



We create chemistry

Resistance Management in Spring Bareground Programs

Jim Bean, Strategic Accounts Manager
Professional Vegetation Management
BASF Corporation

BASF Focus: Weed Resistance Management



Weed Resistance Management in Bareground Programs

- Meet new weed control challenges
- Keep current products viable for the future
- Maintain efficiency and effectiveness



Causes of Plant Resistance

- Use of the same mode of action on the same acre for multiple years
- Use of only one mode of action
- Low use rates
- Management practices on adjoining land



Plant Resistance

Why the Concern?

- We have lost the ability to control some plants
- The number of resistant plants is increasing
- We do not want to make our current chemistry ineffective



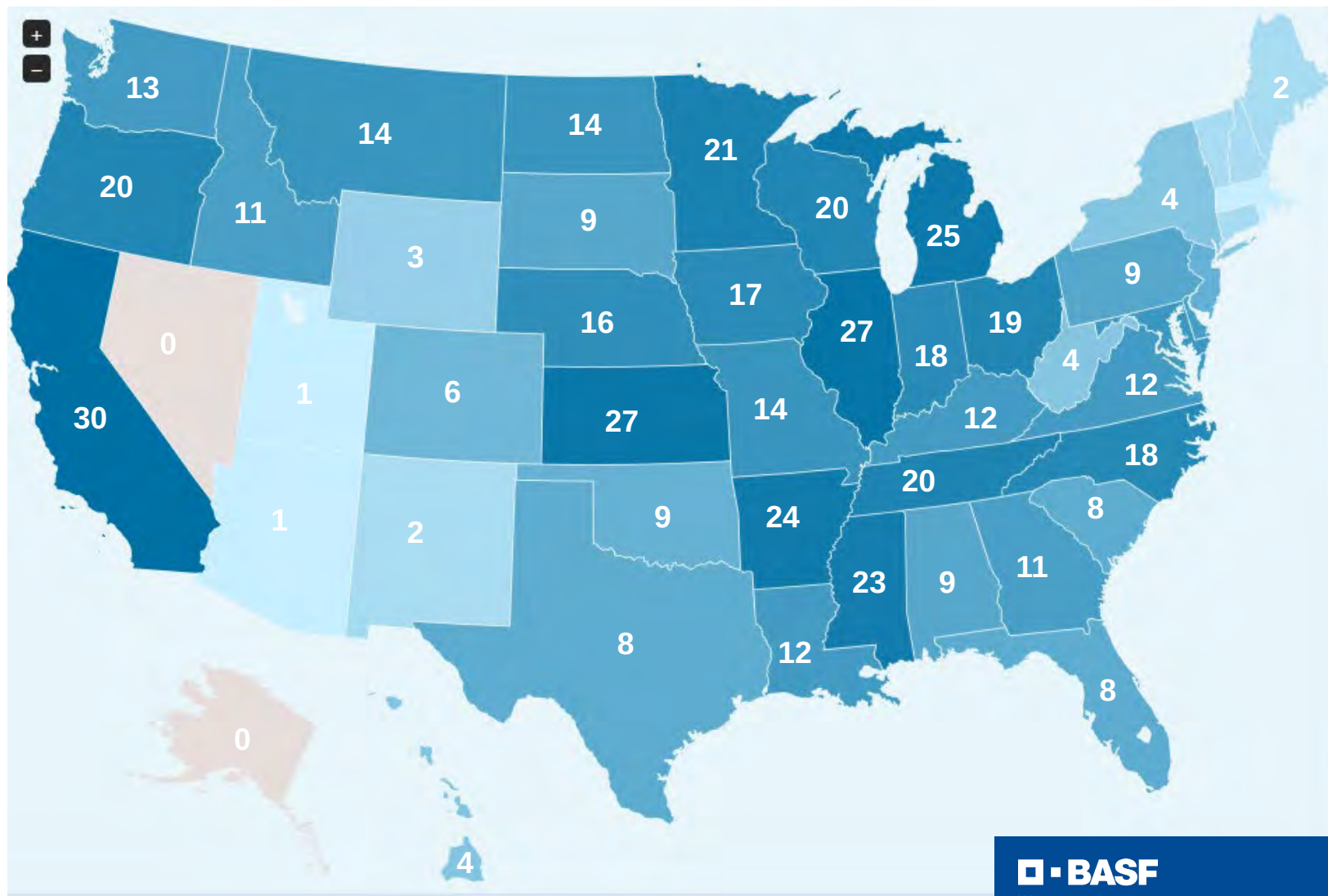
Plant Resistance

Why the Concern?

- The number of resistant plants is increasing
- We have lost the ability to control some plants
- We do not want to make our current chemistry ineffective

Herbicide Resistant Weeds by State

Confirmed Cases



Major Resistant Plants in the U.S.

162 Confirmed Cases, 33 Weeds

- Kochia
- Russian Thistle
- Pigweed
- Palmer Amaranth
- Marestail
- Italian Ryegrass
- Bluegrass
- Ragweed
- Johnsongrass
- Watergrass
- Goosegrass
- Cocklebur
- Lambsquarter
- PA Smartweed
- Foxtail
- Waterhemp
- Shattercane
- Cheatgrass
- Japanese brome
- Sunflower
- Chickweed
- Barnyardgrass
- Nightshade
- Wild oat
- Wild mustard
- Marshelder
- Wild carrot
- Prickly lettuce
- Common groundsel
- Shepard's purse
- Yellow starthistle
- Velvetleaf
- Crabgrass

Resistance by Mode of Action and Herbicide Classification

Weeds	Mode of Action	Class	Example
52	ALS Inhibitors	Class B	Imazapyr
26	Photosystem II Inhibitors	Class C1	Atrazine
17	EPSP Synthase Inhibitors	Class G	Glyphosate
15	ACCase Inhibitors	Class A	Sethoxydim
11	PSII Inhibitors	Class C2	Diuron
8	Synthetic Auxins	Class O	2,4-D
6	PSI Electron Diverter	Class D	Paraquat
6	Microtubule Inhibitors	Class K1	Trifluralin
19	Other		

Kochia is a Problem



Palmer Amaranth is a Problem



Techniques to Prevent Resistance

- Use multiple modes of action on difficult to control weeds
- Change timing pre-emergent versus post-emergent
- Change chemistry every 2 to 3 years
- Use effective labeled rates
- Inspect sites regularly
- Watch for tolerant plants



The Solution to Weed Resistance

DO NOT LET RESISTANCE DEVELOP!



