



We create chemistry

Spring Herbaceous Weed Control Treatments in Southern Pine

Jim Bean

Strategic Accounts Manager

Professional Vegetation Management

BASF Corporation

Why Is HWC Important?

**“Growth lost early will never
will recaptured”**

- Manage vegetation early with site preparation
- Plant high quality seedlings
- Use spring HWC treatments to extend weed control
- Active vegetation management produces yields



Goal of HWC Applications

- Maximize tree growth
- Season long control
- Broad spectrum
- No negative impacts to crop trees



Types of HWC

Broadcast

Aerial



Ground



Types of HWC

Banding

Mechanized



Backpack



Timing of HWC Applications

- Fall
 - Target brush
- Spring
 - Target grass and broadleaf weeds

Sites of HWC Applications

Coastal Plain/Flatwoods - Bedded

Planting row raised mechanically due to high water table



Upper Coastal Plain / Piedmont - No bedding



BASF Products

■ Base Products

- Arsenal AC (site prep and HWC)
- Chopper GEN2 (site prep only)

■ New Products

- Frequency (site prep and HWC)
- Hi-Light

• Use Recommendations

Arsenal AC Review

ARSENAL[®]
herbicide
APPLICATORS CONCENTRATE

- Active ingredient: imazapyr
- Very versatile
 - Active ingredient: imazapyr
 - Very versatile
- Provides the effective, long-term grass, broadleaf weed and brush control
- 4 oz. Arsenal AC + 2 oz. Oust is the industry standard for early spring HWC
- Use rates up to 8 oz. post-emergent or where grass is the major competitor
- Use 20 – 24 oz. in the fall

Arsenal AC Review

ARSENAL[®]
herbicide
APPLICATORS CONCENTRATE

- Consistent control across labeled species
- Better control of tough species
- Lower use rates than other programs



Chopper® GEN2™ Review

Fall Site Prep



- **Chopper GEN2 with Transport Technology™** improves absorption of the active ingredient
- Active ingredient: imazapyr
- Chemical Group 2
- Provides the most effective, long-term brush and broadleaf weed control on the market



Chopper® GEN2™ Review



- Active ingredient: imazapyr
- Fall Site Preparation
- Designed to mix with Oil for enhanced control
- Provides the effective, long-term grass, broadleaf weed and brush control
- 48 oz. Chopper GEN2 is the industry standard for site preparation

