
West Texas Ag Chem Institute Conference

Sorghum New Herbicide Technologies

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United Sorghum Checkoff



Preemergence Herbicides

Active Ingredients (7)

atrazine →

Group 15 herbicides

metolachlor →

acetochlor →

dimethenamid →

mesotrione →

saflufenacil →

Imazamox →

Products

Atrazine

Dual, generics

Warrant

Outlook

Callisto, generics

Sharpen

ImiFlex

Premixes

Bicep, generics

atz+metolachlor

Degree Xtra, Fulltime NXT

atz+acetochlor

Lumax, Lexar

atz+metol+mesotrione

Verdict

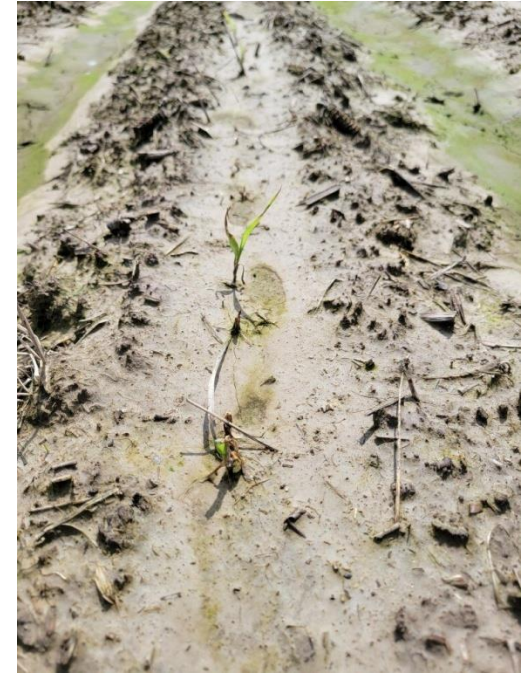
Saflufenacil+dimethenamid

Mesotrione Crop Injury

12 DAT



24 DAT



Mesotrione

Rotation Interval

- Corn and sorghum anytime
- Wheat 4.5 months
- Cotton, peanuts, soybeans the following spring

Soil Type Restrictions

Do not apply to sand, sandy loam or loamy sand soils

Application Timing

- 0 to 21 days prior to planting
- Reduced injury if applied more than 7 days preplant
- Split application – preplant and pre

Rate

Max – 0.19 lb ai or 6 oz Callisto
Most formulations – 0.16 lb ai or 5 oz Callisto equivalent

Postemergence Herbicides

Active Ingredients (8)

atrazine →

2,4-D →

dicamba →

fluroxypyr →

bromoxynil →

prosulfuron →

Metsulfuron+2,4-D →

pyrasulfotole +

bromoxynil + →

fluroxypyr

Product

Atrazine

2,4-D, many

Clarity, Banvel, Other

Starane, StareDown

Moxy, Others

Peak

Ally + 2,4-D

Huskie FX



Much Less Used

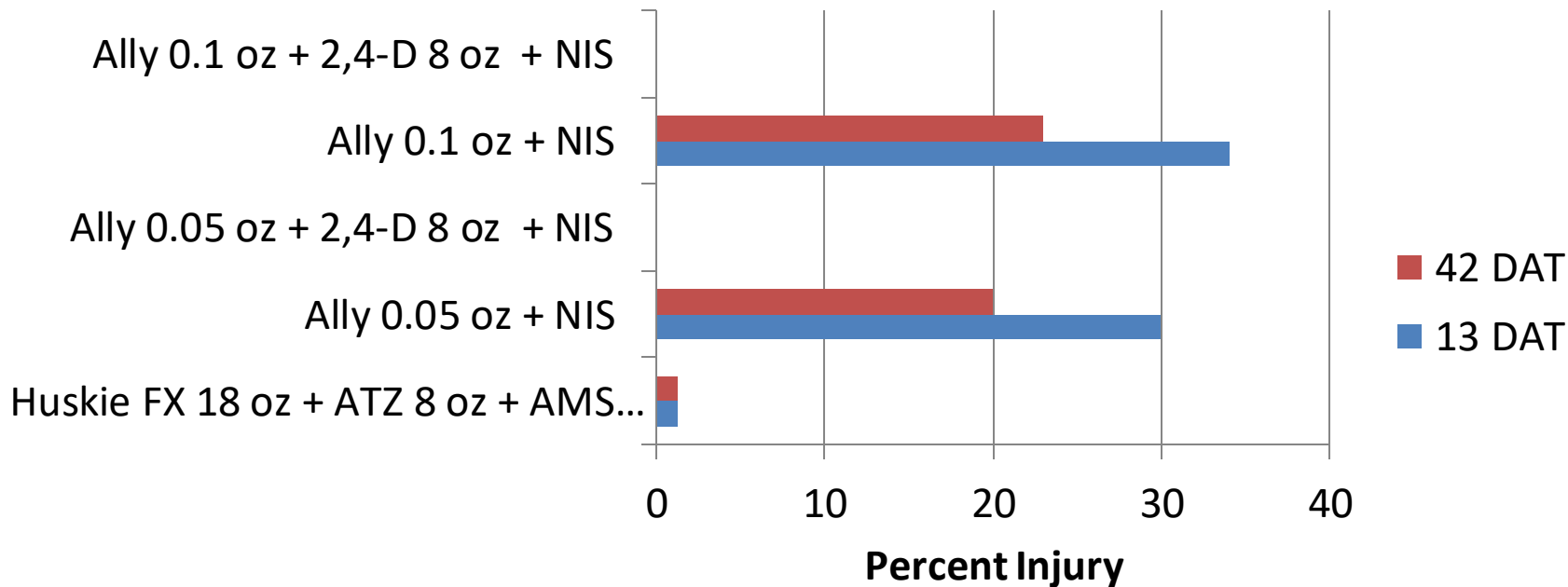
carfentrazone – Aim, halosulfuron – Permit, Yukon

Ally & 2,4-D Amine

- Use in grain sorghum for control of broadleaves
- Interesting synergism occurs between the two herbicides
- Some stunting **may** still occur but crop will recover
- Not labeled for use with non-ionic surfactant
- Rate: 1/20 oz/ac + 2,4-D amine 8 oz/ac



