New Chemistries and Cultural Practices
2015 HERBICIDE UPDATE and MORE

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MISSISSIPPI STATE UNIVERSITY
EXTENSION SERVICE


Sea
Spray


Beijing 2008
Coca-Cola

Jay's Basic Ideas

- **Decreased labor = increasing costs. But there are ways to optimize in order to make your job easier.**
- **Foremost, increased emphasis upon PRE herbicides.**
- **Creative timing for PRE/POST tank mixtures that increase effectiveness and decrease risk of herbicide resistance.**
- **Proper herbicide selection to limit costs without sacrificing control.**
- **Understanding inherent risk of herbicide injury on desired turf.**

Herbicide resistance is dictating herbicide selection.

Herbicide Resistant Weeds in turf. (according to Herbicide Resistant Weeds; Heap, 2014)

Weed Species	***Mode of Action***	***Active Ingredients***
Poa annua	*PSII inhibitors*	*simazine, atrazine*
Poa annua	*ALS inhibitors*	*bispyribac-sodium, foramsulfuron, imazaquin, trifloxysulfuron-sodium*
Poa annua	*EPSP synthase inhibitors*	*glyphosate*
Poa annua	*Microtubule inhibitors*	*dithiopyr, pendimethalin, prodiamine*
Goosegrass	*Microtubule inhibitors*	*dithiopyr, pendimethalin, prodiamine, trifluralin*
Goosegrass	*PSII inhibitors*	*metribuzin*
Goosegrass	*ACCase inhibitors*	*diclofop*
Smooth crabgrass	*ACCase inhibitors*	*fenoxaprop*
Large crabgrass	*ACCase inhibitors*	*sethoxydim*
Lawn burweed	*Synthetic auxins*	*clopyralid, picloram, triclopyr*

Planning Herbicide Programs

What's wrong with this program?

	PRE	POST
Year 1	Pendulum pendimethalin	Revolver foramsulfuron
Year 2	Dimension dithiopyr	Manor metsulfuron
Year 3	Barricade prodiamine	Monument trifloxysulfuron

Planning Herbicide Programs

What's wrong with this program?

	PRE	POST
Year 1	Pendulum **3** pendimethalin *Mitosis inhibitor*	Revolver **2** foramsulfuron *ALS inhibitor*
Year 2	Dimension **3** dithiopyr *Mitosis inhibitor*	Manor **2** metsulfuron *ALS inhibitor*
Year 3	Barricade **3** prodiamine *Mitosis inhibitor*	Monument **2** trifloxysulfuron *ALS inhibitor*

It relies upon the same MOA each year.

Planning Herbicide Programs

This program properly rotates MOA across years.

	PRE	POST
Year 1	Princep **5** simazine *Photosynthesis II inhibitor*	Revolver **2** foramsulfuron *ALS inhibitor*
Year 2	Barricade **3** dithiopyr *Mitosis inhibitor*	Finale **10** glufosinate *Glutamine synthase inhibit.*
Year 3	Specticle **29** indaziflam *Cellulose biosynthesis inhibit.*	Aatrex **5** atrazine *Photosynthesis II inhibitor*
Year 4	Ronstar **14** oxadiazon *Protox inhibitor*	Kerb **3** pronamide *Mitosis inhibitor*

*Note that this program would not be suitable in cool-season grass scenarios and is intended as an example for non-overseeded bermudagrass sports turf.

Common PRE Treatments

No.	Example Product	Active Ingredient	Rate Estimate
3	Barricade	prodiamine	2.0 pt/a
3	Pendulum Aquacap	pendimethalin	4.2 pt/a
3	Dimension	dithiopyr	2.0 pt/a
14	Ronstar	oxadiazon	100 lbs/a
14	Sureguard	flumioxazin	10 oz/a
15	Tower	dimethanamid	2.0 pt/a
3+14	Echelon	prodiamine + sulfentrazone	2.0 pt/a
8	Bensumec	bensulide	2.0 gal/a
14+8	Goose and Crab	oxadiazon + bensulide	114 lbs/a
15	Pennant Magnum	metolachlor	2.0 pt/a
29	Specticle	indaziflam	5.0 oz/a
5	Aatrex	atrazine	2.0 pt/a
5	Princep	simazine	2.0 pt/a
3	Kerb	pronamide	2.0 pt/a
21	Gallery	isoxaben	1.0 lb/a