BASF Vegetation Management Tools to Fight Weed Resistance



- Frequency® Herbicide
- Detail® Herbicide
- Overdrive® Herbicide
- Finale® VU Herbicide

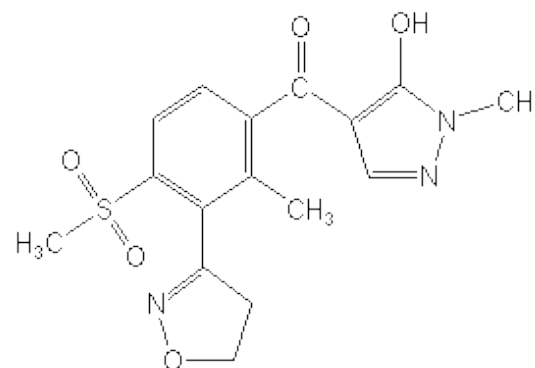
Foundation Products

- Arsenal® Herbicide
- Arsenal® PowerLine Herbicide
- Plateau® Herbicide

Frequency Review

FrequencyTM
herbicide

- Active ingredient: Topramezone
- Group 27 herbicide: HPPD Inhibitor
- Caution label
- LD50 > 2,000 mg/kg
- Low use rates
- No lateral or vertical movement
- Resistant weed management
- Pre-emergent and early post-emergent residual control of annual grasses and broadleaf weeds



Frequency Review



- AI has been approved for aquatic uses
- Excellent for high rainfall areas
- MSO @ 1% for post emerge activity
- At 4 oz. or less certain Perennial grasses are tolerant (see label)
- Use Rates: 4-16 oz.
- Minimum 10-20 gpa
- Weed size range: 3-6 inches

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**

- Waterhemp - Common and Tall
- Velvetleaf

*partial control

Grasses 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

Additional Species Controlled

FrequencyTM
herbicide

- Bermudagrass*
- KR Bluestem
- Chlorisgrass
- Crowsfoot grass
- Mexican sprangletop
- Western Ragweed
- Silverleaf nightshade



Note: Requires multiple applications alone or a tank-mix with Arsenal PowerLine

Bareground

7 oz. Frequency + 2 oz. Detail + 12 oz. Plateau

FrequencyTM
herbicide

Applied May 2018



5 MAT



Bareground

FrequencyTM
herbicide

7 oz. Frequency + 2 qts. Glyphosate + 7 oz. Milestone

Applied May 2017 - 1 MAT

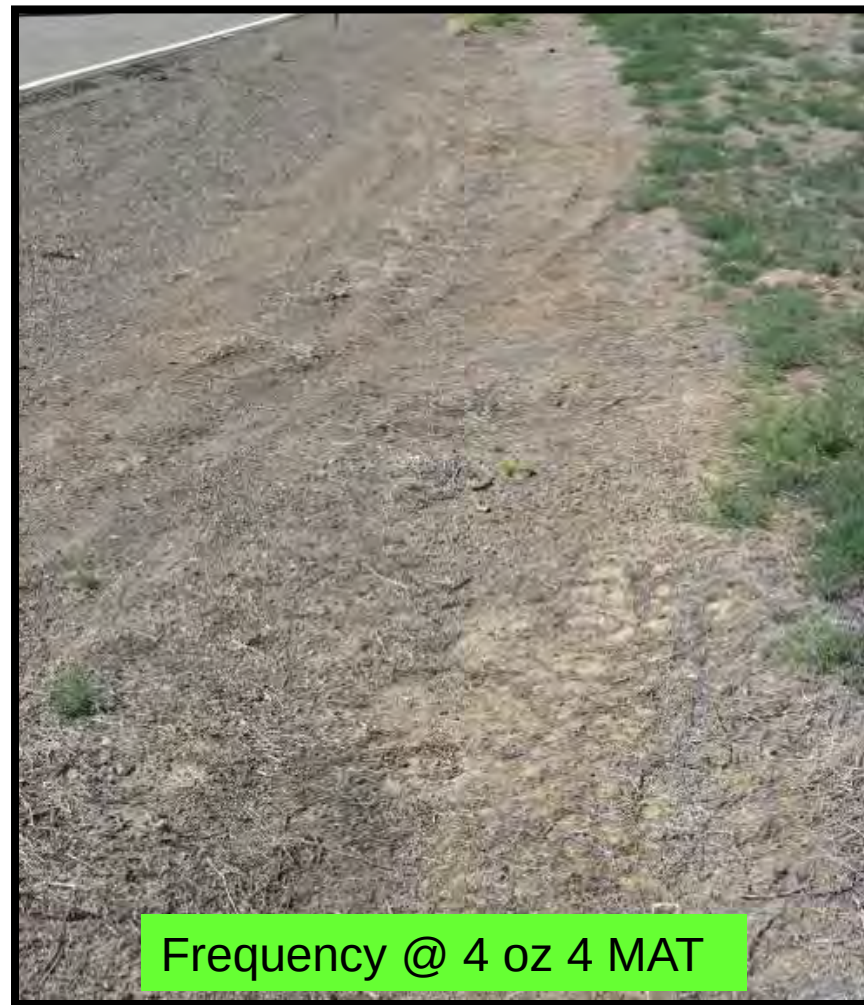


5 MAT



Russian Thistle Control

Frequency[™]
herbicide



Russian Thistle Control

Frequency[™]
herbicide



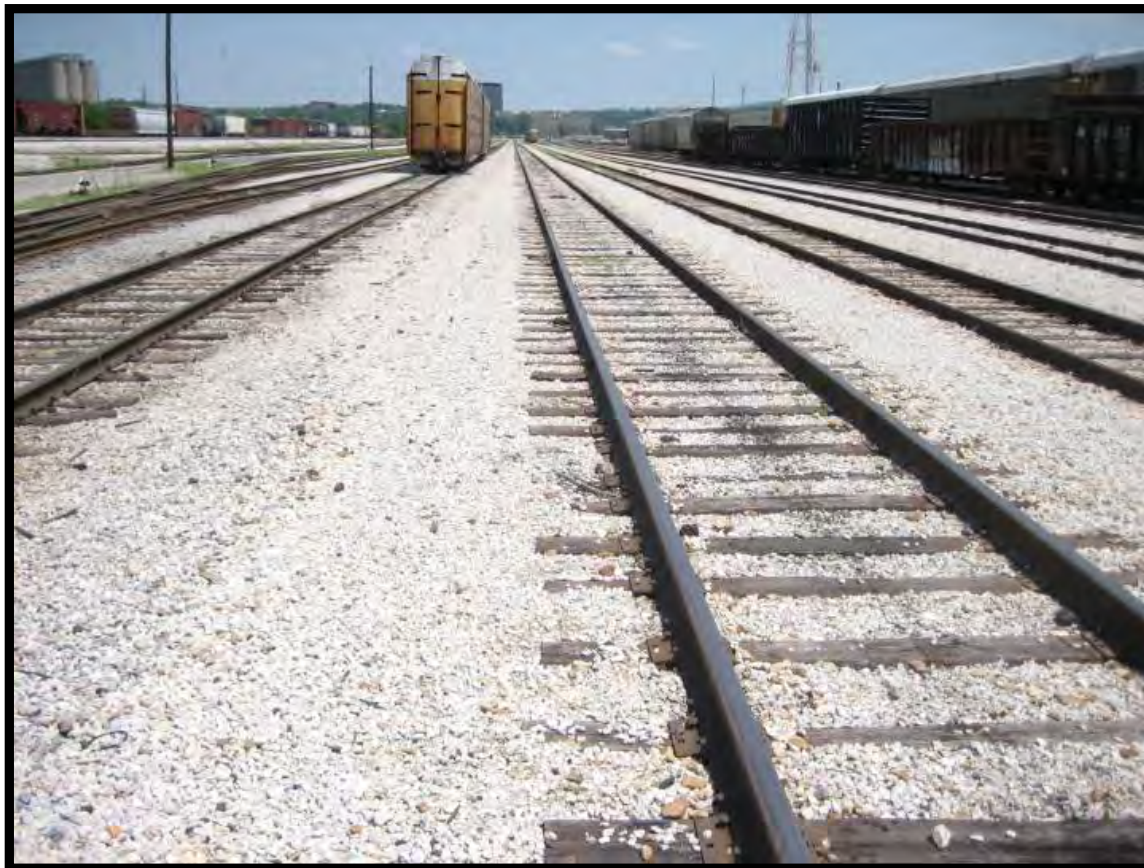
8 oz. Frequency + 7 oz Milestone + 32 oz. Glyphosate
3 MAT

