

The Effect of Spray Tip Type and Pressure on Postemergence Weed Control

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Field measure herbicide efficacy comparing conventional, venturi, and variable rate spray tips.

Materials and Methods:

Experiment: Field Plots located near Manhattan, KS
Design: 4 x 2 randomized complete block with split plot and 3 reps.
Main plot: Herbicide
Subplots: Spray tip by pressure
Plot Size: 3 x 9 m
Species: large crabgrass, ivyleaf morningglory, velvetleaf, common sunflower, sorghum, corn
Visual Ratings: 14 and 28 days after treatment (DAT)
Herbicides (2): Paraquat, 0.25 kg ai/ha, NIS at .25% v/v
Glyphosate, 0.17 kg ae/ha, AMS @ 2.0% w/w
Spray Volume: 94 l/ha
Application Conditions:
Date: June 28, 2006
Temp: 27 degrees C
R. H.: 42%
Wind: Direction - 203 degrees
(180 would be perpendicular to plot).
Wind Speed: 2.8 km/h, gust to 4.0 km/h



Materials and Methods cont.:

Spray Tips: Turbo Flat-fan (TT) TeeJet
Air Mix (AM) Greenleaf
Ultra Lo Drift (ULD) Hypro
Turbo Flat-fan Induction (TTI) Tee Jet
VariTarget (VT) Delavan

Orifice Size: TT and AM = 11002
ULD and TTI = 110015
VT = blue and yellow cap

Spray Pressure: Conventional Tips @ 276 kPa (40 PSI) & 483 kPa (70 PSI)
VT tip at 172 kPa (25 PSI)

Speed: 9.6 km/h

Tractor mounted 3-point sprayer

3 meter boom with 4 tips

Nozzle Spacing: 51 cm

Boom Height: 51 cm



Materials and Methods cont.:

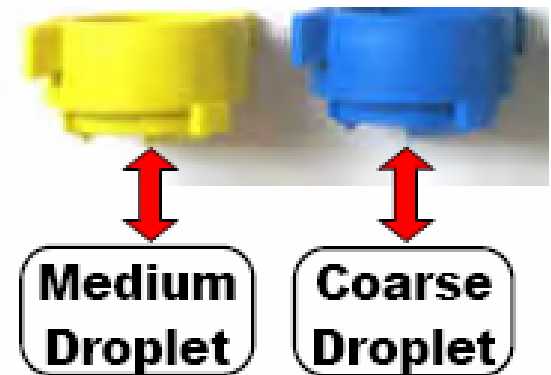
Turbo Flat-fan (TT)

Air Mix (AM)

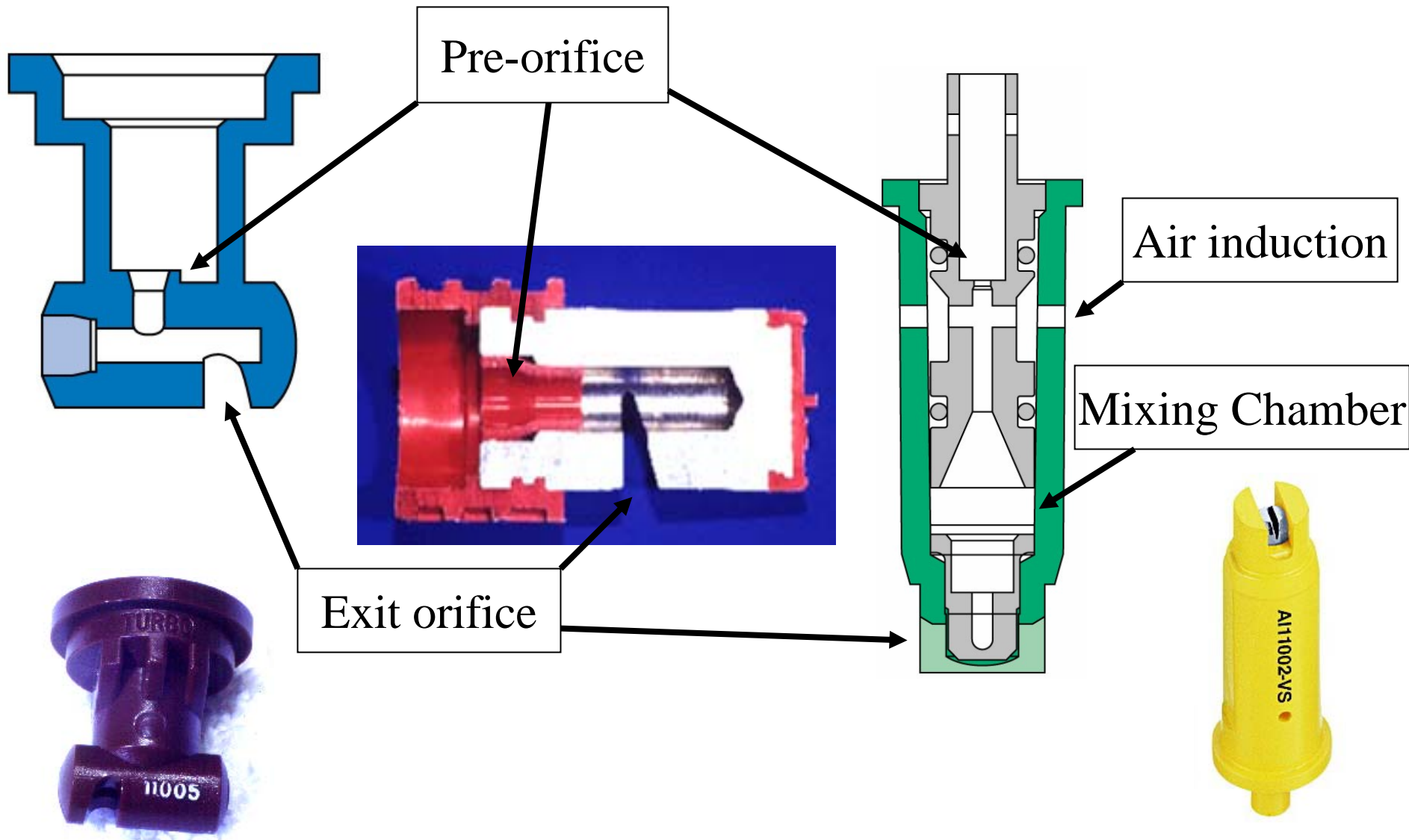
Ultra lo-drift (ULD)