Common PRE Treatments

Lawn Fairway

No.	Example Product	Active Ingredient	Rate Estimate
3	Barricade	prodiamine	2.0 pt/a
3	Pendulum Aquacap	pendimethalin	4.2 pt/a
3	Dimension	dithiopyr	2.0 pt/a
14	*Ronstar* no residential*	*oxadiazon*	*100 lbs/a*
14	Sureguard	flumioxazin	10 oz/a
15	Tower	dimethanamid	2.0 pt/a
3+14	Echelon	prodiamine + sulfentrazone	2.0 pt/a
8	Bensumec	bensulide	2.0 gal/a
14+8	*Goose and Crab* no residen*	*oxadiazon + bensulide*	*114 lbs/a*
15	Pennant Magnum	metolachlor	2.0 pt/a
29	Specticle	indaziflam	5.0 oz/a
5	Aatrex	atrazine	2.0 pt/a
5	Princep	simazine	2.0 pt/a
3	*Kerb* no residential*	*pronamide*	*2.0 pt/a*
21	Gallery	isoxaben	1.0 lb/a

Common PRE Treatments

Greens

No.	Example Product	Active Ingredient	Rate Estimate
3	Barricade	prodiamine	2.0 pt/a
3	Pendulum Aquacap	pendimethalin	4.2 pt/a
3	Dimension	dithiopyr	2.0 pt/a
14	Ronstar	oxadiazon	100 lbs/a
14	Sureguard	flumioxazin	10 oz/a
15	Tower	dimethanamid	2.0 pt/a
3+14	Echelon	prodiamine + sulfentrazone	2.0 pt/a
8	Bensumec	bensulide	2.0 gal/a
14+8	Goose and Crab	oxadiazon + bensulide	114 lbs/a
15	Pennant Magnum	metolachlor	2.0 pt/a
29	Specticle	indaziflam	5.0 oz/a
5	Aatrex	atrazine	2.0 pt/a
5	Princep	simazine	2.0 pt/a

SPECT(i)CLE™ FLO

Indaziflam – Cellulose Biosythesis Inhibitor (CBI)
Residential and non-residential turf.

Turf tolerance: Bermudagrass, Zoysiagrass, Centipedegrass, St. Augustinegrass, Buffalograss, Bahiagrass. No cool-season grasses. Non-overseeded scenarios only.

Turf tolerance varies. Application may inhibit rooting of stolons.
Do not apply to newly established turf (16 months or younger).

Weeds: crabgrass, goosegrass, *Poa annua*, many broadleaves and some sedges.

Rate: 3 to 10 fl oz/A… maximum yearly rate 18. For Poa and crabgrass, recommend initial application of 4.5 fl oz with repeat app 2 months later.

A PRE with some early POST activity, especially on Poa annua and young broadleaf weeds..

Can be tank mixed with Revolver, Celcius, Princep, Sencor… for POST control…

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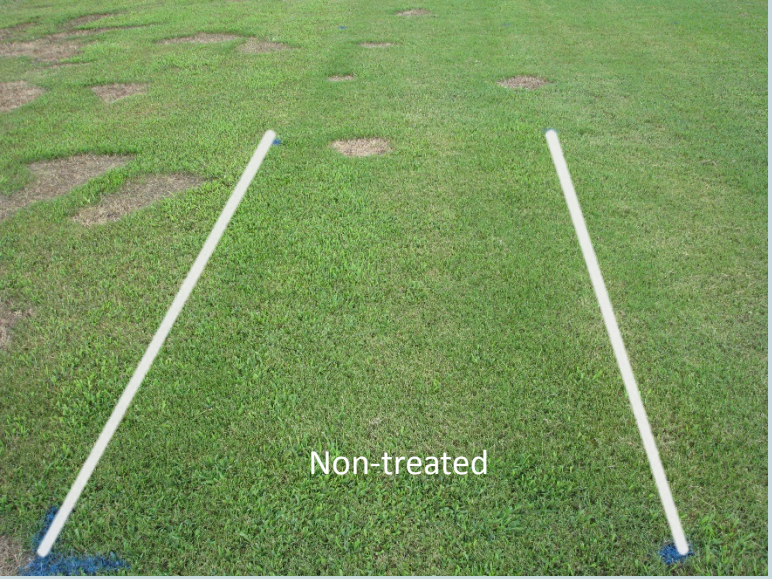
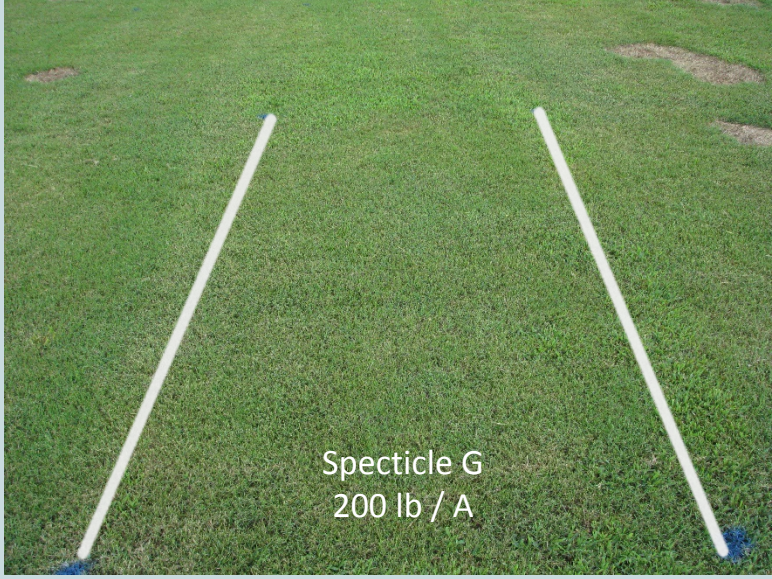
Turf tolerance varies. Application may inhibit rooting of stolons.
Do not apply to newly established turf (16 months or younger).