Railroads

12 oz. Frequency + 1 qt Arsenal

3 MAT, Kansas City

FrequencyTM
herbicide



**8 oz. Frequency + 8 oz + Plateau
+ 1 qt. Glyphosate
(2 MAT)**

Frequency™
herbicide



BASF Bareground Program 3 MAT

8 oz. Frequency + 8 oz. Perspective

Frequency[™]
herbicide



Kochia Control

FrequencyTM
herbicide



8 oz. Frequency + 8 oz Perspective
3 MAT

BASF Bareground Program 3 MAT

7 oz. Frequency + 7 oz. Milestone + 16 oz. Glyphosate

Frequency[™]
herbicide



Bareground

Frequency[™]
herbicide

8 oz. Frequency + 2 oz. Detail + 48 oz. Arsenal Powerline + 1% MSO



Bareground Control

8 oz. Frequency + 1 oz. Detail + 12 oz. Plateau + 1% MSO

Appl 6/19



10/22/19



Bareground Control

8 oz. Frequency + 1 oz. Detail + 12 oz. Plateau + 1% MSO

Frequency[™]
herbicide

Appl 6/19



10/22/19



Bareground Control

8 oz. Frequency + 1 oz. Detail + 12 oz. Plateau + 1% MSO

FrequencyTM
herbicide

Appl 6/19

10/22/19



Bareground Control

8 oz. Frequency + 1 oz. Detail + 12 oz. Plateau + 1% MSO

Frequency[™]
herbicide

Appl 6/19

10/22/19



Bareground Control

8 oz. Frequency + 1 oz. Detail + 12 oz. Plateau + 1% MSO

Frequency[™]
herbicide



10/22/19

Key Southern Species

- Bermudagrass*
- KR Bluestem
- Chlorisgrass
- Crowsfoot grass
- Mexican sprangletop
- Western Ragweed
- Silverleaf nightshade



Note: Requires multiple applications alone or a tank-mix with Arsenal PowerLine

Frequency

Frequency 8 oz/ac 7 MAT Bermuda Response

Frequency[™]
herbicide



Soft Residual Bareground Control

Frequency[™]
herbicide



BASF Bareground Program 1 WAT

8 oz. Frequency + 2 oz. Detail + 32 oz. Arsenal

Frequency[™]
herbicide



Tank Mixes for Specific Uses

7 oz. Frequency + 2 qts. Glyphosate + 7 oz. Milestone

Frequency[™]
herbicide

Applied May 2017 - 1 MAT



5 MAT



Bareground Control

Frequency[™]
herbicide

Appl 6/15/16

1 WAT



7 oz. Frequency + 2 oz. Detail + 32 oz. Arsenal + 1% MSO

• BASF
We create chemistry

Bareground Control

An effective option versus Esplanade + Method + Glyphosate

Frequency[™]
herbicide

Appl 6/15/16

10 MAT



7 oz. Frequency + 2 oz. Detail + 32 oz. Arsenal + 1% MSO

• BASF
We create chemistry

Frequency Advantages vs. Esplanade

Frequency
herbicide

Label comparison

	Frequency	Esplanade
Active Ingredient	Topramezone	Indaziflam
AI Per Gallon	2.8 lb	1.67
Use Sites	18	10
Type of Application	Pre & Post	Pre-emerge
Grasses Controlled	Annual & Perennial	Annual Only
Movement	Very Little	Ground & Surface Water Advisory
Aquatic	AI Approved	Advisories Issued
REI	Non Ag- when dry, Ag-12 h	12 h
MOA	Roots, Shoots & Leaves	Roots
Max Per Year	16 oz/Ac	10 oz/Ac
Aerial Application	Yes	No
Broadleaf	38	54
Grasses	15	22
Suppressed	NA	13
Warn Season Turf Release	No	Yes



Frequency



Bareground Recommendations

- If you have been using 5 oz. Esplanade + 12 oz. Method (or 7 oz. Milestone) + 2 qts. Glyphosate
- Rotate to 10 oz. Frequency + 40 oz. Arsenal (or 12 oz. Plateau) + 2 oz. Detail
 - Add 6 oz Overdrive, 5 oz. Milestone or 8 oz. Method if Canada or Bull thistle are present
- Use 12 oz. Frequency and 48 oz. Arsenal with high kochia pressure, in the southeast or in fall applications
- Add 2 oz. Detail for improved burndown of existing vegetation
 - Drop glyphosate as long as Arsenal or Plateau is in the mix for grass control
- Tank-mix with Arsenal or Plateau to improve grass and vine control
 - Use tank-mix with Arsenal for Bermudagrass
- Add Oust, Method or Milestone to expand weed spectrum

Frequency Position



- Recommend 8 oz. to 12 oz.
- Add 2 oz. Detail for improved burndown of existing vegetation
 - Drop glyphosate as long as Arsenal or Plateau is in the mix for grass control
- Tank-mix with Arsenal PowerLine or Plateau to improve grass and vine control
 - Use tank-mix with Arsenal PowerLine for Bermudagrass

Frequency Position



- Frequency works well with competitive products
 - Perspective / Method
 - Milestone / Opensight
- Great way to rotate chemistry for resistance management

Tips for Success

- Add 2 oz. Detail for improved burndown of existing vegetation
- Follow order of mixing on label
- Tank-mix with Arsenal PowerLine (post-emergent) to improve Bermudagrass, nutsedge and vine control



Frequency Summary

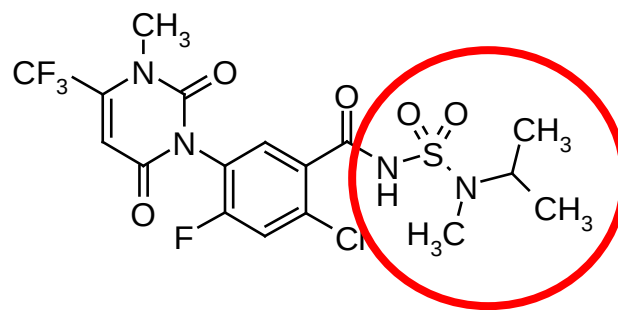
FrequencyTM
herbicide

- Excellent long-term control at 8 – 12 oz. of difficult to control weeds
- Low use rates
- Tank-mix partner for resistance management
- Works well with other products
 - Milestone
 - Method / Perspective
 - Arsenal
 - Plateau



Detail Review

- Active ingredient: Saflufenacil
- Synergy patent - Improves spectrum and burn down of glyphosate
- Group 14 herbicide
- Non volatile
- Soluble concentrate formulation
- Caution label
- Limited soil residual
- Does not antagonize with slow acting ALS chemistry
- No grazing or haying restrictions in rangeland
- Developed as a pine control product
- CA registration: 2018



Detail Review

amaranth spp.

