.

At St. Joseph, soybean height was reduced equally at 32 and 35%, respectively, only with Grasp and Regiment in comparison to the nontreated control.



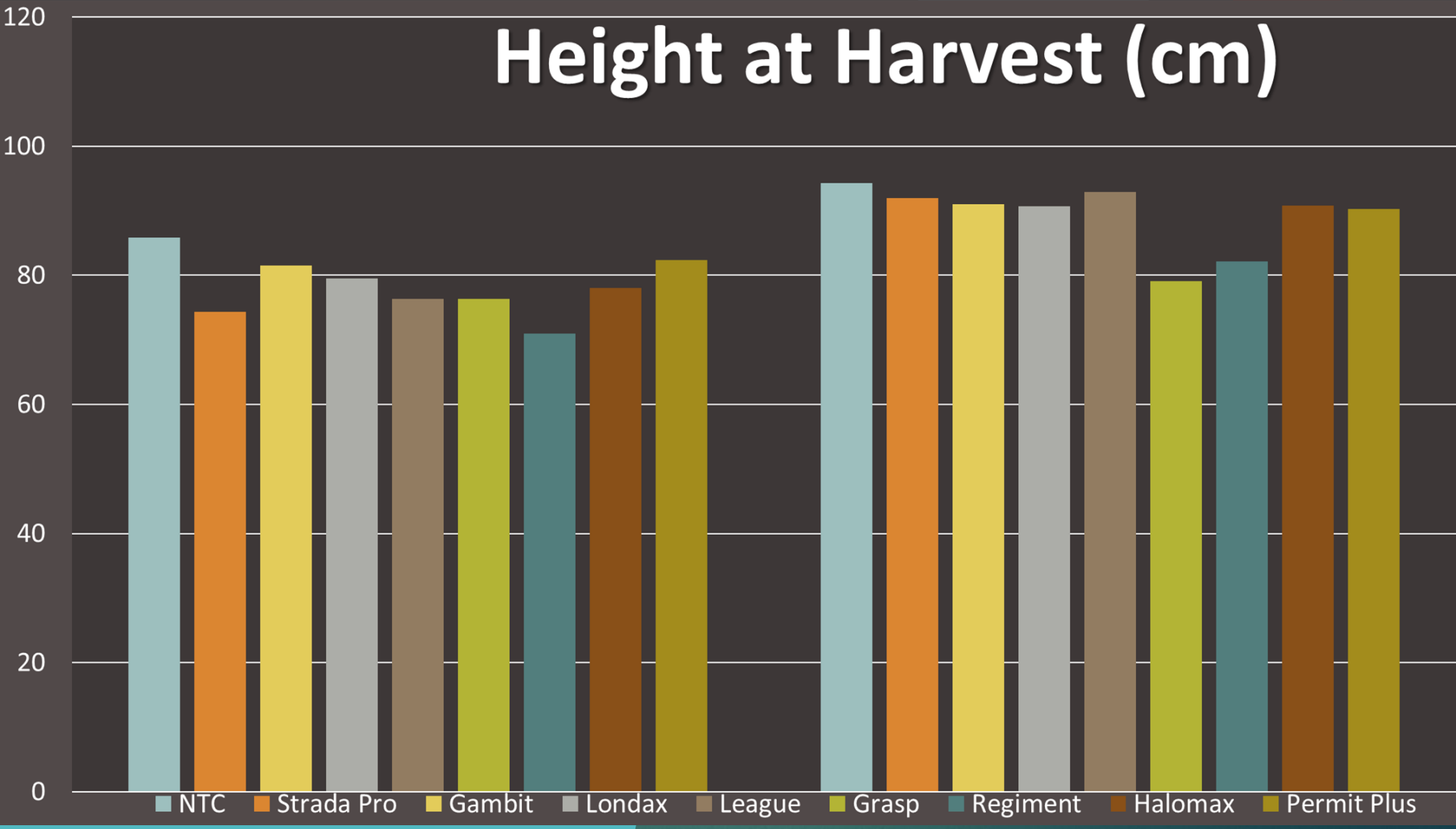


At Lonoke, only Grasp and Regiment injured soybean at 18 and 19% while at St Joseph injury was 54% and 35% with these respective herbicides.