Post Application Crop Injury Hays, KS 2022

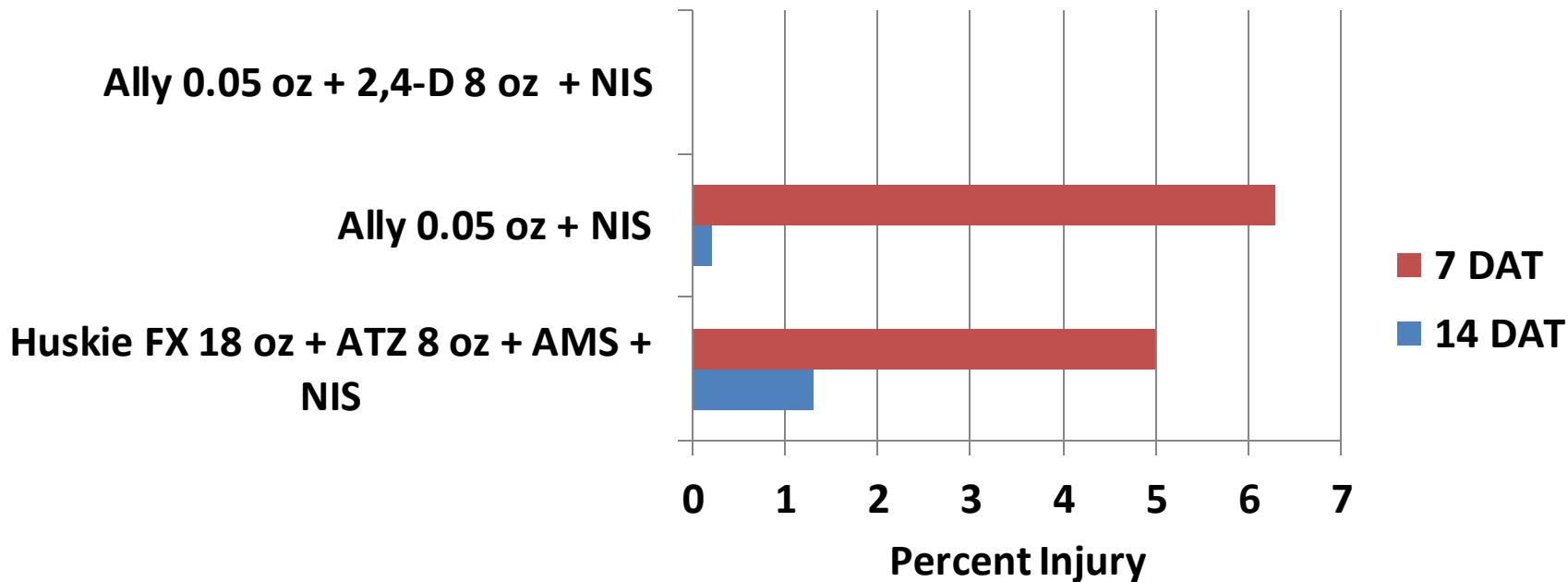


Application: June 22

Water: 15 GPA

Source: KSU Kumar

Post Application Crop Injury Lubbock, TX 2023

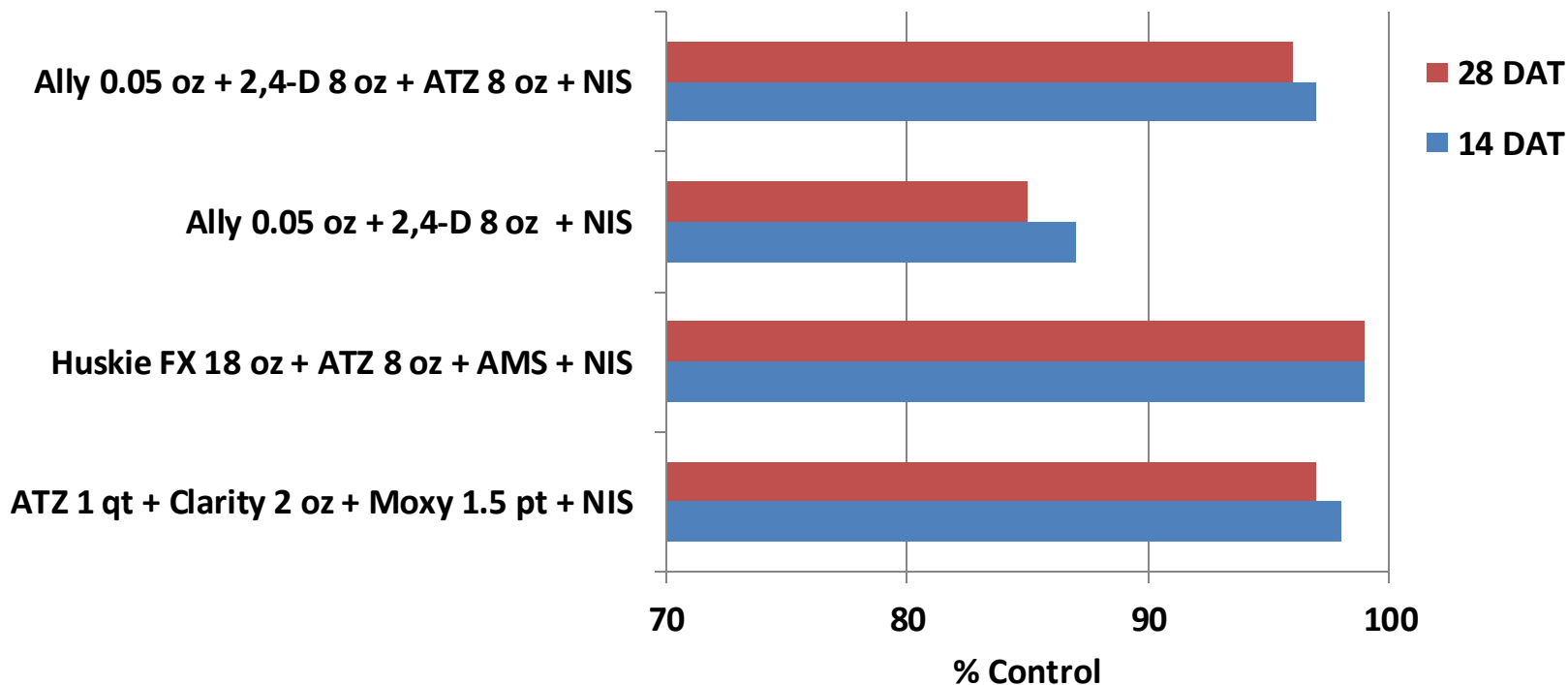


Application: 5 inch sorghum
Water: 15 GPA

Source: TAMU
Keeling/White



Post Palmer Amaranth Control Lubbock, TX 2023



Application: 3 inch weeds, 5 inch sorghum
Water: 15 GPA

Source:TAMU
Keeling/White



Lubbock, TX 2023 Palmer amaranth Control



Ally 0.05 oz + 2,4-D 8 oz
+ATZ 8 oz + NIS



Huskie FX 18 oz +
ATZ + AMS + NIS



Untreated

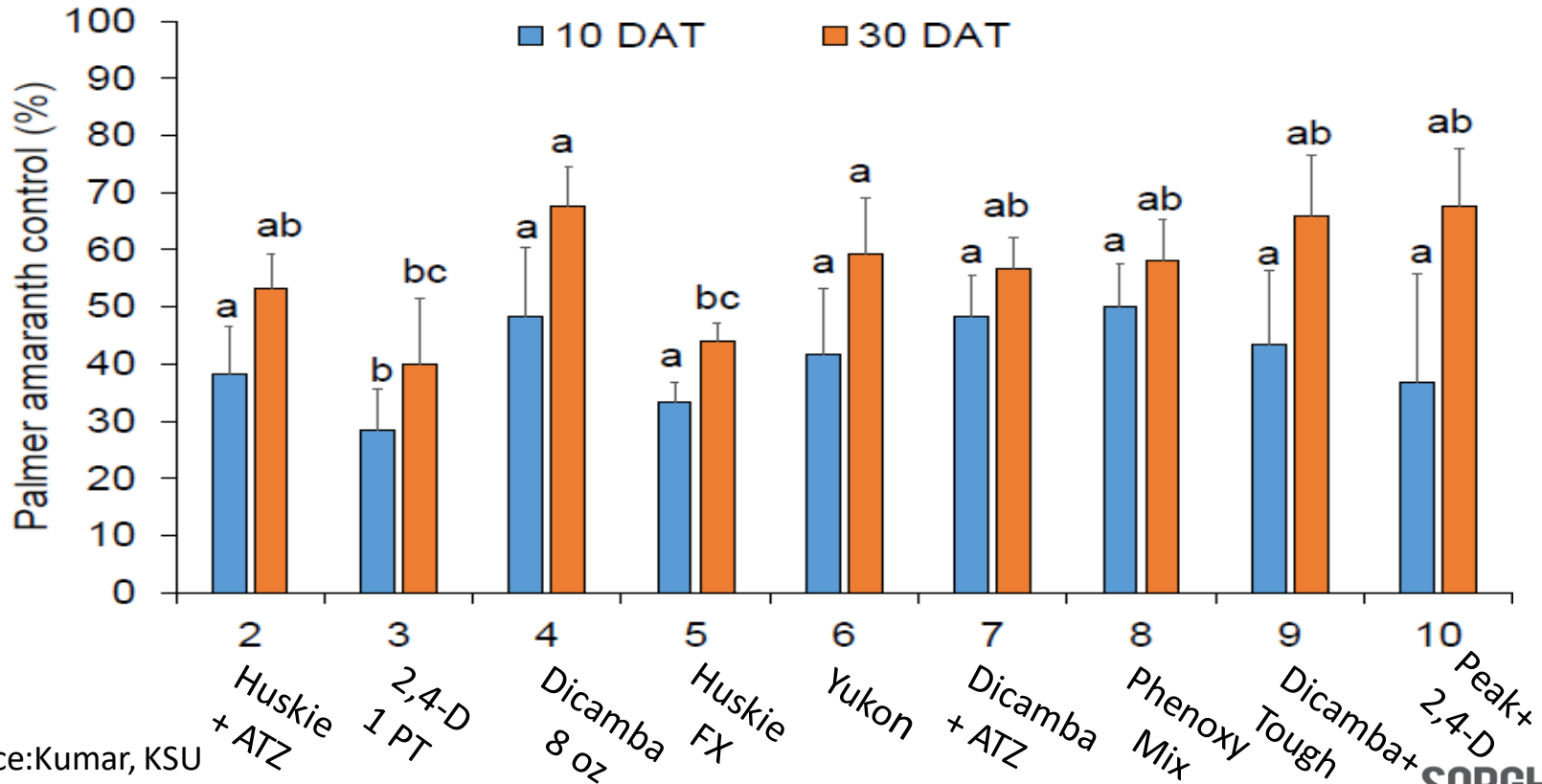
Now What?!



Late season weed control, what are the options?

- **Huskie FX** – 18 oz, up to Flag leaf or 30 inches
- **Peak** – 1 oz, 30 inches or prior to heading
- **Clarity** – 8 oz, Anytime after **soft dough** is reached. 30 day PH.
- **2-4-D** – 1 pt ,Don't treat from boot to early dough stage
- **Aim** – Up to 1 oz/A, Do not apply past pre-boot stage, Harvest-Aid 3 days prior to harvest.
- **Atrazine** – 12 inches
- **Roundup** – after physiological maturity, Up to 44 oz Power Max rate, 7 DPI
- **Sodium Chlorate (Defol)**, 3.6 to 4.8 qt, 7-10 days pre harvest
- **Sharpen** – 1-3 oz, Not labeled in sorghum but is for wheat, sunflower and soybean, 3 DPI in those crops.