beggarticks, hairy
beggarweed, Florida
bindweed, field*
buckwheat, wild
canola, volunteer
carpetweed
chamomile, mayweed
chickweed, common
cocklebur, common
cockle, corn
copperleaf, Virginia
cowcockle
dandelion*
devil's-claw
eclipta
eveningprimrose, cutleaf
filaree spp.

fleabane, hairy
galinsoga
groundcherry, cutleaf
groundsel, common
jimsonweed
knotweed, prostrate

kochia

lambsquarters spp.

lettuce, prickly
mallow, Venice
marestail/horseweed
melon spp.
morningglory spp.
mustard spp.
nettle, burning
nightshade spp.
purslane, common
pennycress, field

pigweed spp.

prickly sida/teaweed
puncturevine

ragweed, common & giant

rocket, London
sesbania, hemp
shepherd's-purse
smartweed spp.
sowthistle spp.

spurge spp.

sunflower, common

tansymustard spp.
thistle, Canada*

thistle, Russian

velvetleaf

waterhemp spp.

willowweed

Performance may vary depending upon growth stage and application
method (PRE vs. POST)

*Control of seedling stage and suppression of perennial growth stage

Detail

Burndown Kochia Post
14 DAT - Detail + glyphosate

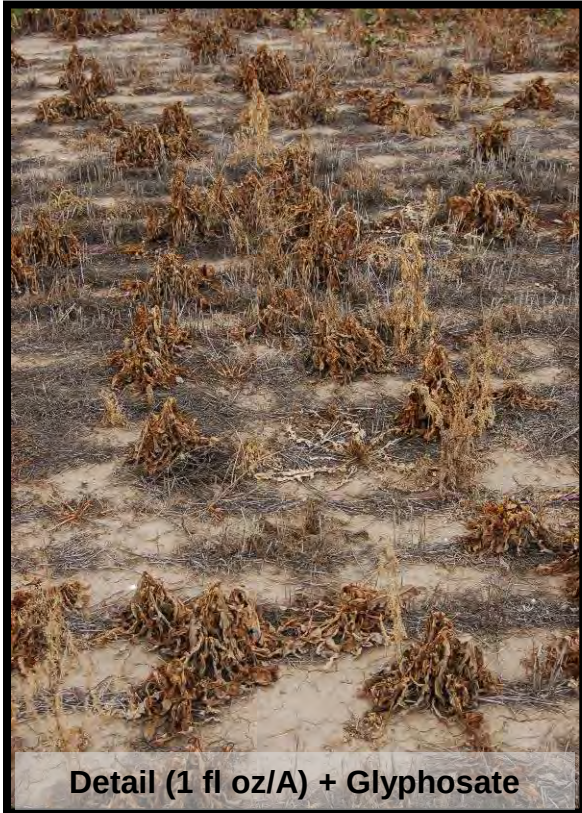


Razor Pro 32 oz + Detail (3oz)

Razor 32 + Edict 1 oz

Detail

Kochia 12 DAT – Fort Collins, CO



Faster and more complete kill than 2,4-D

Bareground Application

8 oz. Frequency + 12 oz. Plateau + 2 oz. Detail + 1% MSO
3MAT

DETAIL™
POWERED BY **KIXOR**® HERBICIDE



Kochia Control

Canyon County, ID



Appl 7/29/16

2.5 WAT



2 oz Detail + 2 qts Aquastar

Kochia, Russian Thistle and Pigweed Control

Dimmit, TX

2 DAT



2 oz Detail + 2 qts Glyphosate + 1% MSO

Kochia, Russian Thistle and Pigweed Control

Dimmit, TX

1 WAT



2 oz Detail + 2 qts Glyphosate + 1% MSO



Kochia, Russian Thistle and Pigweed Control

Dimmit, TX

1 WAT



2 oz Detail + 2 qts Glyphosate + 1% MSO

Kochia, Russian Thistle and Pigweed Control

Dimmit, TX

1 WAT



2 oz Detail + 2 qts Glyphosate + 1% MSO

2 oz. Detail + 2 qts. Glyphosate
1 WAT

DETAIL™ 
POWERED BY KIXOR® HERBICIDE



Bareground Control

DETAIL™
POWERED BY **KIXOR**® HERBICIDE

Appl 6/15/16

1 WAT



7 oz. Frequency + 2 oz. Detail + 32 oz. Arsenal + 1% MSO

Bareground Control

An effective option versus Esplanade + Method + Glyphosate



Appl 6/15/16



10 MAT



7 oz. Frequency + 2 oz. Detail + 32 oz. Arsenal + 1% MSO



Soft Residual

2 oz. Detail + 12 oz. Plateau + 8 oz. Frequency

DETAIL™
POWERED BY **KIXOR**® HERBICIDE



■ BASF
We create chemistry

Impact of No MSO

8 oz. Frequency + 2 oz. Detail + 12 oz. Plateau

DETAIL™
POWERED BY **KIXOR**® HERBICIDE



3 WAT



Applied May 2016

■ BASF
We create chemistry

Tips for Success

- 2 oz. per acre broadcast
- ¼% - ½% solution in backpack
- **MUST add MSO 1% for control**
- Coverage is critical +10 gpa.
- **pH must be between 6.0 – 7.5**
 - Do not add acidifying agents
- Maximum 6 oz. per year



Detail

Bareground Recommendations



- Add 2 oz. Detail for improved burndown of existing vegetation to late pre-emergent and early post emergent treatments
 - Drop glyphosate as long as Arsenal or Plateau is in the mix for grass control
- Use 2 oz. Detail + 2 qts. Glyphosate or (2 oz Detail + 6 oz. Plateau or 16 oz. Arsenal) as a cleanup treatment for kochia, Russian thistle, pigweed, marehail and many more weeds
- Detail will heat up any tank-mix without disrupting translocation

Detail Position



- Excellent tank-mix partner for fast burn-down
- For bareground only: position 1-2 oz. Detail without glyphosate as long as Arsenal PowerLine / Arsenal or Plateau is in the mix for grass control
- Patented enhancement of glyphosate – Add 1 pint for enhanced grass burndown
- Provides control of many difficult to control broadleaf weeds
- Resistance management
- Target markets
 - Bareground
 - Roadside selective weeding
 - Utility brush
 - Invasive species

Detail Summary



- Excellent tank-mix partner for fast burn-down
- Patented enhancement of glyphosate
- Provides selective control of many difficult western weeds
- Resistance management

Plateau Review



- Unique product for soft residual and selective grass control
- Active Ingredient: Imazapic
- Group 2 herbicide
- Post-emerge control + residual soil activity
- Non-restricted use
- Can be used near sensitive crops
- No odor, non-volatile

Perennial Grasses Controlled



- Perennial Grasses
 - Johnsongrass (seedling & rhizome)
 - Barnyardgrass
 - Vaseygrass
 - Bahiagrass
 - Dallisgrass / Smutgrass
 - Suppression only



Annual Grass Control



- Annual Grasses
 - Sandbur
 - Crabgrass
 - Broadleaf Signalgrass
 - Foxtails
 - Fall Panicum
- Nutsedge



Johnsongrass Control



8 oz/acre, 30 DAT
Use up to 12 oz. for
established stands



Invasive Species Controlled



- Medusahead
- Cheatgrass
- Downey Brome
- Leafy Spurge
- Japanese Brome
- Russian Knapweed
- Dalmatian Toadflax
- Many others



Soft Residual

2 oz. Detail + 12 oz. Plateau + 8 oz. Frequency



Tolerant Grasses



- Big Bluestem
- Little Bluestem
- Indiangrass
- Smooth Bromegrass
- Kentucky Bluegrass
- Needlegrass
- Wheatgrasses
- Sideoats Grama
- Blue Grama
- Buffalograss
- Russian Wild Ryegrass
- Prairie Sandreed

And MANY more!