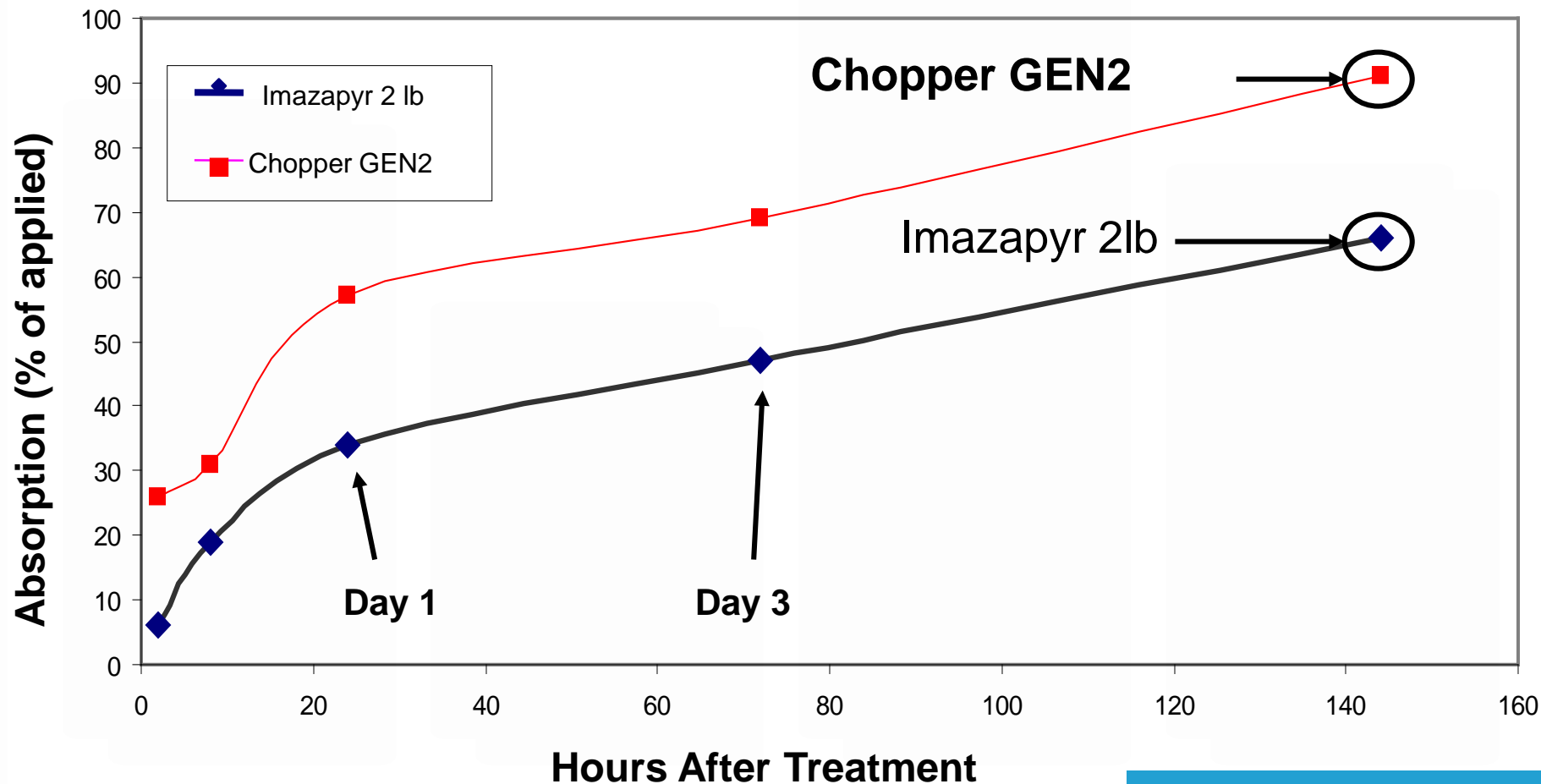


Chopper® GEN2™ Review



- Preplant only – no over the top application
 - Get more imazapyr into the plant faster
 - Better for drought conditions
 - Better for late season applications when leaves start to change
 - Works well on waxy shrubs with oil
- Excellent for fall site preparation applications
 - Residual provides HWC next year
- Excellent for bedded sites
 - One day before bedding or immediately following bedding

Red Oak- Impact of Transport Technology



Chopper® GEN2™ on Beds



For tracts bedded mid-season (May – July)

- Make Chopper GEN2 site prep applications June – September at least 3 weeks after bedding
 - On sandy soils additional HWC may not be needed
 - For fine textured soils
 - Add Oust XP to the Chopper GEN2 for additional HWC
 - OR
 - Make an additional post-plant HWC the next spring
- On all soils make Chopper GEN2 applications from February up to the day before bedding and follow with a post plant HWC
- One sites with deciduous species like blackberry or hardwoods delay applications until after leaf-out

Chopper® GEN2™ on Beds



For tracts bedded late season (September - November)

- Make Chopper GEN2 site preparation applications from February thru July
 - On sandy soils additional HWC may not be needed
 - For fine textured soils
 - An additional post-plant HWC is recommended
- On sites with deciduous species like blackberry or hardwoods delay applications until after leaf-out



Chopper® GEN2™ Timing and Pine Growth on Upper Coastal Plain Sites



Chopper GEN2 site prep was applied at different timings and was followed by different HWC timings: 3 year results

- Early Chopper GEN2 site preparation treatments (July) resulted in better pine growth than site preparation later in the year (October)
- There was a synergistic response between Chopper GEN2 site preparation and Arsenal AC + Oust XP HWC with pine growth far exceeding the growth of either treatment alone



Chopper® GEN2™ Timing and Pine Growth on Upper Coastal Plain Sites



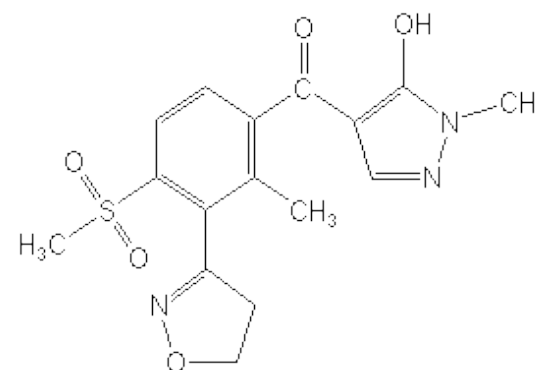
Chopper GEN2 site prep was applied at different timings and was followed by different HWC timings: 3 year results