Rescue Post Treatments (boot)



Source: Kumar, KSU

3 Herbicide Technologies

- **Inzen
(ALS – SU)**
- **igrowth (ALS
(ALS - IMI)**
- **Double Team
(ACCCase - Fop)**

All non-GMO



Herbicide Technologies

| | igrowth | Inzen | Double Team |
|------------------------|-------------|-----------------|---------------|
| Companies | Advanta/UPL | Pioneer/Corteva | S&W/ADAMA |
| Herbicide | ImiFlex | Zest | FirstAct |
| Mode-of-Action | ALS (Imi) | ALS (SU) | ACCCase (Fop) |
| PRE | ✓ | | |
| POST | ✓ | ✓ | ✓ |
| Broadleaf Activity | Moderate | A little | None |
| Crop Rotation Concerns | Wheat? | Minimal | None |
| Seed Per Bag | 600,000 | 50 lb | 600,000 |

igrowth[®] - 2023

Seed from Advanta (Alta)

igrowth Seed ≈ \$261/bag **MSRP, 600 seed/bag**

ImiFlex Herbicide (imazamox) from UPL ≈ \$287/gal or
6 oz = \$13.50 and 9 oz = \$20.20 (price can be
variable)

Apply PRE at 9 oz and in most cases should be
applied in combination with an acetamide herbicide

OR

Apply POST at 6 oz following an acetamide PRE
treatment



Double Team™

Seed from S&W (Sorghum Partners)

- Seed sold in 600,000 seed/bag
- Double Team Seed: ≈ \$306/bag

FirstAct™ – Sold by ADAMA

Cost: ≈ \$1.00/oz = \$10/acre



Double Team™ - 2023

FirstAct™

- Quizalofop is a proven over-the-top grass herbicide
- Most common use rate – 10 oz
- **Apply to > 11 inch sorghum for crop safety**
- **Do not apply mixed with other herbicides**



Grass resistance to ACCase is relatively low compared to ALS herbicides



Inzen™ - 2023

- **P 85Z65:** limited in 2023
 - 114 CRM / 70 RM
- Zest (nicosulfuron) we have experience with the product
- Very good activity on grass species, but limited broadleaf activity
 - SU grass resistance may be present in some fields



HT Estimated Seed and Herbicide Cost 2023*

| | igrowth | Double Team | Inzen |
|--------------------------|------------------|--------------------|------------------|
| Seeding Rate/acre | Cost/acre | Cost/acre | Cost/acre |
| 30,000 | \$17.66 | \$16.56 | \$16.24 |
| 50,000 | \$21.35 | \$21.59 | \$21.35 |
| 70,000 | \$25.03 | \$26.63 | \$26.47 |
| 90,000 | \$28.72 | \$31.67 | \$31.58 |

*Assuming 10% discount over MSRP for seed and herbicide. Subtracted the cost of conventional seed (\$145/bag 700,000 seed). Does not include application cost or adjuvants. 6 oz ImiFlex, 10 oz FirstAct and 0.68 oz Zest rate.

Rotational Restrictions

| Product | Corn (Field) | Soybeans | Wheat (winter) | Cotton | Sorghum |
|----------|--------------|----------|----------------|-----------|----------------------|
| Zest | Anytime | 15 days | 4 months | 10 months | 10-18 months* |
| IMIFLEX | 8.5 months | Anytime | 3 months** | 9 months | 18 months |
| FirstAct | 4 months | Anytime | 4 months | Anytime | 4 months*** |

* Cannot plant sorghum with ALS resistant traits for 18 months

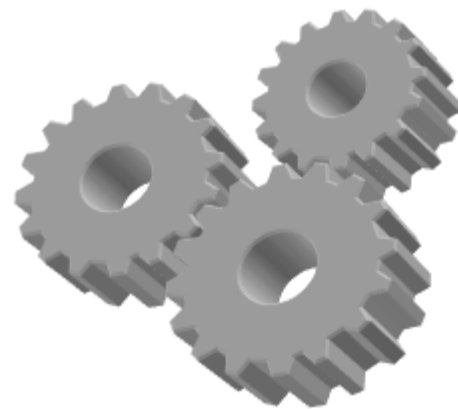
**If < 10 inches of rain/irrigation during the growing season plant back to wheat is 15 months

***Cannot plant Double Team Sorghum in consecutive years



Use in a Weed Control System

- Pre-plant – Start clean
- Pre-emergence – Group 15 herbicide
- Post-emergence
- Broadleaf help