Turbo Flat-fan Induction (TTI)

VariTarget (medium & coarse) VT



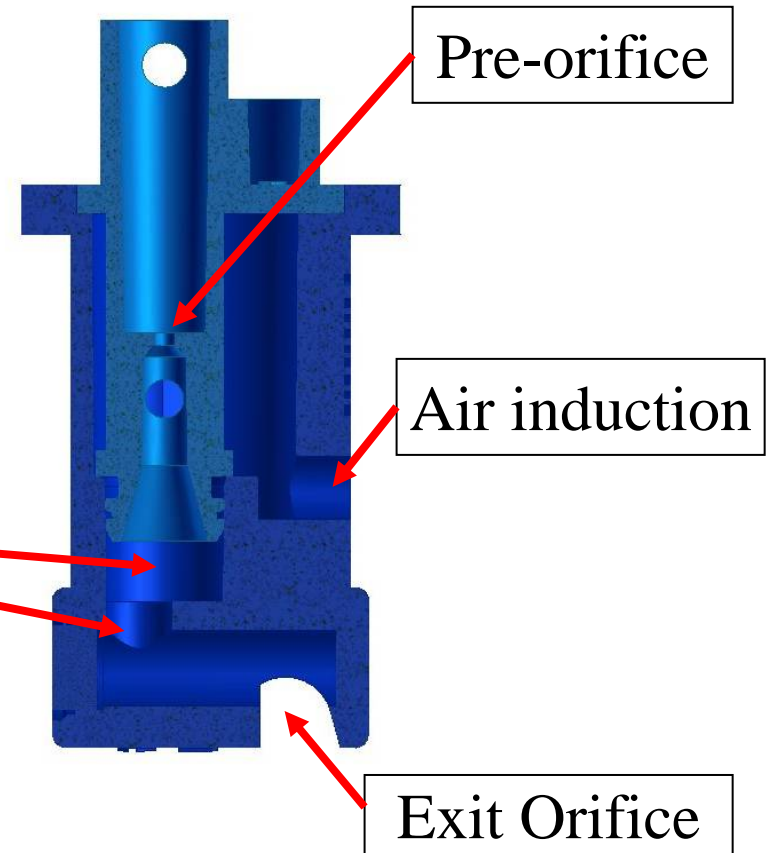
Turbo/Chamber/Venturi Flat-fans:



Next Generation Air Induction Tips:

- Next generation:
 - More compact
 - Larger drops
 - Operates at lower pressures
 - Percentage of fines do not increase with pressure