- Optimal HWC timing was not influenced by timing of Chopper GEN2 site preparation
 - On sites where planted pines and weeds developed quickly in the first year, HWC early in the first pine year resulted in the best pine response
 - On sites with slow pine and weed development response, HWC in June of the first pine year resulted in the best pine response
- A second year HWC increased pine growth by up to 23%
- Modern silvicultural techniques resulted in pine growth that equaled or exceeded the growth in complete vegetation management studies where pines were kept weed free for up to 5 years

Frequency Review

Frequency[™]
herbicide

- Active ingredient: Topramezone
 - Chemical Family: benzoylpyrazole; pyrazolone
 - HPP Inhibitor (Bleacher)
- Residual and early postemergence control of annual grasses and broadleaf weeds
- No woody control
- Absorbed by roots and foliage
- Xylem and phloem mobile
- Non-volatile
- Caution label
- No lateral or vertical movement



Frequency Review



- Pre-emergent broadleaf weed control and some warm season grasses
- Add tank-mix partner to burn down emerged vegetation and grasses
- Excellent for high rainfall areas
- Add MSO @ 1% for post emerge activity
- Excellent tolerance over the top for all southern pines and other conifers
- Use Rates: Up to 16 oz. for Forestry site preparation / HWC
- Great for old field sites

Broadleaves Controlled

- Palmer Amaranth
- Powell Amaranth
- Burcucumber
- Carpetweed
- Common Chickweed
- Common Cocklebur
- Common Lambsquarters
- Common Mallow
- Dandelion*
- Hairy Galinsoga

- **Horseweed (Marestail)**

- Jimsonweed
- **Kochia**
- Venice Mallow*
- Morningglory sp.*
- Mustard sp.

- Nightshade - Black, E. Black, Hairy
- Pigweeds - Redroot, Smooth, Tumble and Prostrate
- Prickly Lettuce
- Common Ragweed
- Giant Ragweed
- Shepardspurse
- Prickly Sida
- Pennsylvania Smartweed
- Ladysthumb
- Sunflower - Wild and Volunteer
- Canada Thistle*
- Russian Thistle
- Velvetleaf
- Waterhemp - Common and Tall

*partial control

Broadleaves Controlled

- Bermudagrass
- Barnyardgrass
- Large Crabgrass
- Smooth Crabgrass
- Giant Foxtail
- Goosegrass
- Green Foxtail
- Yellow Foxtail*
- Seedling Johnsongrass*
- Shattercane*
- Sprangletop
- Rhodes grass, windmill grass
- Fall Panicum*
- Wild-Proso Millet
- Broadleaf Signalgrass*
- Woolly Cupgrass*