Source: Corteva – Jeff Krumm



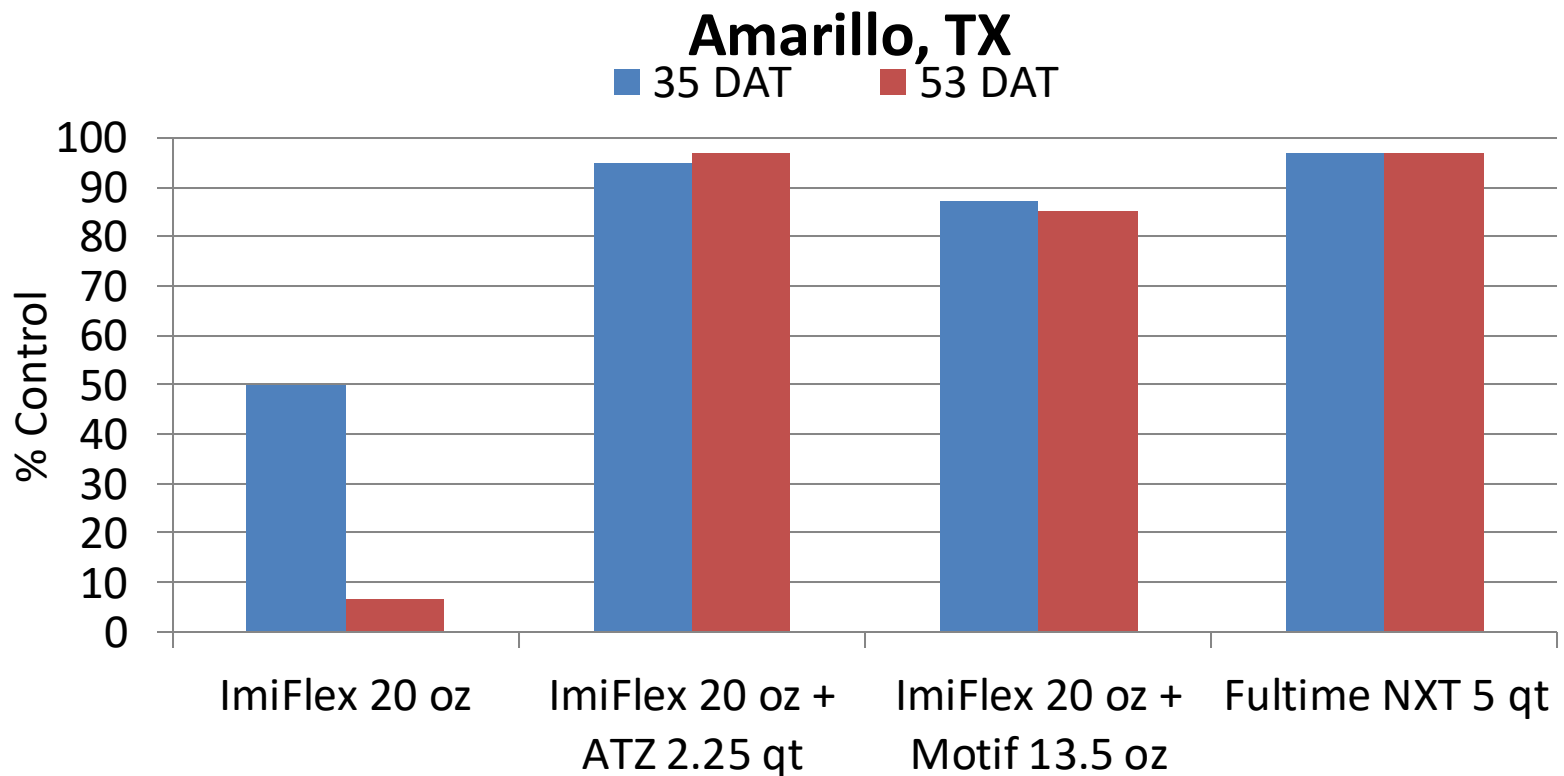
Source: Corteva – Jeff Krumm



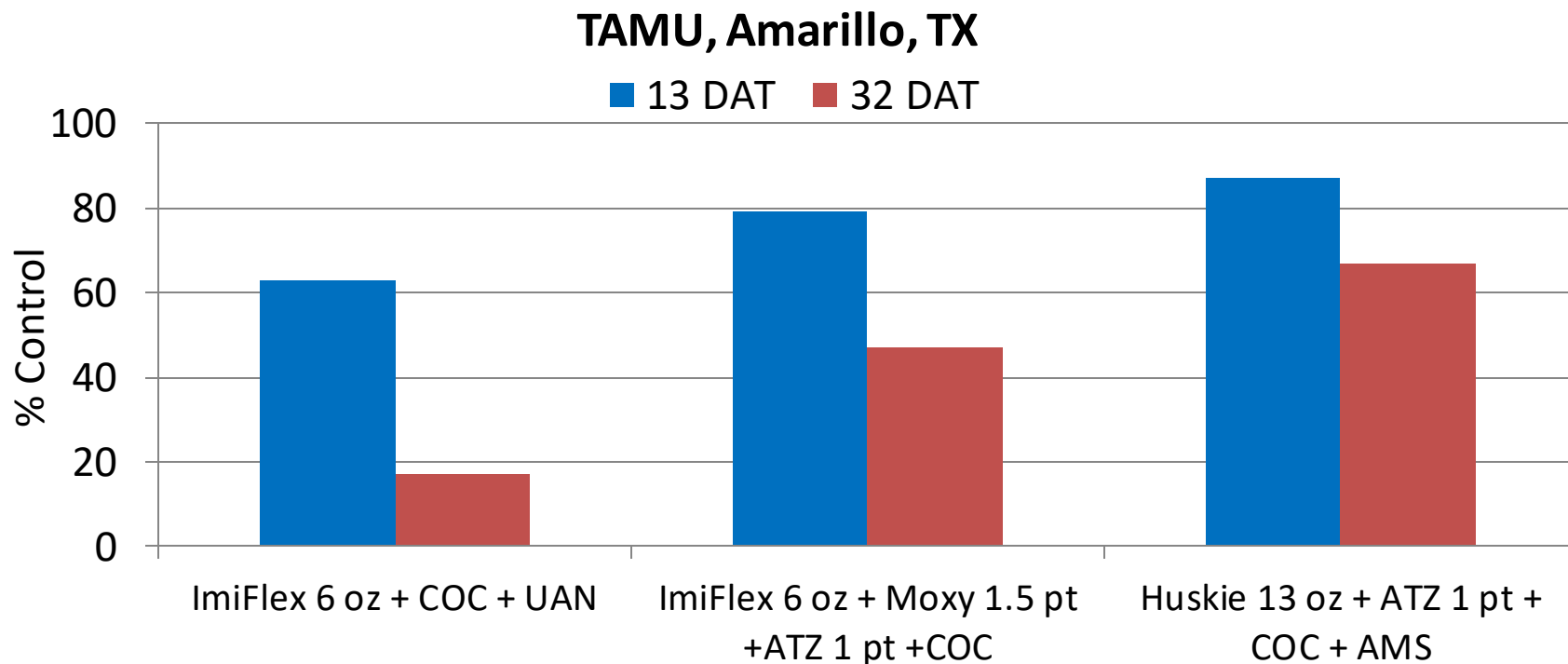
Source: Corteva – Jeff Krumm



2021 PRE Application – Palmer Amaranth

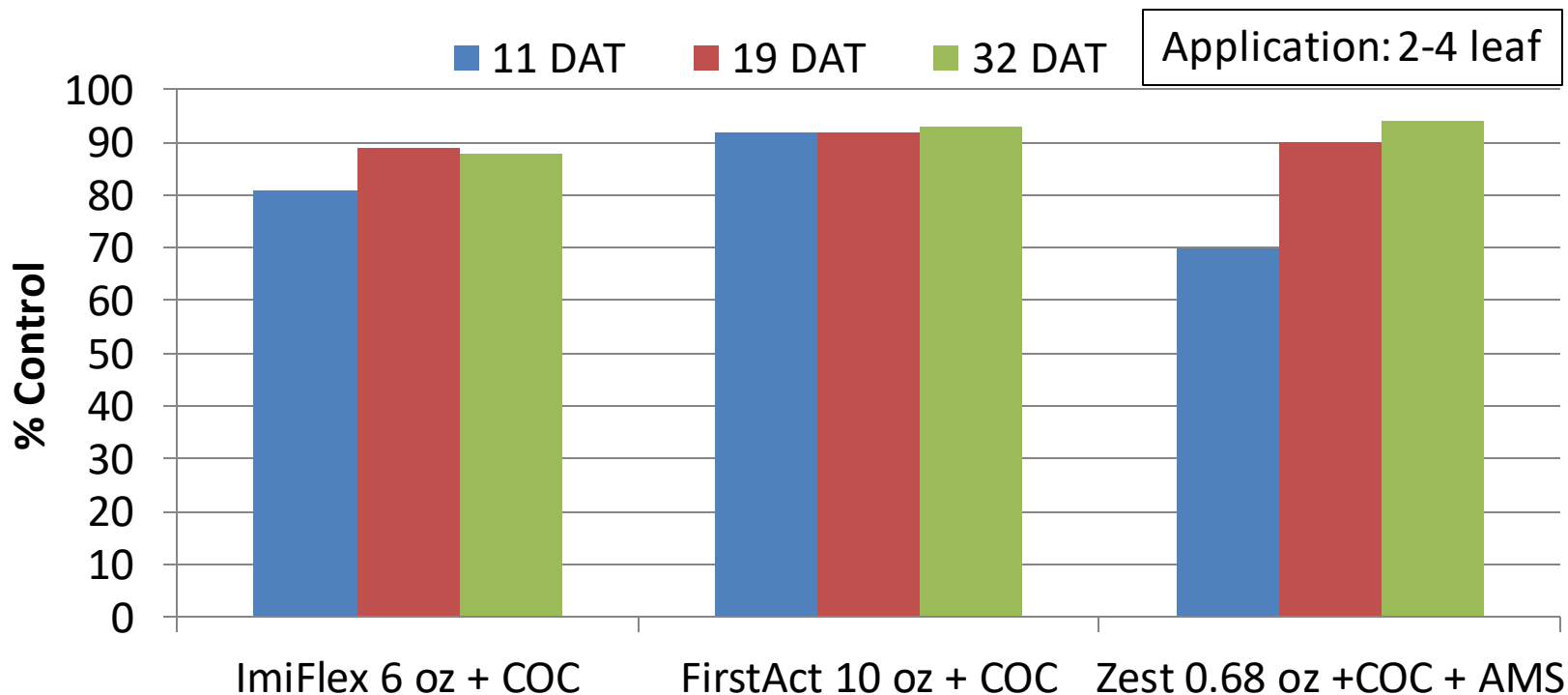


2021 POST Application – Palmer Amaranth