Tips for Success



- Use 1% MSO for post-emergent applications
- Use 12 oz. Plateau with 8 – 12 oz. Frequency for season long, soft residual control.
 - Add 1 oz. Detail for improved post-emergent broadleaf weed burndown

Plateau

Bareground Recommendations



- Use 12 oz. Plateau + 10 oz. Frequency + 2 oz. Detail for soft residual bareground
- Use 48 oz. Arsenal + 12 oz. Frequency + 2 oz. Detail for hard residual in the southeast and to control Bermudagrass
- Detail will heat up any tank-mix without disrupting translocation

Plateau Summary



- Outstanding product with many unique uses
- Contact and residual control
- Soft Residual
- Resistance management

Plateau Position



- Use 1% MSO for post-emergent applications
- Use 12 oz. Plateau with 8 – 12 oz. Frequency for soft residual bareground and resistance management
- Add 2 oz. Detail to Accord XRT for improved burndown of existing vegetation
- Add 2 oz. Detail to Plateau for improved broadleaf weed control for roadside and invasive species control

Plateau Summary



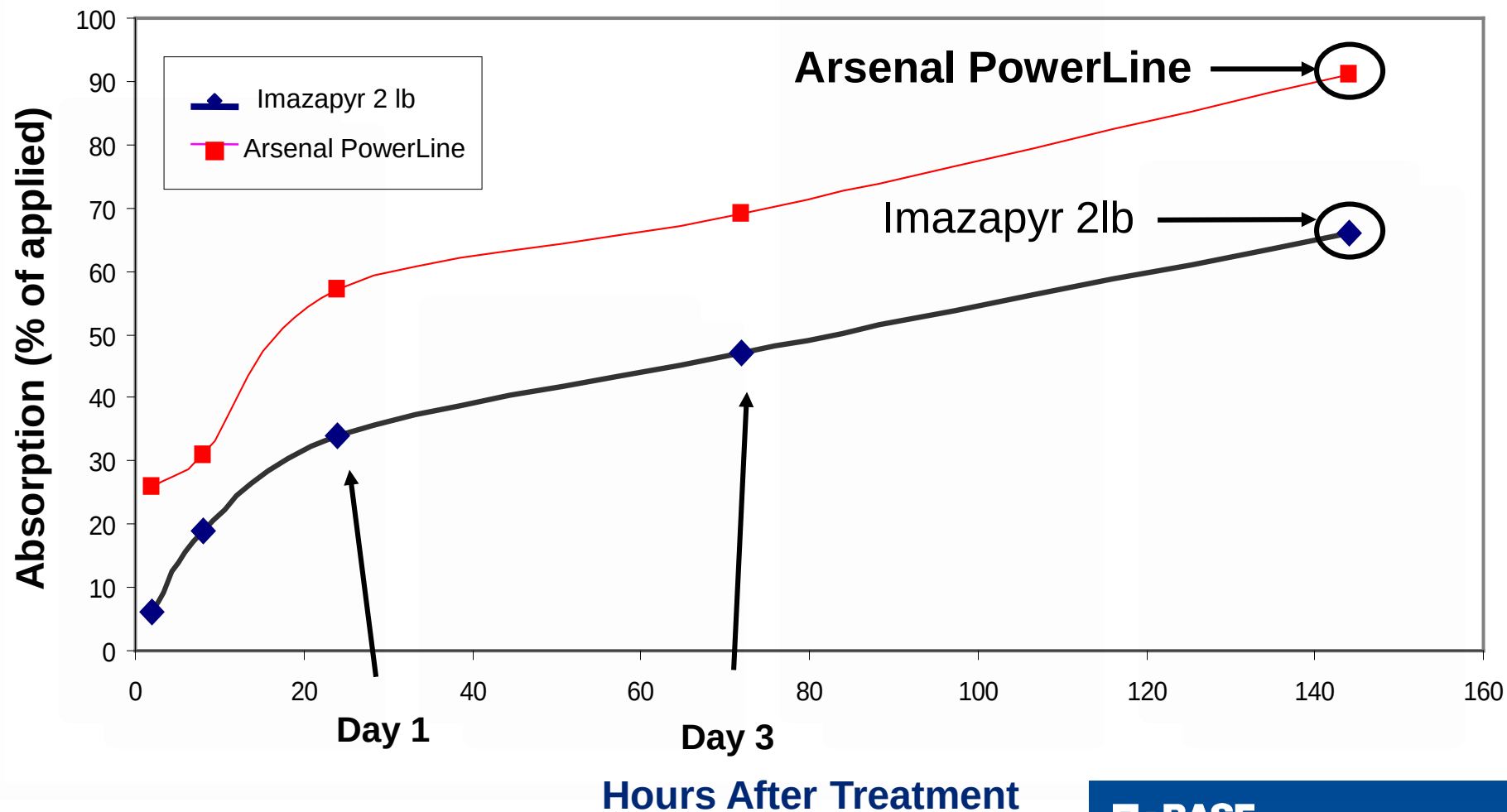
- Outstanding product with many unique uses
- Contact and residual control
- Excellent for bareground
- Seedhead suppression
- Restore native plants
- Improves grazing quality

Arsenal PowerLine Review

- **Arsenal PowerLine** with ***Transport Technology***™ improves absorption of the active ingredient
- Active ingredient: imazapyr
- Group 2 herbicide
- Only imazapyr product with ***Transport Technology***™
- Provides the effective, long-term broadleaf weed and grass control

Arsenal PowerLine Review

Red Oak- Impact of Transport Technology



Arsenal PowerLine Position

- Recommend Arsenal for pre-emergent applications
- Recommend Arsenal PowerLine with Detail in the tank for post-emergent applications
 - Replace glyphosate for grass control
 - Enhanced performance with Detail
- Transport technology gets more active ingredient into the plant
- Provides grass and vine control

Arsenal PowerLine Summary

- Transport technology gets more active ingredient into the plant
- More consistent than generic imazapyr across labeled species
- Better control of tough species and during difficult spray conditions
- Lower use rates than other programs

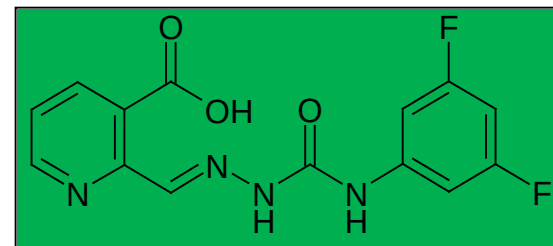


Overdrive Overview



A postemergent herbicide for the control of annual, perennial and biennial broadleaf weeds in key non-crop markets, including roadside, industrial and rangeland areas.