Weeds: crabgrass, goosegrass, *Poa annua*, many broadleaves and some sedges.

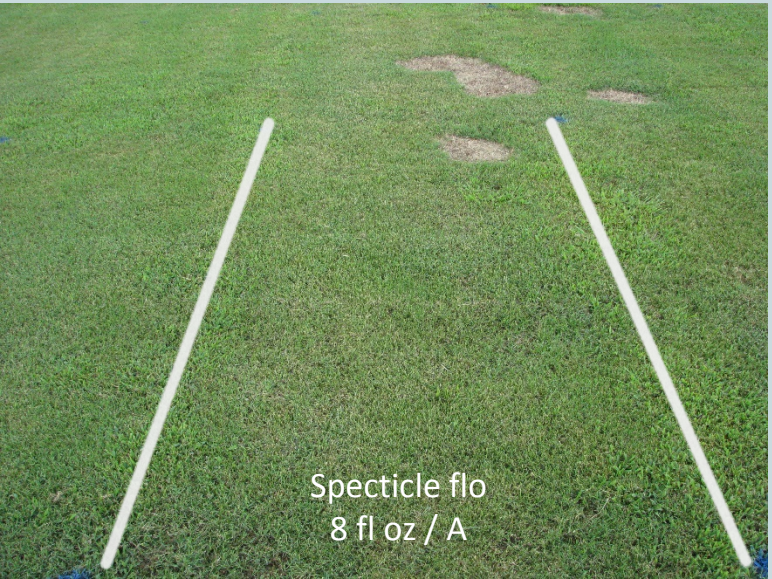
Rate: 100 to 200 lbs/A… maximum yearly rate 200 lbs/A.

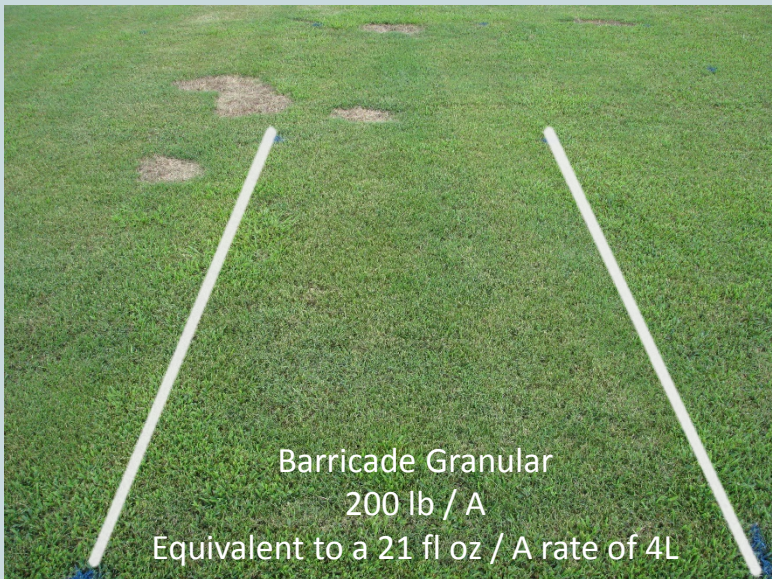
A PRE with some early POST activity, especially on Poa annua and young broadleaf weeds..