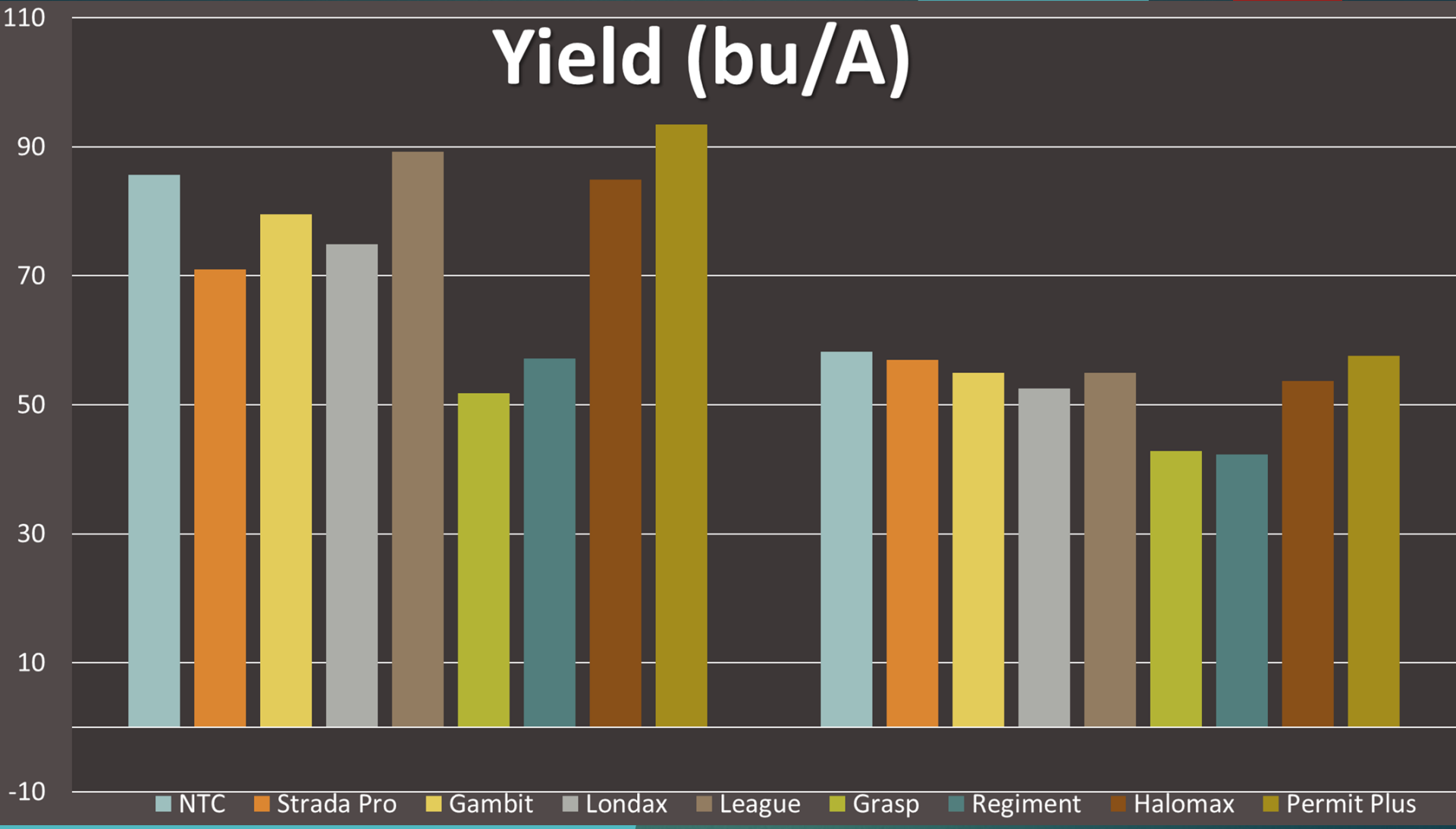
At Lonoke, only Grasp and Regiment reduced soybean height (29%) in comparison to the nontreated control.

At St. Joseph, soybean height was reduced 32 and 35%, respectively, and equally only with Grasp and Regiment in comparison to the nontreated control.



At Lonoke, soybean height was reduced equally at 13% with Strada Pro, Gambit, League, Grasp, and Regiment only in comparison to the nontreated control.

At St. Joseph, soybean height was reduced equally only with Grasp and Regiment at 15% in comparison to the nontreated control.



At Lonoke, soybean yield was reduced with only Strada Pro (17%), Grasp (39%), and Regiment (33%) in comparison to the nontreated control.

At St. Joseph, soybean yield was reduced following application of only Grasp (26%) and Regiment (27%) in comparison to the nontreated control.

Questions?