- Overdrive contains a novel active ingredient
 - Diflufenzopyr + Dicamba

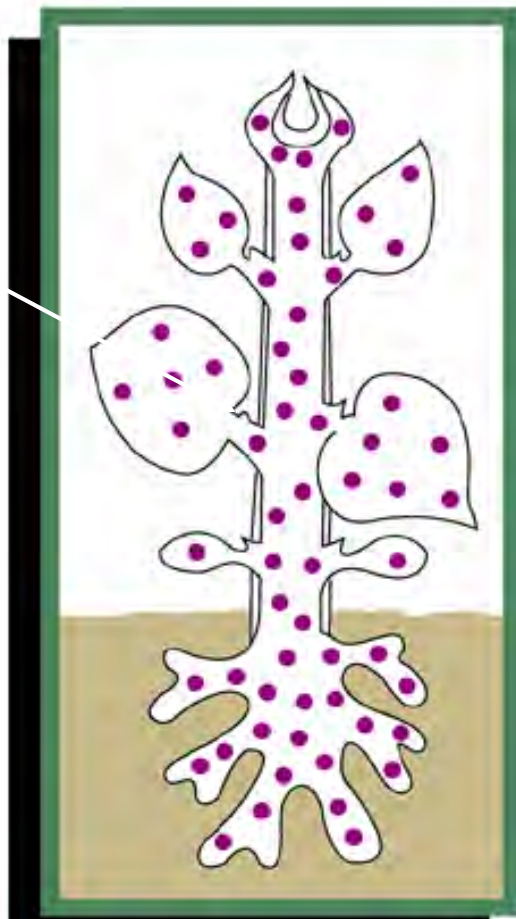


- Diflufenzopyr is a member of a unique class of chemistry
 - Semicarbazone
 - Polar auxin transport inhibitor (ATI)

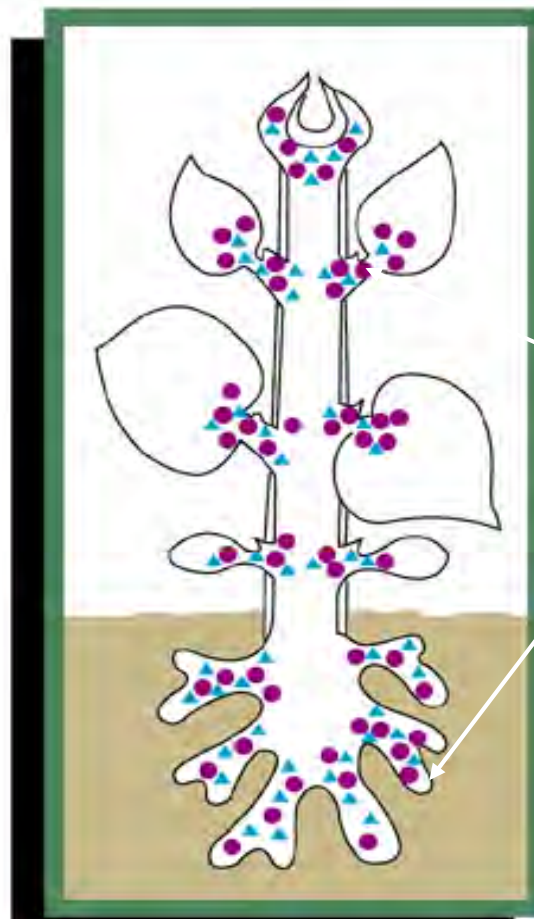
Biological Activity

overdrive[®]
herbicide

Natural
plant auxins



Non-treated plant



After Overdrive application

Auxins and
dicamba
accumulate in
meristems
(broadleaf weed
control)

Broadleaf Weeds Controlled



■ Control of over 90 annual broadleaves including:

- Waterhemp/pigweed
- Kochia
- Russian thistle
- Maretail (horseweed)
- Woolly and tropic croton
- Sowthistle
- Bitter sneezeweed
- Prostrate spurge
- Prickly lettuce

■ Control of over 50 biennial and perennial weeds including:

- Musk thistle
- Yellow starthistle
- Teasel
- Canada thistle
- Curly dock
- Plantain
- Buttercup
- Western ragweed
- Horsenettle

Biological Activity



Efficacy of Overdrive on common ragweed and wild sunflower.