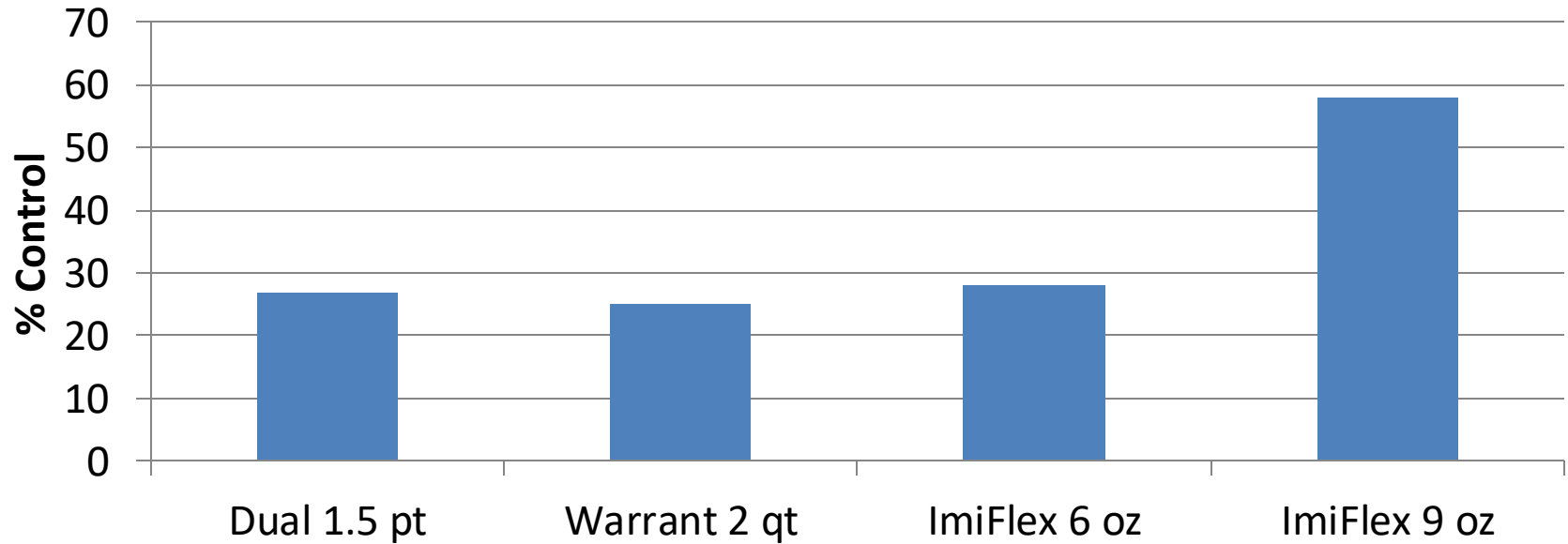
Source: TAMU, J. Bell & K Heflin

Sandbur POST Control near Akron, Colorado 2021

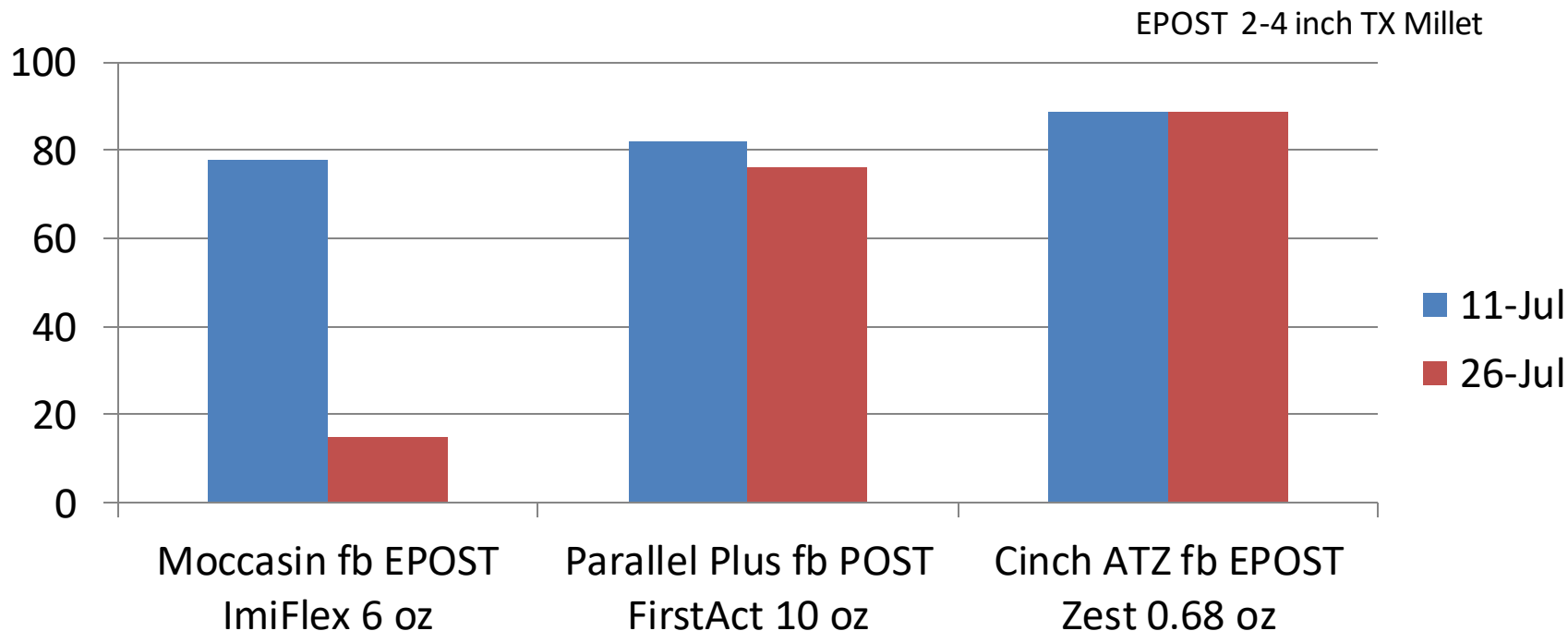


Sandbur PRE Control near Akron, Colorado 2021

70 DAT



ImiFlex, FirstAct and Zest Comparison – TX Panicum (Millet) POST – 2022, Lubbock, TX