*partial control

Bermudagrass control 6 WAT

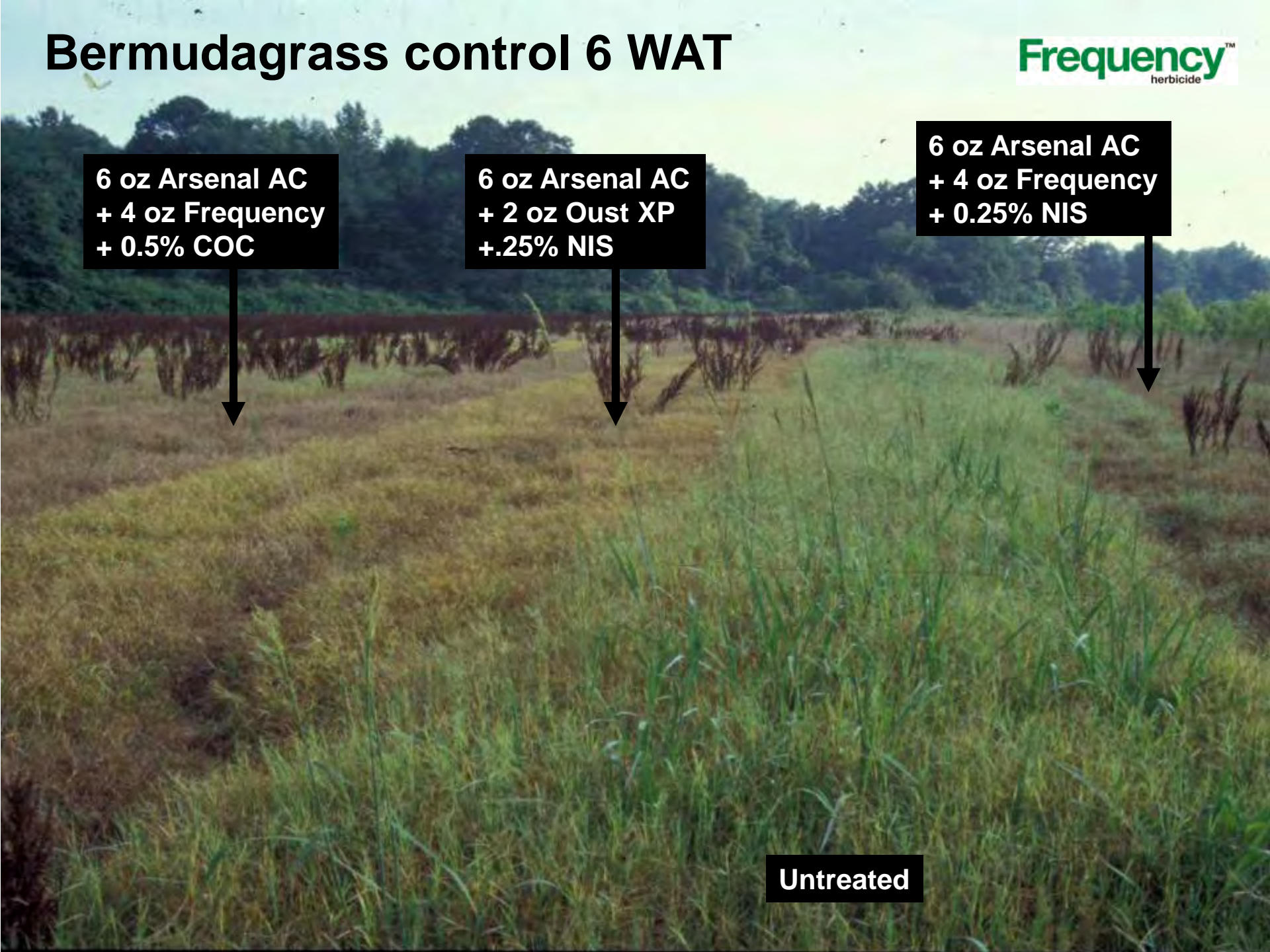
FrequencyTM
herbicide

6 oz Arsenal AC
+ 4 oz Frequency
+ 0.5% COC

6 oz Arsenal AC
+ 2 oz Oust XP
+.25% NIS

6 oz Arsenal AC
+ 4 oz Frequency
+ 0.25% NIS

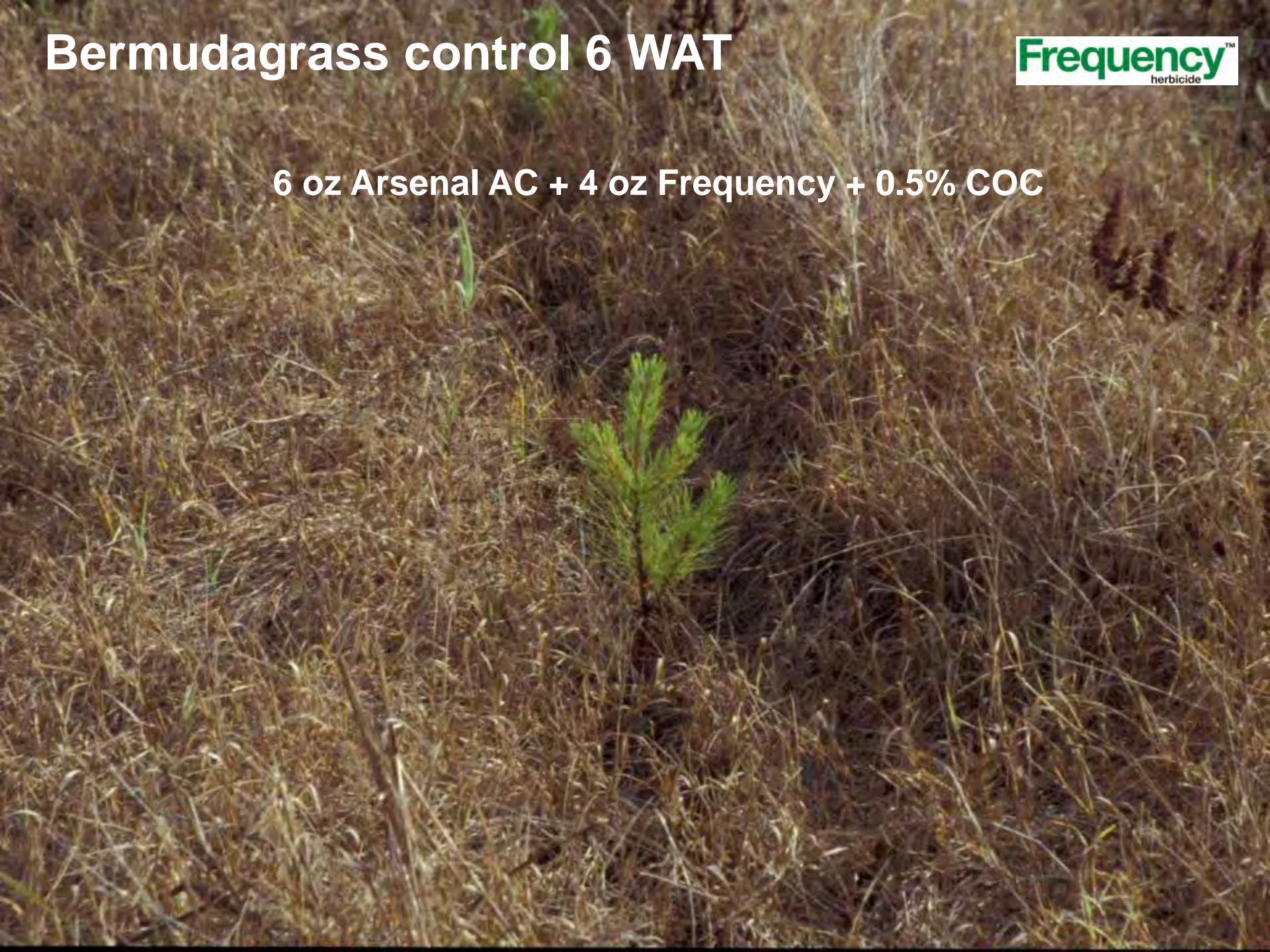
Untreated



Bermudagrass control 6 WAT

Frequency[™]
herbicide

6 oz Arsenal AC + 4 oz Frequency + 0.5% COC



Frequency Opportunities

Frequency[™]
herbicide

- Longleaf or Slash Pine Site Prep/HWC
 - Old fields
 - Bermudagrass Pastures



Herbaceous Weed Control

8 oz. Frequency – 1 MAT
Longleaf Pine

Frequency[™]
herbicide



Excellent
tolerance to all
southern pines

Herbaceous Weed Control

8 oz. Frequency – 1 MAT

Longleaf Pine



Applied April 2018



1.5 YAT

Frequency Conclusions

FrequencyTM
herbicide

- Excellent tolerance over the top of southern pines
- New solution for enhanced Bermudagrass and broadleaf weed control problems
- Another option where pine tolerance is a concern

Tips for Success

Frequency[™]
herbicide

- Add 2 oz. Detail for improved burndown of existing vegetation
 - Site prep only
- Tank-mix with Chopper GEN2 for site prep or Arsenal AC for site prep and HWC to improve grass control

Recommendations



Longleaf or Slash Pine Site Preparation

- 32 oz. Chopper GEN2 + 8 oz. Frequency + 2 oz. Detail + 1% MSO

Longleaf Pine or Slash Herbaceous Weed Control

- 4 oz. Arsenal AC + 8 oz. Frequency (No surfactant)