Fast Activity- 1 WAT



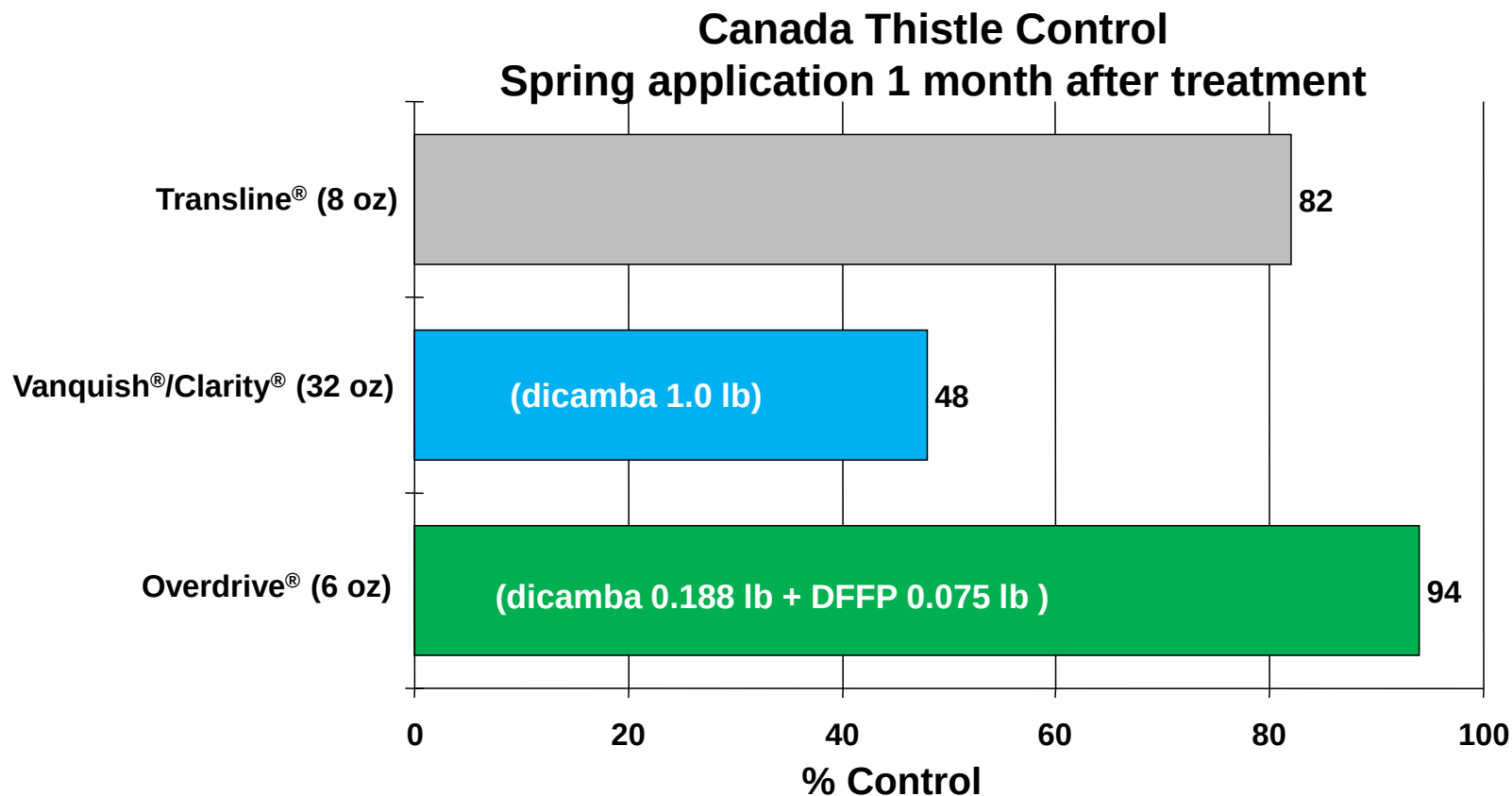
2 qt/A glyphosate + 3 oz Oust



**4 oz/A Overdrive + 1 pt/A 2,4-D + 1 qt/A
glyphosate + 3 oz Oust**

Canada Thistle Control

overdrive
herbicide



Source: Ryan P. Tichich and Jerry D. Doll, 2001 NCWSSA, Univ. Wisconsin Madison

Overdrive and Clarity are registered trademarks of BASF. Transline is a registered trademark of DowAgroSciences. Vanquish is registered trademark of Syngenta. Always read and follow label directions. ©2002 BASF Corporation. All Rights Reserved.