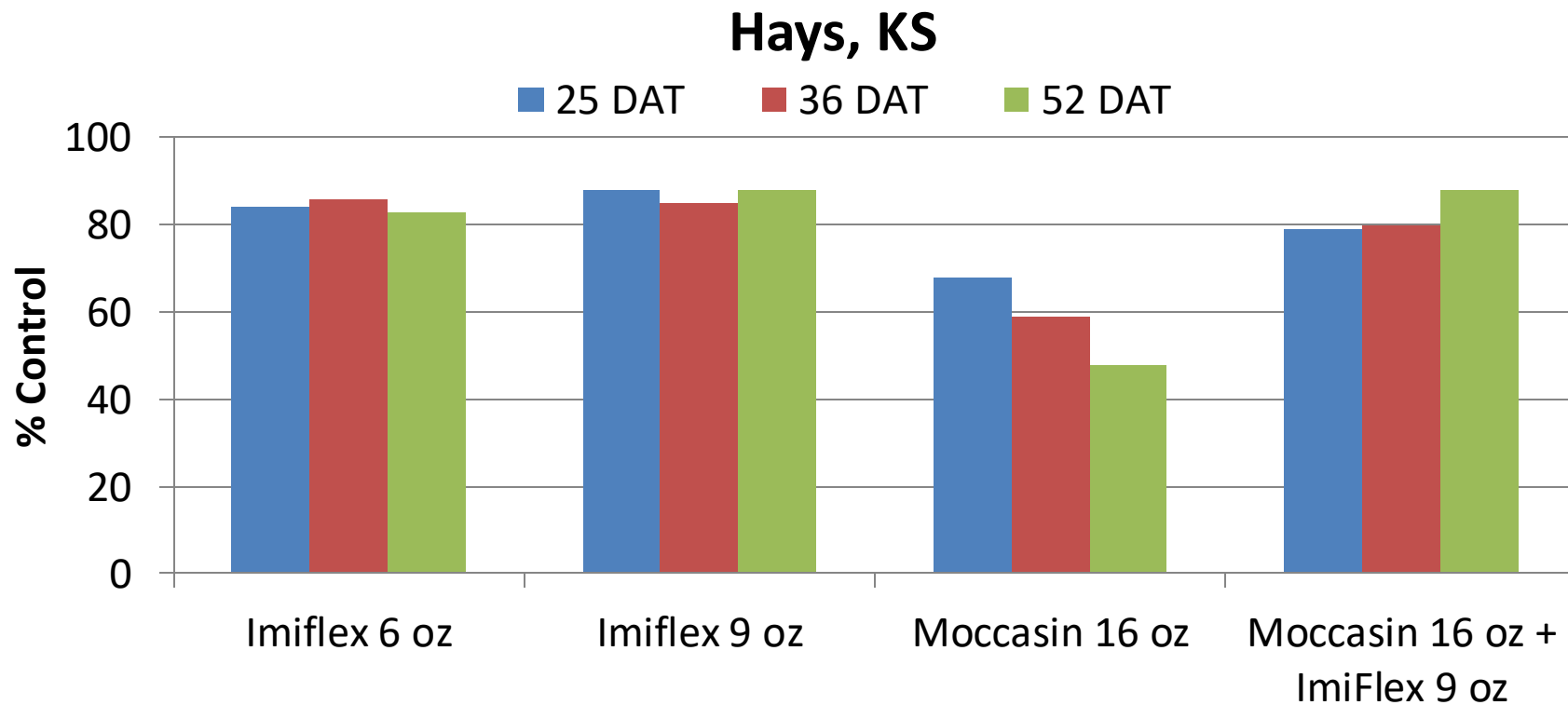
EPOST: June 22

POST: June 30

Rainfall: 0.93 in June 2

Source: Pete Dotray, TAMU

ImiFlex PRE Application – Green Foxtail Control – 2021

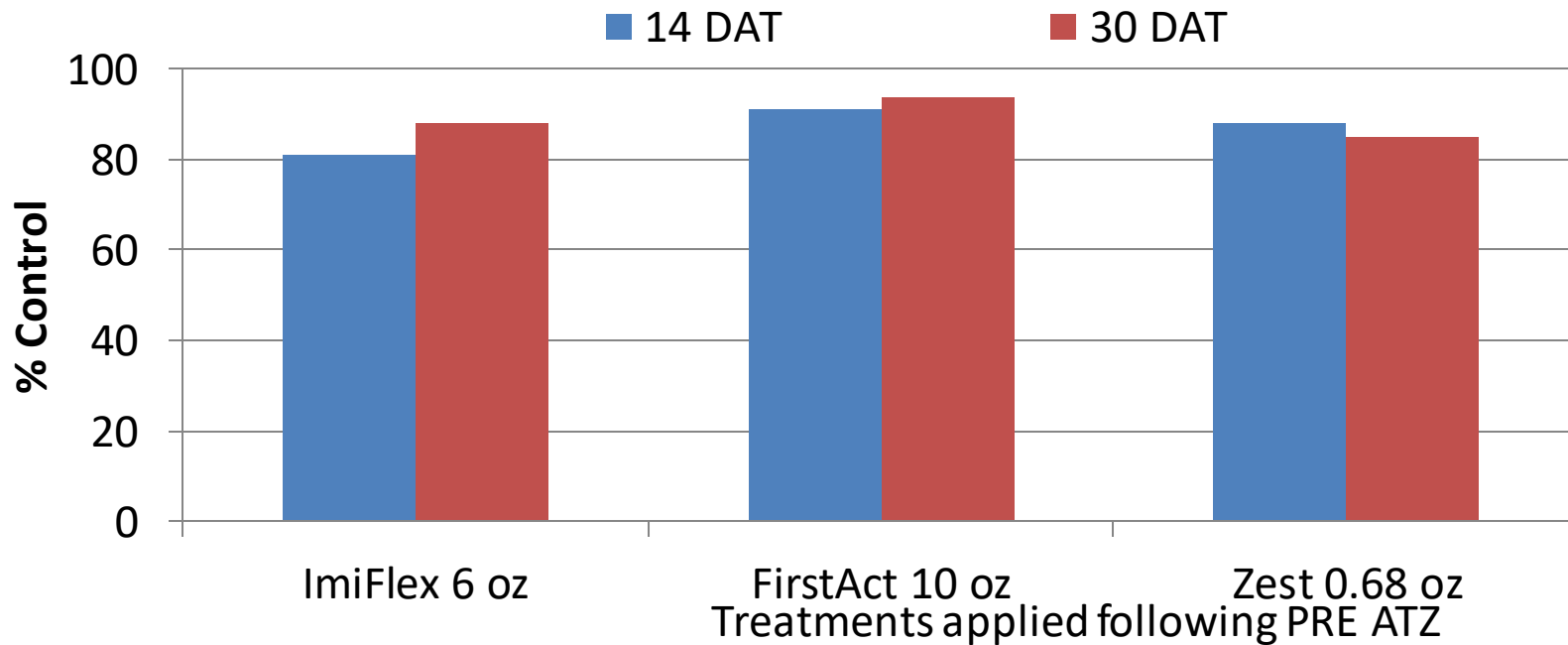


Source: Vipin Kumar

Herbicide Comparison Hays, KS - 2021

Green Foxtail

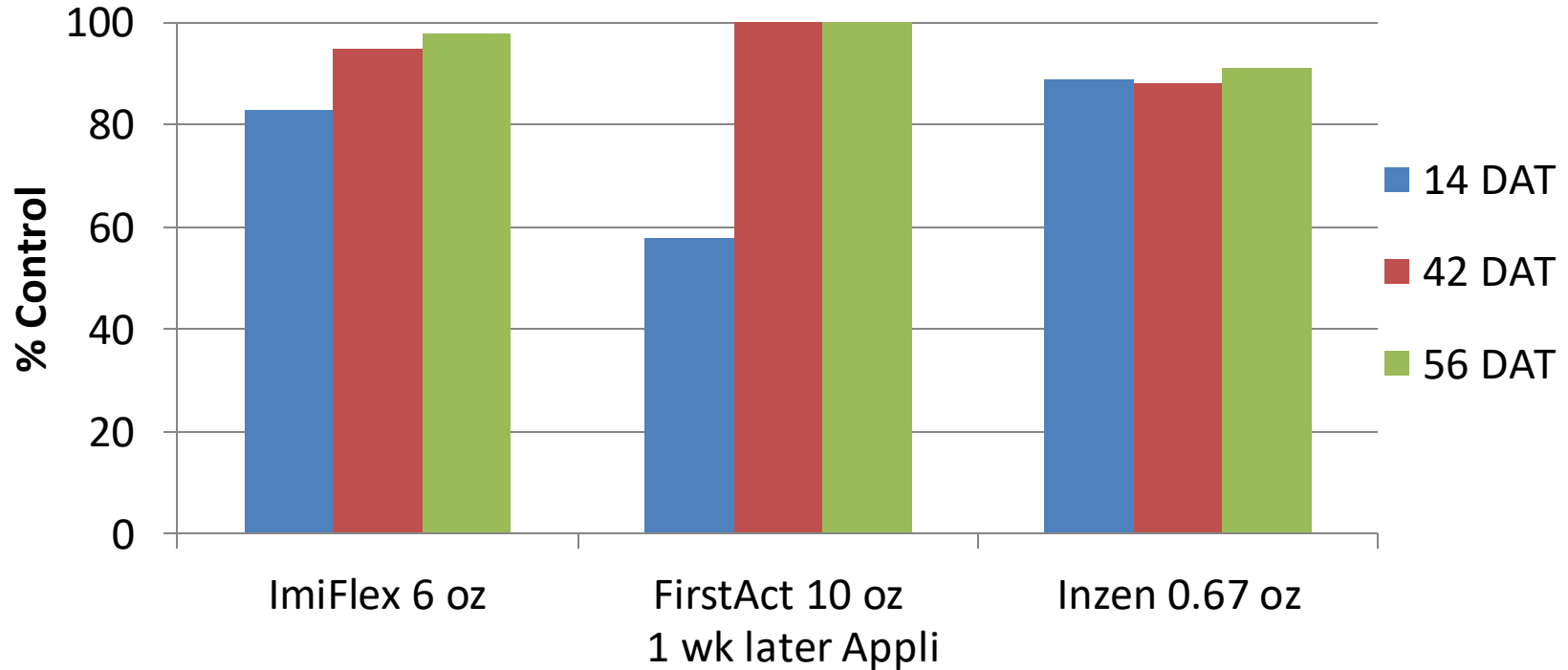
Application: size: 3 lf



Source: Vipin Kumar

Control of Volunteer Sorghum - 2022