- 16 oz. Clethodim + 8 oz. Frequency (No surfactant)

Frequency Summary

FrequencyTM
herbicide

- Excellent tank-mix partner for difficult to control weeds
- Up to 16 oz. per acre
- Season long control
- Tank-mix partner for resistance management

Conclusions

- Data indicates no significant differences in pine growth when comparing broadcast versus banding HWC
 - Banding does leave a seed / rhizome source
- Early site preparation followed HWC the next spring have resulted in better pine growth than single product applications
- On bedded sites site prep can be done up to the day before bedding or immediately after with CopperGEN2 and oil
- Frequency is a new option for pre and post plant herbaceous weed control
 - All southern pines

Overall Summary

- Arsenal AC is the standard for spring HWC control
- Chopper GEN2 is the standard for site preparation with long residual
- Use Frequency (preplant or over the top) for difficult to control broadleaf weeds and for resistance management.
- Don't forget the other BASF Products

- | | |
|-----------|-------------|
| ■ Detail | ■ Hi-Light |
| ■ PTM | ■ Bas-Oil |
| ■ Stalker | ■ Colorfast |



Questions

Jim Bean

Strategic Accounts Manager

901-496-2443

james.bean@basf.com

Greg Armel

Strategic Accounts Manager

919-491-9655

gregory.armel@basf.com

Visit bettervm.basf.us for more information



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