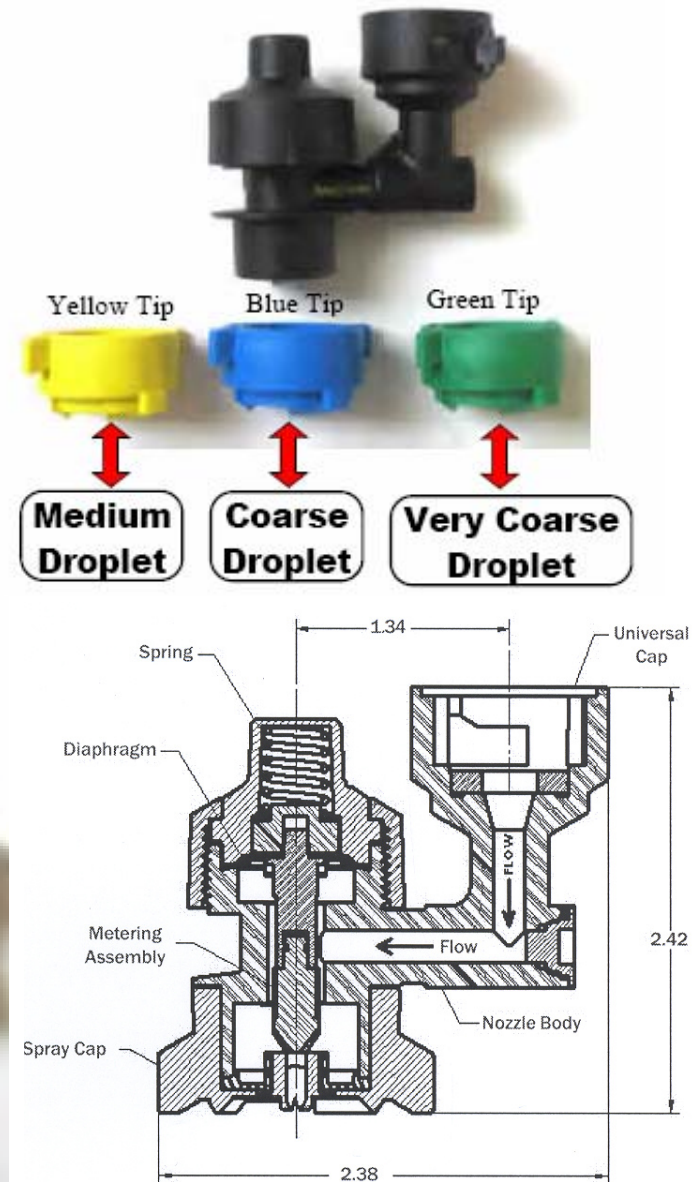
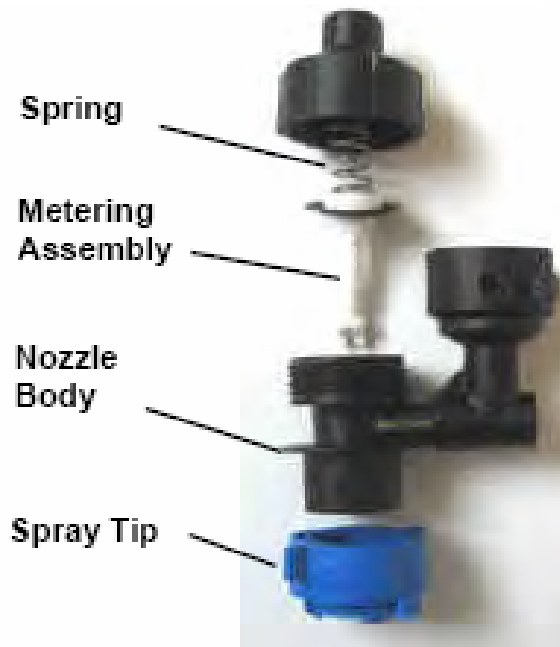
Primary and secondary expansion chambers



Variable rate application tip:

- Speed variations from 2-20 MPH
- Application rates of 5-40 GPA
- Variable area pre orifice
- Variable area spray orifice
- Optimize spray droplet size
- Maintain efficacy and minimize drift.