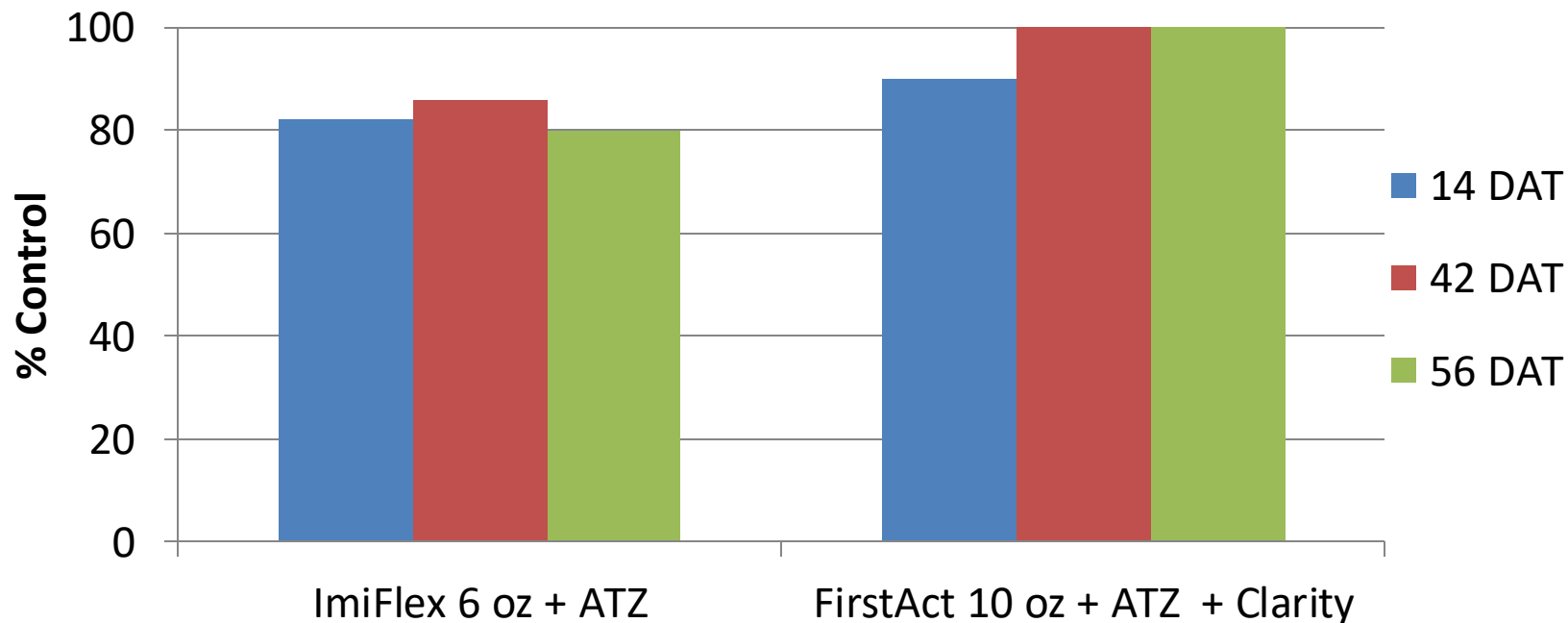
Garden City, KS



Source: Currie and Gier, KSU

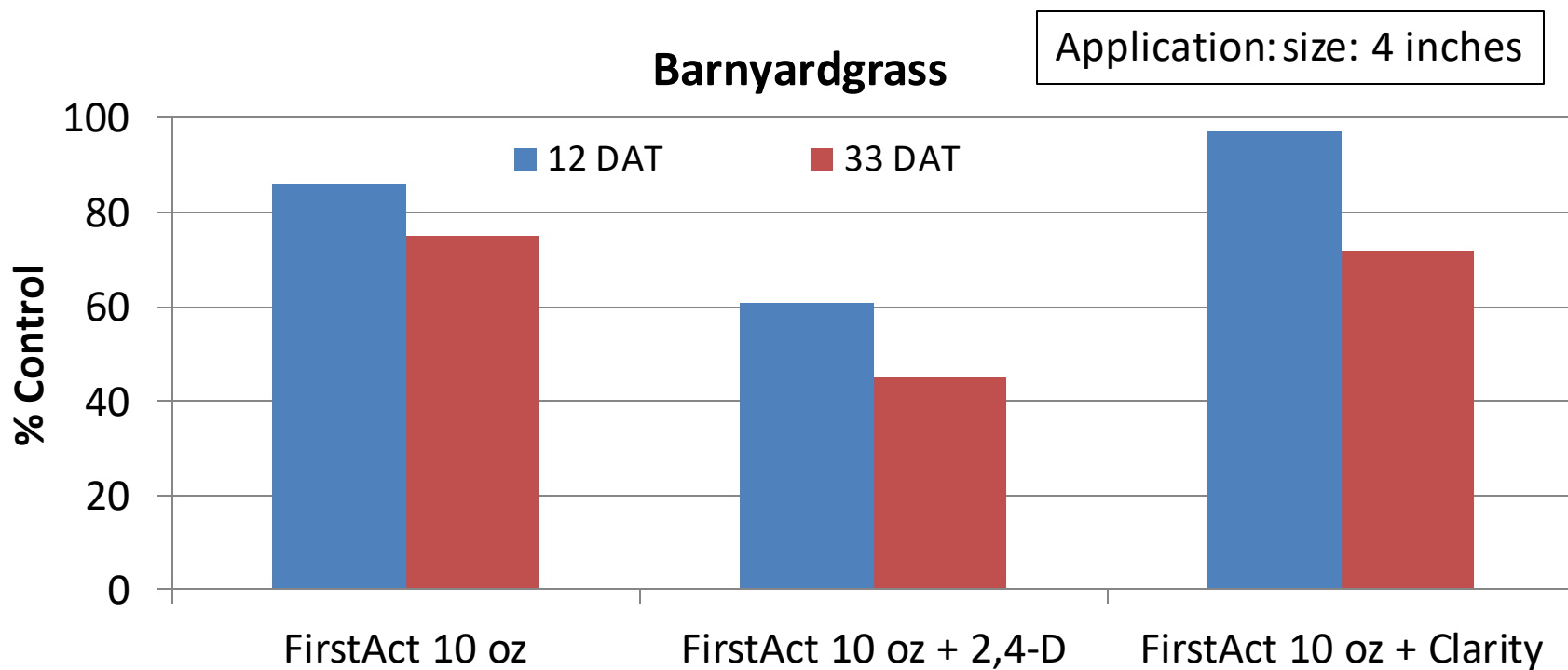
ImiFlex and FirstAct Control of Volunteer Corn - 2022

Garden City, KS

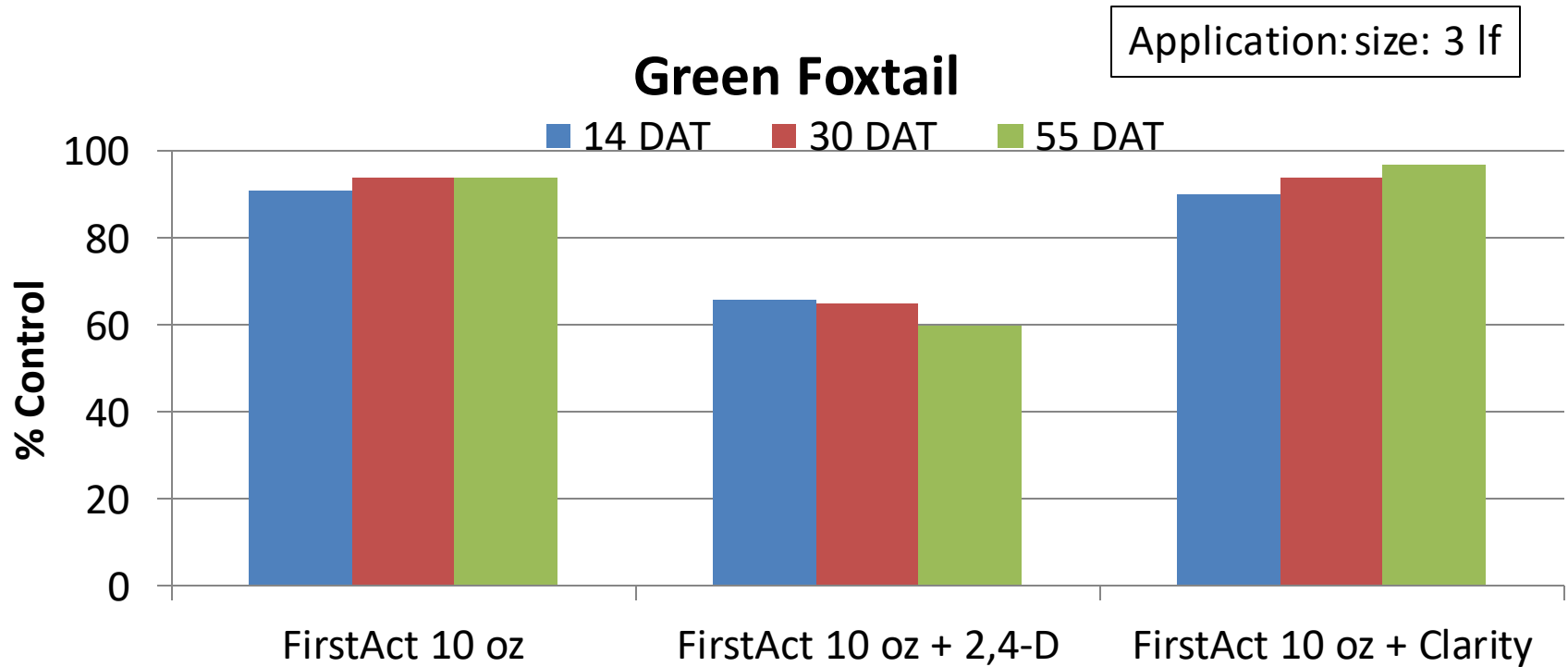


Source: Currie and Gier, KSU

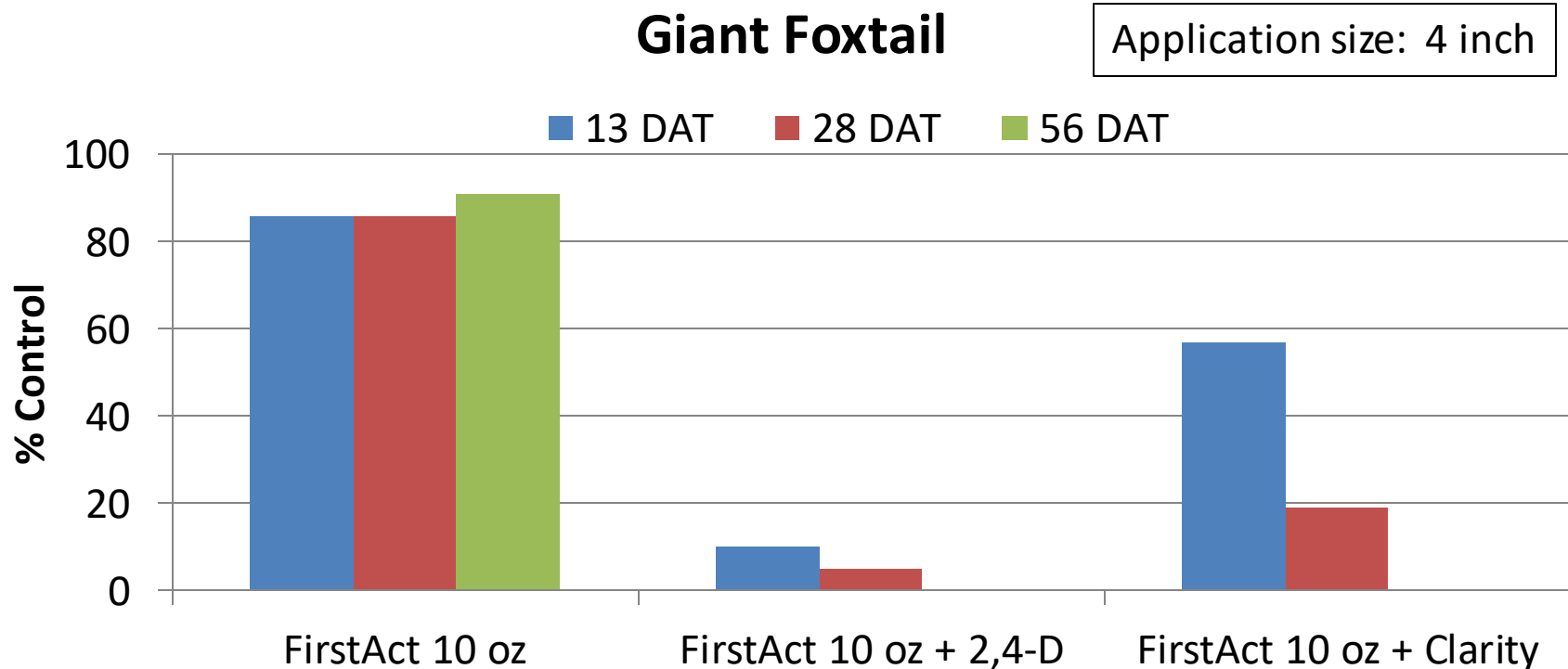
Antagonism with 2,4-D and Clarity near Fort Collins, Colorado - 2021