Canada Thistle Control

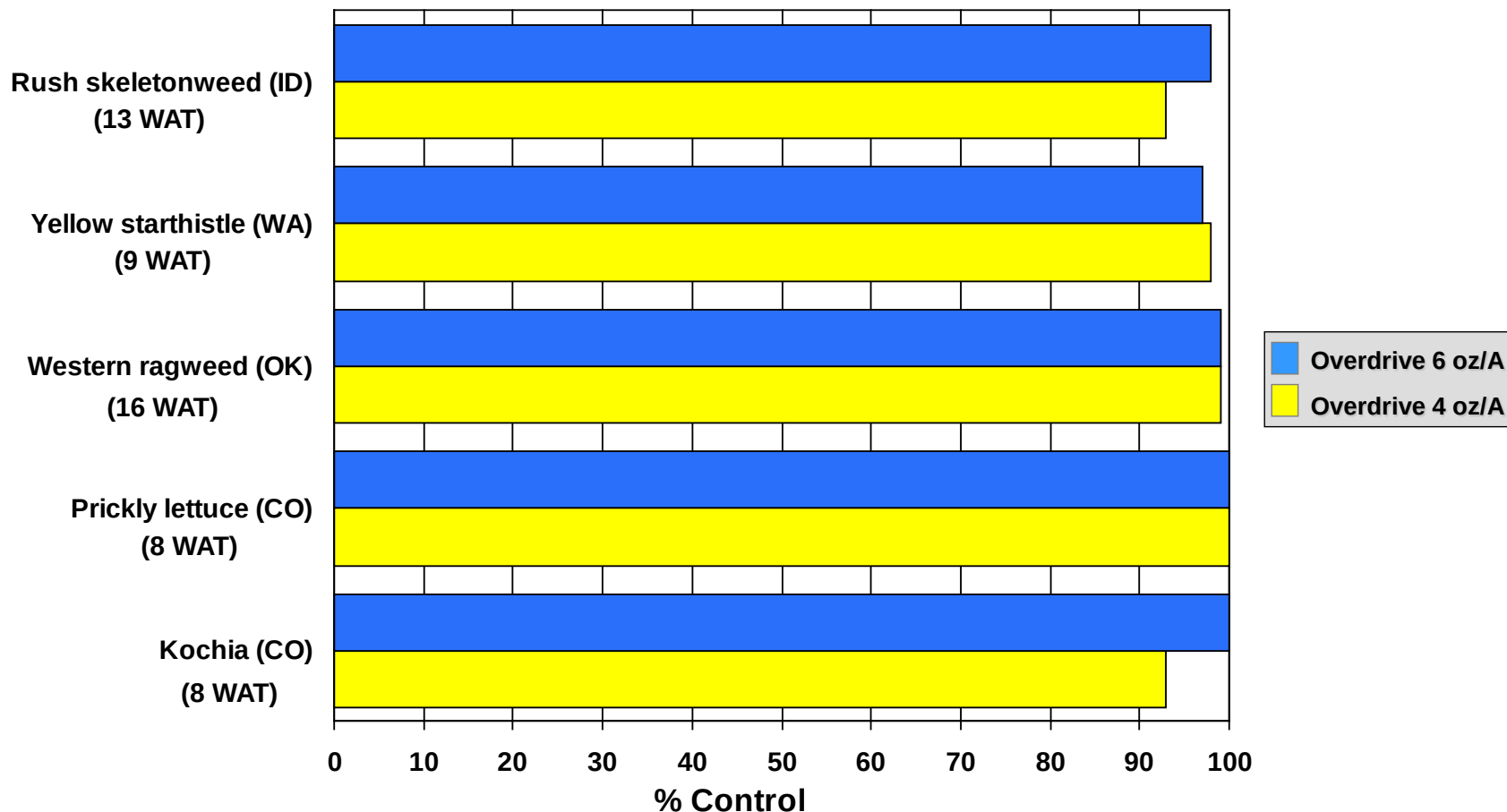


Initial knockdown and control of Canada thistle with Overdrive



Perennial Weed Control

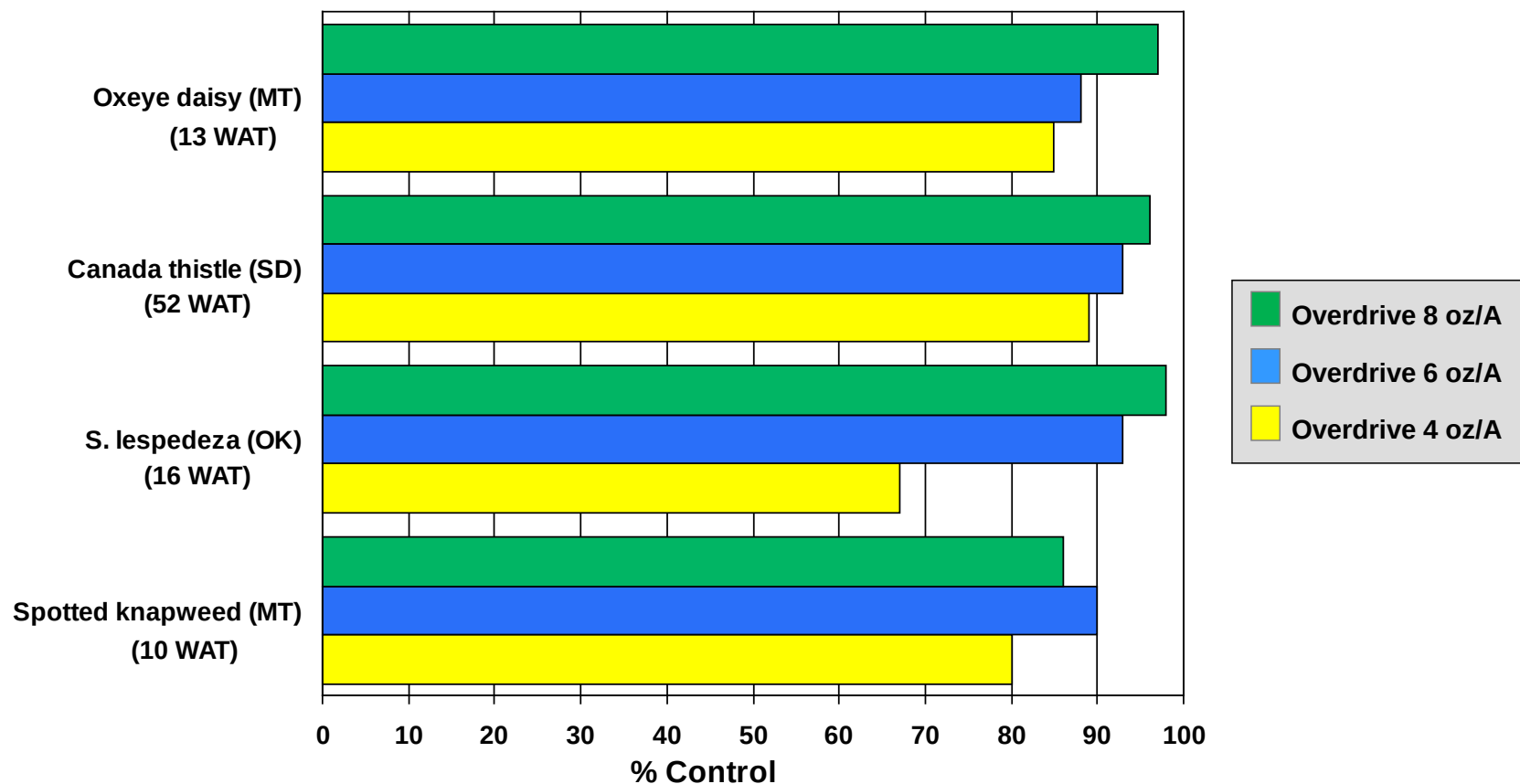
overdrive[®]
herbicide



Source: BASF Research Trials

Broadleaf Weed Control

overdrive[®]
herbicide



Source: BASF Research Trials

Application Guidelines



- Timing and rates
 - Post emergence 4-8 oz/A
 - Use higher rates for larger annual weeds or biennial and perennial weeds
 - Maximum of 10 oz per acre per season for non-crop uses
- Surfactant
 - Standard recommendation – NIS at 0.25% v/v
 - Methylated seed oil 1 qt/A for perennials or larger weeds
- Mixing
 - Add Overdrive to a clean half full tank with water
 - Add surfactant, then add remaining water
 - Use agitation and provide sufficient time for granules to saturate and dissolve

Overdrive

Bareground Recommendations



- For Canada or bull thistle and other ALS resistant weeds:
 - Use 6 oz. of Overdrive + 12 oz. Plateau + 2 oz. Detail + MSO
 - Use 6 oz. of Overdrive + 48 oz. Arsenal + 2 oz. Detail + MSO
 - Add Milestone or Method to increase residual control

Overdrive Summary



- Broad spectrum
- Less active ingredient
- Great tank-mix partner
- Excellent for resistance management
- No grazing restrictions
- Improves grazing quality



Detail versus Overdrive

■ Detail

- Safer around crops
- Limited activity on warm season grasses
- Works great with glyphosate
- No baggage
- Low use rates
- Conifer activity

■ Overdrive

- Broader spectrum
- Better thistle control
- Not likely to develop resistance

Finale VU Review

- Unique mode of action
- Active ingredient: Glufosinate
- Group 10 herbicide
- Signal word: Warning (temporary eye injury)
- Broad spectrum contact herbicide
- Works on glyphosate, SU and ALS resistant weeds
 - Kochia, Russian thistle, marestail, pigweed, crabgrass
- Use rates: 2 to 6 qts. based on weed height
- Bareground market, side trimming around ornamentals, walkways



Finale VU Review

Finale® VU
Herbicide

- Rainfast in as little as 30 minutes but may take up to 4 hours depending on weed and environmental conditions
- Tank mixes with pre-emergents
- No soil residual – seed immediately
- One lb of active ingredient per gallon
- Packaging: 2 X 2.5 gallon



Glyphosate Alternative Mixes

- Bareground
 - 12 oz. Plateau + 2 oz. Detail + 2 qts. Finale VU
- Clean-up or crack and crevice
 - 2 qts. Finale VU + 6 oz. Plateau + 1 oz. Detail



Finale

Bareground Recommendations

- Substitute 2 qts. Finale VU for 2 qts. Glyphosate for burndown
- Add 2 oz. Detail for residual broadleaf weed control
- Add 6 oz. Plateau or 16 oz. Arsenal for longer residual in cleanup treatments
- Always add MSO

Finale VU Review

- Glyphosate alternative
- Post-emergent control of glyphosate resistant weeds
- No soil activity – can reseed immediately



BASF ProVM Spray Indicators

- Recognized World Leader as Manufacturer of Specialty Colorants – Forestry & Industrial
 - Quality
 - Consistency
 - Professional
- **Overview- Spray Indicators (SI)**
 - **Hi-Light®** Spray Pattern Indicator (short term, bareground / light vegetation)
 - **Colorfast®** Spray Pattern Indicator (long term)
 - **Bas-Oil®** Spray Marker (for oil mixes)



Bareground Recommendations

Hard Residual (No desirable plantings adjacent to site)

Midwest, Northeast, PNW

- Use 10 oz. Frequency + 40 oz. Arsenal + 2 oz. Detail
 - Add 6 oz Overdrive or 5 oz. Milestone or 8 oz. Method if Canada or Bull thistle are present

Southeast, Southwest, PNW

- Use 12 oz. Frequency + 48 oz. Arsenal + 2 oz. Detail
 - Add 6 oz. Overdrive or 5 oz. Milestone or 8 oz. Method if Canada or Bull thistle is present
- Add 2 oz. Detail for improved burndown of existing vegetation
 - No need for glyphosate as long as Arsenal or Plateau is in the mix for grass control
- Tank-mix with Arsenal to improve grass and vine control
 - Use tank-mix with Arsenal for Bermudagrass

Bareground Recommendations

Soft Residual (No desirable plantings adjacent to site)

Midwest, Northeast, PNW

- Use 10 oz. Frequency + 12 oz. Plateau + 2 oz. Detail
 - Add 6 oz Overdrive or 5 oz. Milestone or 8 oz. Method if Canada or Bull thistle are present

Southeast, Southwest, PNW

- Use 12 oz. Frequency + 12 oz. Plateau + 2 oz. Detail
 - Add 6 oz. Overdrive or 5 oz. Milestone or 8 oz. Method if Canada or Bull thistle is present
- Add 2 oz. Detail for improved burndown of existing vegetation
 - Drop glyphosate as long as Arsenal or Plateau is in the mix for grass control
- Tank-mix with Arsenal or Plateau to improve grass and vine control
 - Use tank-mix with Arsenal for Bermudagrass

Overall Summary

- Start switching bareground mixes to avoid resistance
- Use Frequency for pre-emergent long-term bareground and resistance management
- Use Detail for post-emergent burndown and resistance management
- Use Plateau for soft residual and difficult to control grasses
- Use Arsenal PowerLine for the best grass and weed control. Use Arsenal 2NS for Custom Blends
- Remember Overdrive for thistle control and resistant management
- Consider Finale VU as a glyphosate alternative
- Use Hi-Light as a spray pattern indicator

BASF ProVM Podcasts

- 5 - 7 Minute Podcasts
 - Posted on the ProVM website
 - Timely subjects

www.bettervm.basf.us



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



We create chemistry