VariTarget



Results

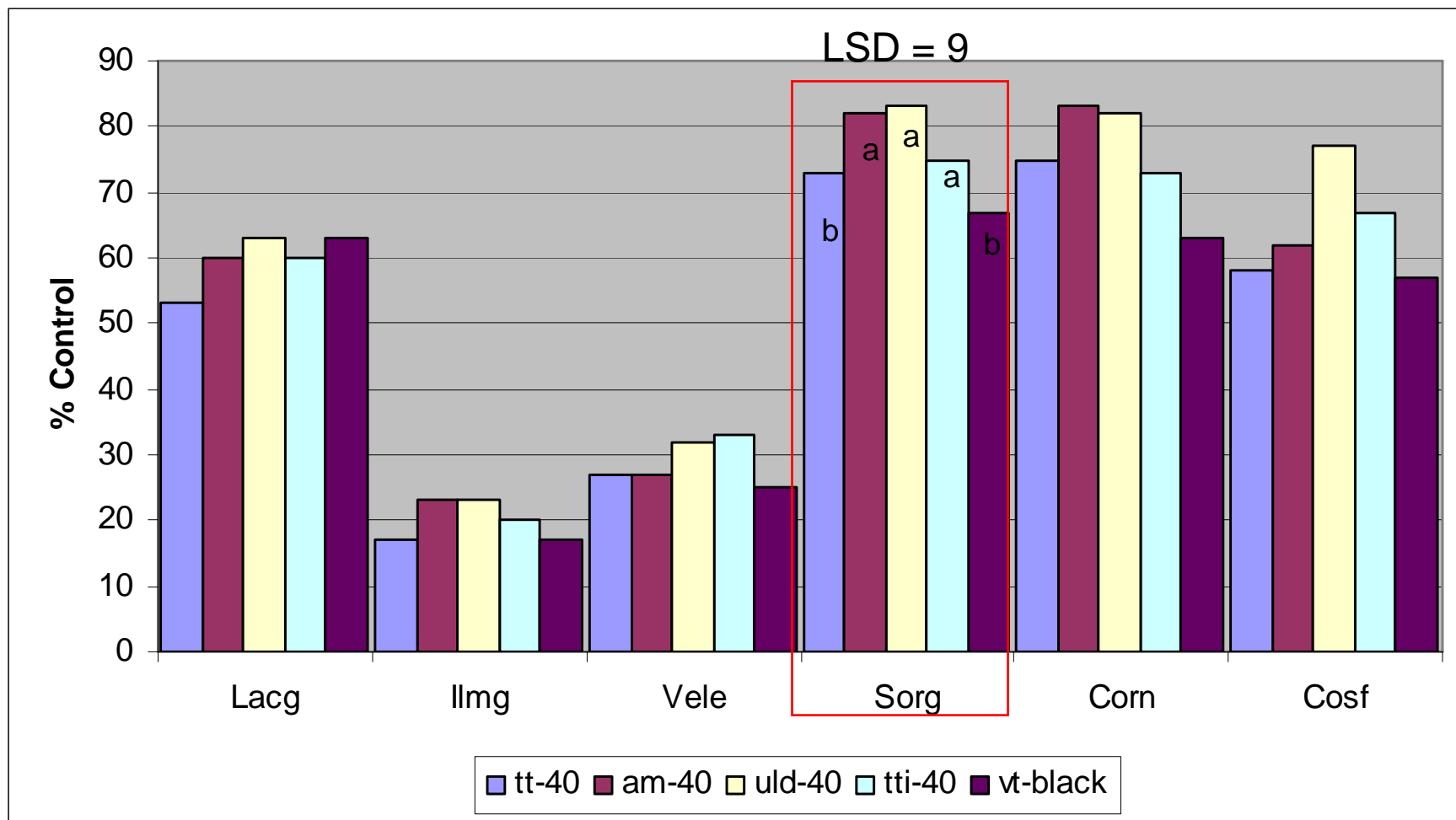


Discussion



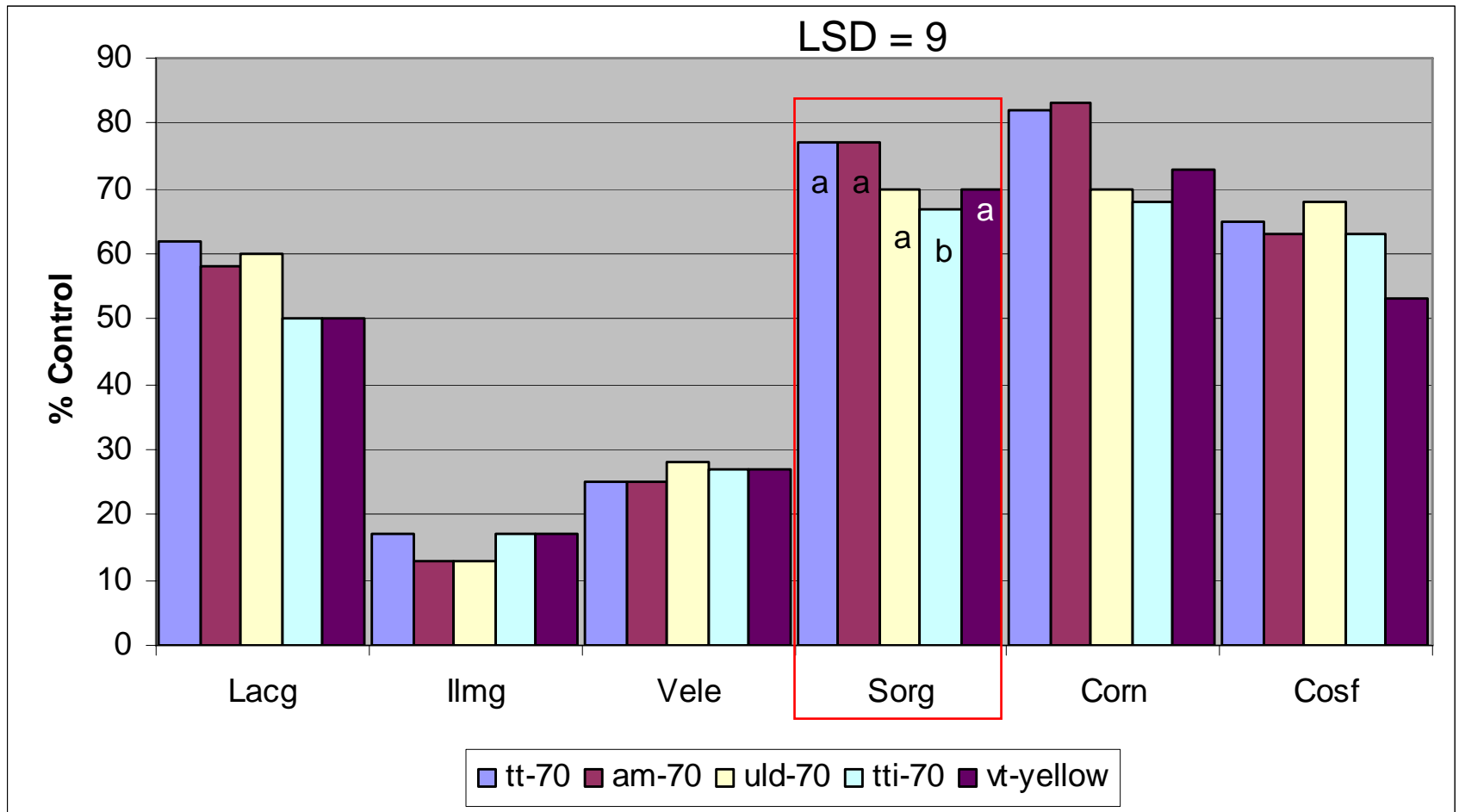
Glyphosate by Spray Tip

40 PSI- 28 DAT



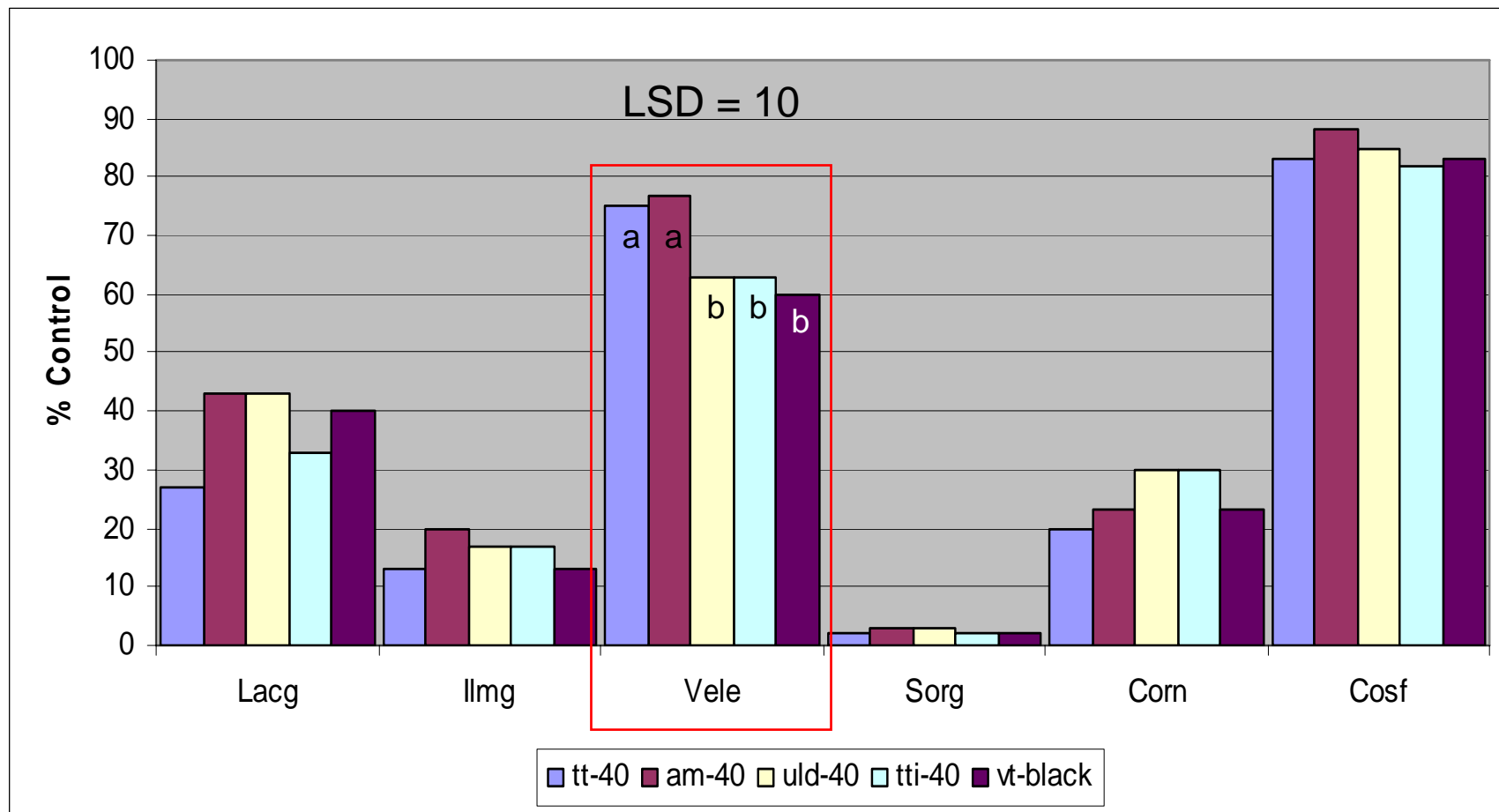
Glyphosate by Spray Tip

70 PSI - 28 DAT



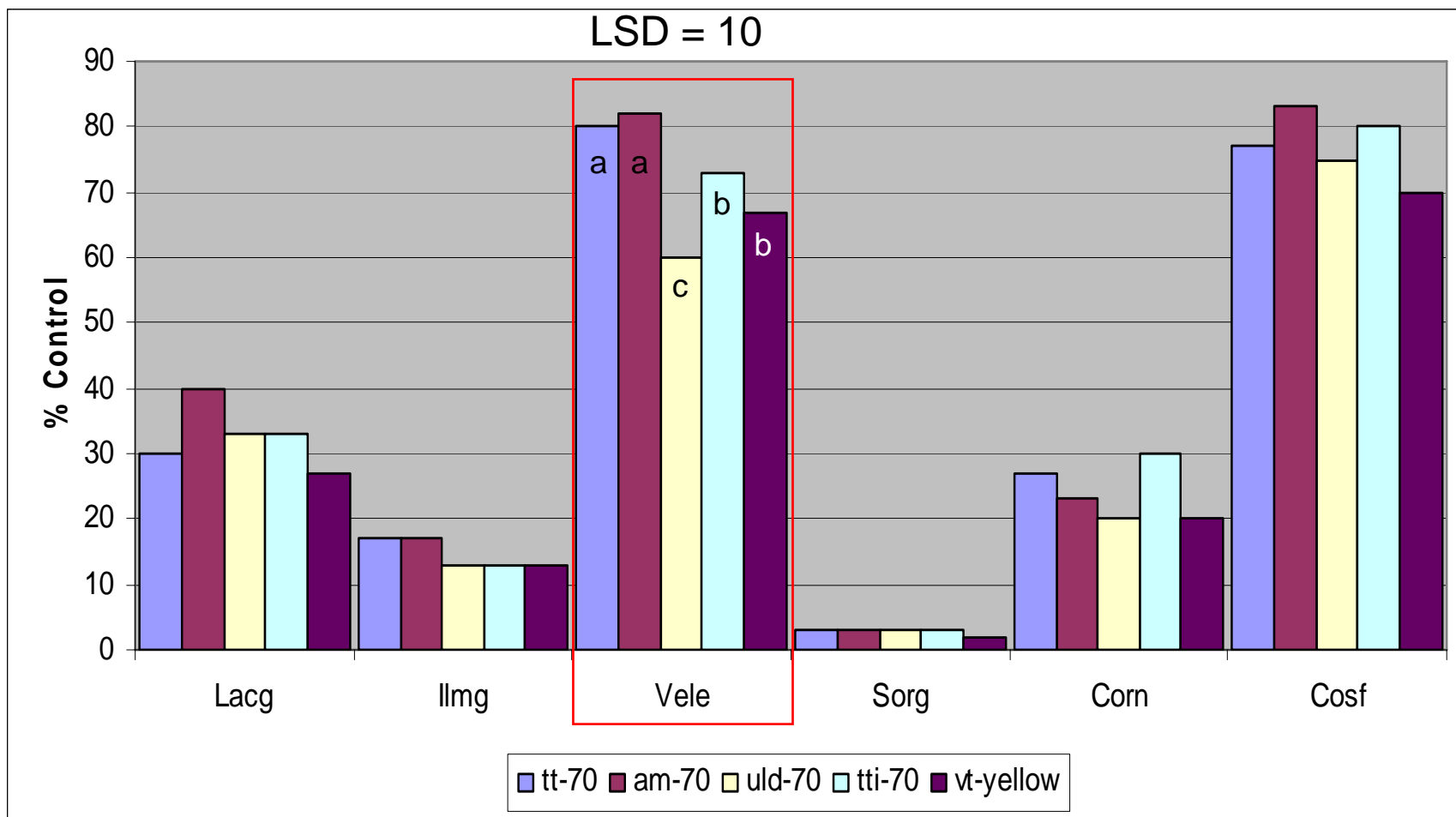
Gramoxone by Spray Tip

40 PSI- 28 DAT

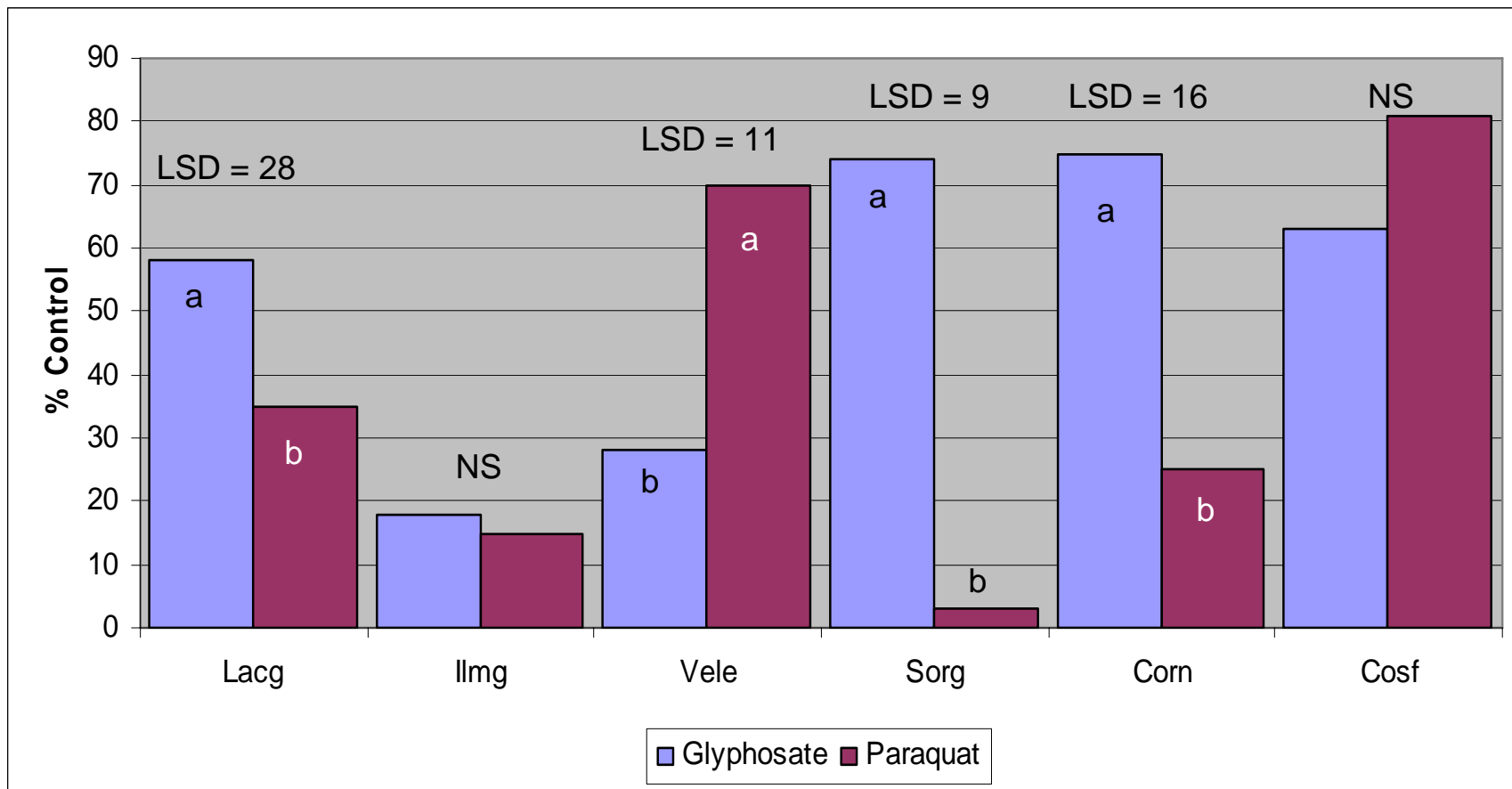


Gramoxone by Spray Tip