Antagonism with 2,4-D and Clarity near Hays, KS 2021



Antagonism with 2,4-D and Clarity near Clay Center, NE - 2021



2,4-D and Dicamba Antagonism

- **2,4-D (21 Trials)**
 - 52% of the time decreased grass control was noticeable (10 to 15% decrease)
 - 19% of the time decreased grass control was dramatic
- **Dicamba (25 Trials)**
 - 24% of the time decreased grass control was noticeable (10 to 15% decrease)
 - 8% of the time decreased grass control was dramatic

Data from various locations in 2021 and 2022



STEWARDSHIP GUIDELINES

Prevent the Development of
Grass Weed Resistance to
igrowth[®], Double Team[™] and
Inzen[™] Sorghum Technologies

SorghumCheckoff.com

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4201 N. Interstate 27
Lubbock, TX 79403
Phone: (806) 687-8727

SorghumCheckoff.com

1. Use Pre-emergence herbicide

- Use pre-emergence herbicide containing one of the following **Group 15 herbicides**:
 - S-metolachlor or metolachlor
 - Acetochlor
 - Dimethenamid



2. Make application to small grass

- **Control grasses when they are small, preferably less than 3 inches tall.**

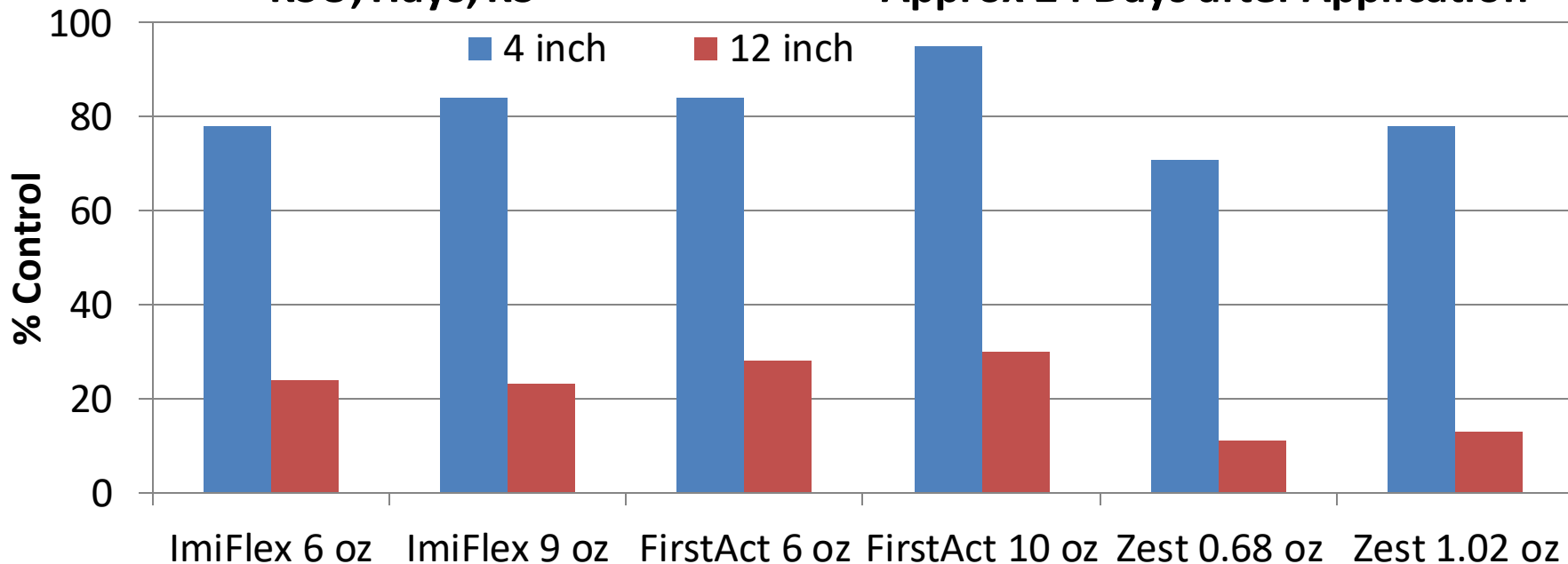


Grass Size Matters

Treatments Applied to 4 in. vs 12 in. Green Foxtail

KSU, Hays, KS

Approx 24 Days after Application



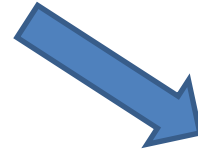
3. Avoid Resistant Weeds

Do not use if grasses are present in the field that are known to be resistant to the herbicide technology being planned.

These biotypes will not be controlled and will only get worse unless controlled by other weed control options.



Gene Flow



JG and shattercane are both close relatives of sorghum – so cross-pollination can occur.

Good stewardship practices will greatly decrease the potential for cross-pollination.

4. Control Johnsongrass and Shattercane in the Field

- It is very important that johnsongrass and shattercane plants **are not flowering at the same time** as the HT sorghum in order to prevent cross-pollination.
- If the grain sorghum flowering is uniform in the field pollen shed will occur for about 10 days, but longer if late tillers are present.
- Because of tillers, johnsongrass can flower and be susceptible to cross pollination from flowering sorghum for a much longer period of time.
- Shattercane flowering typically ranges from 6 to 22 days.



5. Johnsongrass and Shattercane near Field

- **Manage johnsongrass and shattercane growth in road ditches, fence rows and nearby places so that flowering does not coincide with flowering of the HT sorghum.**
 - Pollen from grain sorghum can travel hundreds of feet.
 - There is no set distance that johnsongrass and shattercane should be controlled from the HT sorghum field, however, the more the better, especially downwind in the prevailing wind direction.



6. Control Volunteer Sorghum

Control all volunteer sorghum/off-types in the following year prior to flowering

Not only does this prevent cross-pollination to nearby johnsongrass and shattercane, but also the establishment of resistant volunteer/feral sorghum in and near the field.



7. Scout for Grass Escapes

If resistance is suspected, treat the escaped grass with a herbicide with a different mode-of-action (or tank mixes) from that used in the initial application and/or use nonchemical methods to achieve control where possible.

An indicator of possible resistance is a failure to control a grass species known to be susceptible to the herbicide used, especially if other adjacent grass of the same species and size were controlled.

8. Tarp Grain Trucks



In trucking HT grain from the field following harvest, care should be taken to avoid spills along road sides that could lead to volunteer HT sorghum the following year.

Crop Rotations



Crop Rotation Following igrowth or Inzen Sorghum

- In the crop following igrowth or Inzen sorghum, avoid solely depending on SU or IMI herbicides to control weeds.
- Do NOT rotate with Clearfield wheat, sunflowers or canola.
- Any volunteer Clearfield crop will NOT be controlled in igrowth sorghum and possibly not in Inzen sorghum.

Crop Rotation with Double Team

ACCCase Inhibitors (group 1)

Double Team

FirstAct (quizalofop)

– Chemical Family (FOP)

Other FOPS

Fusilade – fluazifop

Ricestar - fenoxaprop

FOPS and DIMS are both ACCCase Inhibitors, however, very little cross resistance between the two chemistry families have been observed.

DIMS

Poast – sethoxydim

Select - clethodim

Crop Rotation Following Double Team Sorghum

- Do not depend on ACCase (Group 1) herbicides, especially FOPS, to control grass following Double Team Sorghum.
- If an ACCase herbicide is used it should be from the DIM chemistry family.
- Do NOT rotate with CoAxiom wheat, or any wheat with the Axigen trait.
- Enlist volunteer corn will not be controlled with FirstAct.

Back to Back Years of Sorghum

- Continuous sorghum is generally not recommended.
- However, rotating igrowth or Inzen sorghum with Double Team sorghum is a sound stewardship program.

Other Information

Advanta/UPL

[igrowth Grain Sorghum Hybrids ImiFlex Herbicide](#)

Corteva

[2022 Sorghum United States Product Use Guide](#)

S&W/ADAMA

[Double Team Sorghum Cropping Solution](#)

Information given in this presentation is meant to supplement and not replace recommendations from the seed and crop protection companies.



Texas Sorghum Producers Board Award

Bushland TX, TAMU PRE Trial



Source: TAMU, Bell