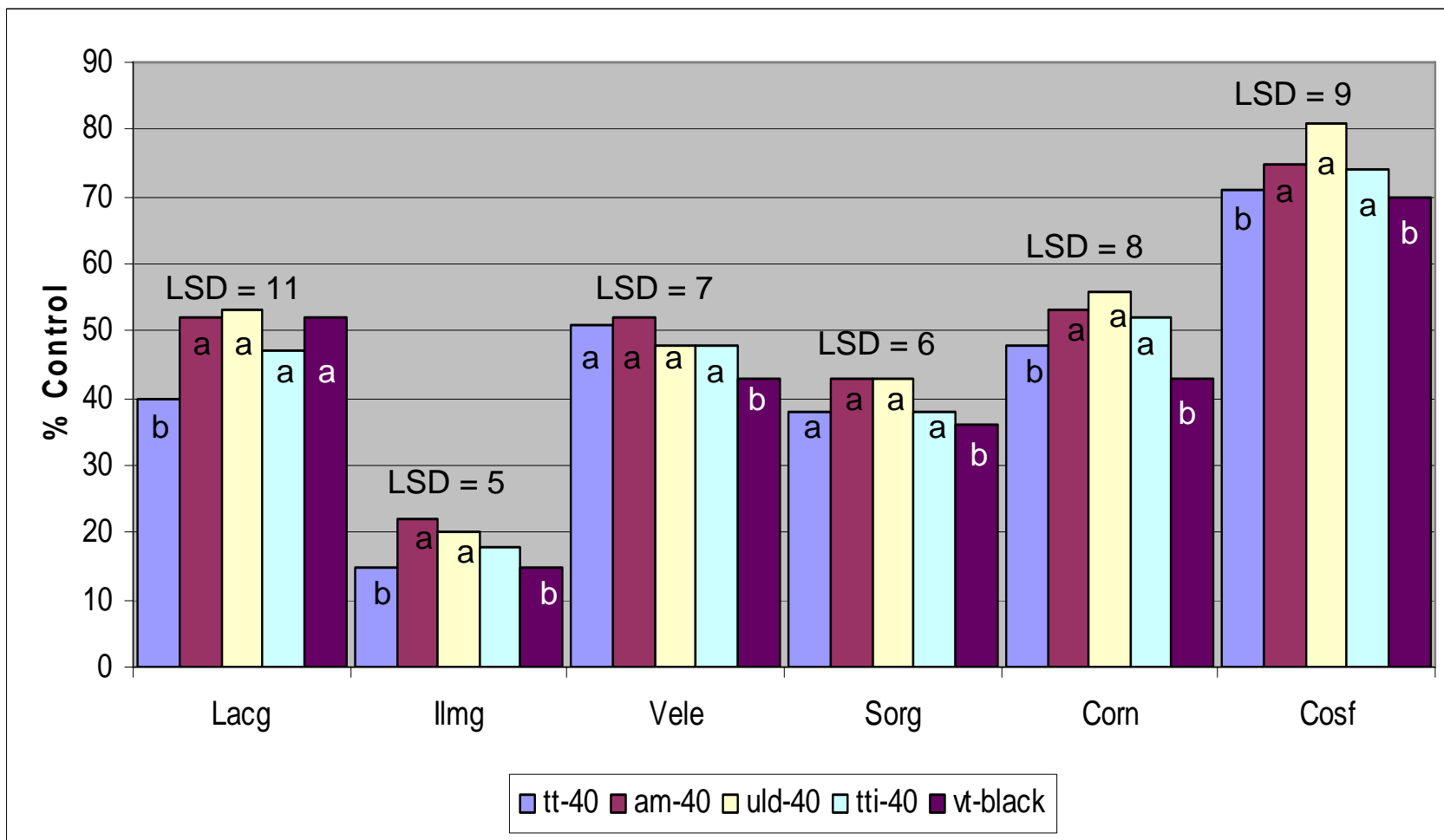
70 PSI - 28 DAT



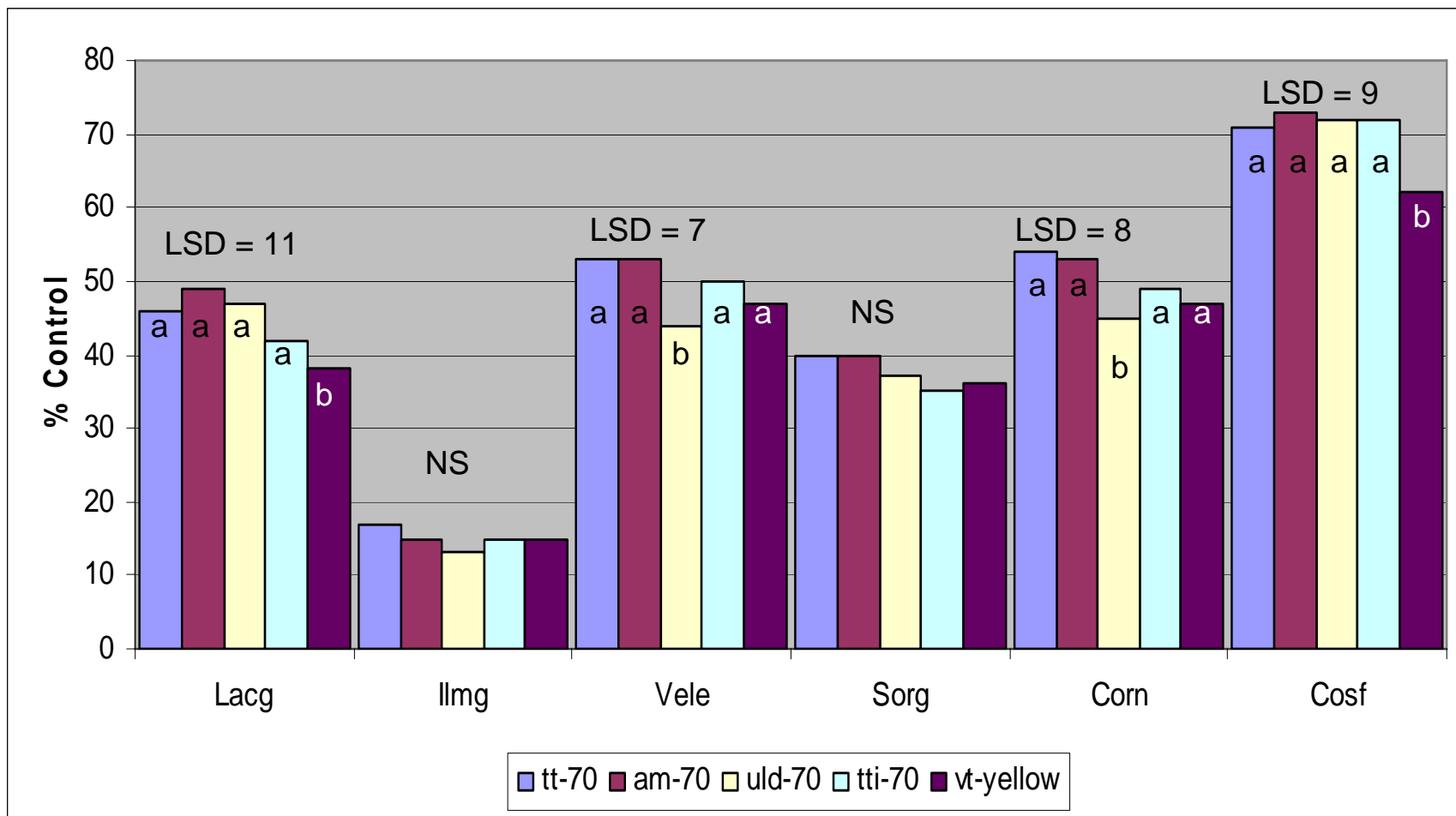
Chemical Across Spray Tip – 28 DAT



Spray Tip Across Chemical – 40 PSI



Spray Tip Across Chemical – 70 PSI



Summary of findings – glyphosate:

- The ULD was typically better at 40 PSI for all species. It was significantly better than the TT and VT for Sorg control.
- At 70 PSI the TT was slightly better except for Vele, Corn, and Cosf control. It was significantly better than the TTI for Sorg control.
- The only significance was found for Sorg control at both 40 and 70 PSI.

Summary of findings - paraquat:

- The AM was typically better control at 40 PSI except for Corn. It was significantly better than the VT, TTI, and the ULD for Vele control.
- The same trend was found at 70 PSI. The AM was significantly better than the ULD, TTI, and VT for Vele control.
- The only significance was found for Vele control at both 40 and 70 PSI.

Summary of findings across chemical:

- Glyphosate had significantly better control with Lacg, Sorg, and Corn among nozzles.
- Vele was controlled best with paraquat.
- Cosf and Iimg control was not significantly different with either chemical.

Conclusions:

- The ULD performed best with glyphosate at the low pressure with the TT best at the high pressure. This trend is reverse of what was expected and somewhat different from last year.
- With paraquat, the AM did best at both low and high pressure.
- The new TTI and the new variable rate (VT) did not perform as well when compared other tips with the VT being significantly less in several comparisons.



Thanks