June 26,
3 months after treatment





Dithiopyr – Mitosis Inhibitor
Residential and non-residential turf.

Turf tolerance: Most warm and cool season grasses.

Application may inhibit rooting of stolons.
Do not apply within 3 months prior to sod harvesting.
Do not apply to golf course putting greens.

A PRE with some early POST activity prior to crabgrass tillering.

Weeds: crabgrass, goosegrass, *Poa annua*, many broadleaves.

Rate: (0.25 lb ai/A) split applications recommended in southern and coastal regions of the state at 8-week intervals); timely irrigation or rainfall critical for activation.

Can be tank mixed with Defendor, 2,4-D… for POST control

Spect(i)cle® TOTAL

RESIDUAL NON-SELECTIVE HERBICIDE

Non-selective control of emerged and pre-emerged grasses and broadleaf weeds in Non-Crop Areas including, Paths, Parking Lots, Curbs, Sidewalks, Driveways, Around Buildings, Gravel Areas, Loading Ramps, Educational Facilities, Storage Yards, Vacant Lots, Fence Rows, Parks, Hardscapes (including crack and crevice), Municipal, Mulched Areas, Landscape Ornamental Beds, and Government Sites.

- **Dual Action FORMULA Kills EXISTING WEEDS & GRASSES PLUS Prevents New Weeds & GRASSES for up to 6 Months**
- **Rainproof in 30 minutes**
- **Visible Results in Hours**
- **Simple, Convenient, Easy to use**
- **An easier way to manage large areas of unwanted weeds & grasses**

ACTIVE INGREDIENTS:

Indaziflam	0.089%
Diquat dibromide	0.890%
Glyphosate isopropylamine salt	20.460%
OTHER INGREDIENTS:	78.561%
TOTAL:	100.00%

Contains 1.87 lbs Glyphosate isopropylamine salt, 0.08 lbs Diquat dibormide and 0.008 lbs Indaziflam per gal

EPA Reg. No. 432-1532

KEEP OUT OF REACH OF CHILDREN

CAUTION

Contains

1.125 Gal. (144 Fl. Oz.)

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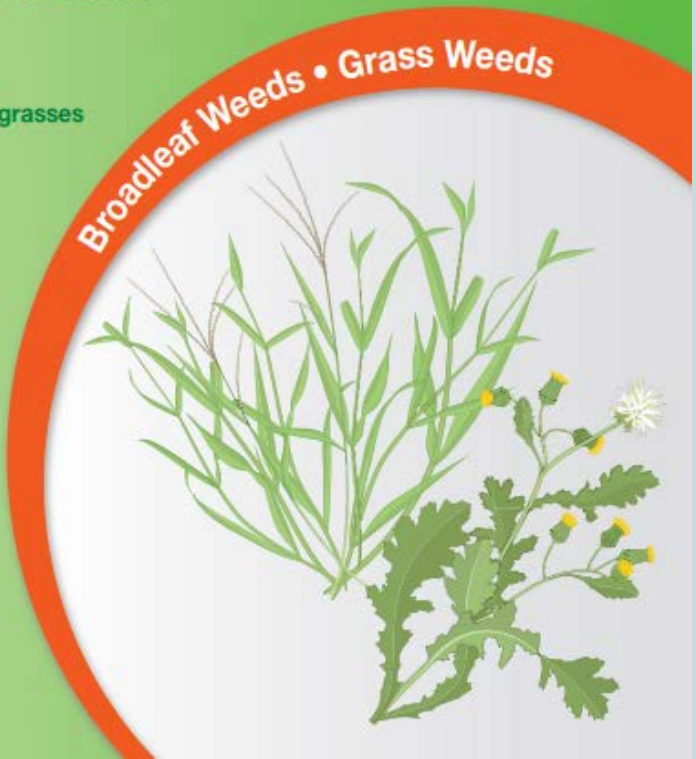
81757933B 131118AV2a



Spect(i)cle® TOTAL

Indaziflam, diquat, glyphosate –

-- Non-selective PRE and POST

Residential and non-residential turf.

Turf tolerance: Non-selective

Weeds: pretty much everything

Rate: 16 fl oz / 1000 ft^2


SPECT(i)CLE FLO
Roundup Plus


SPECT(i)CLE G

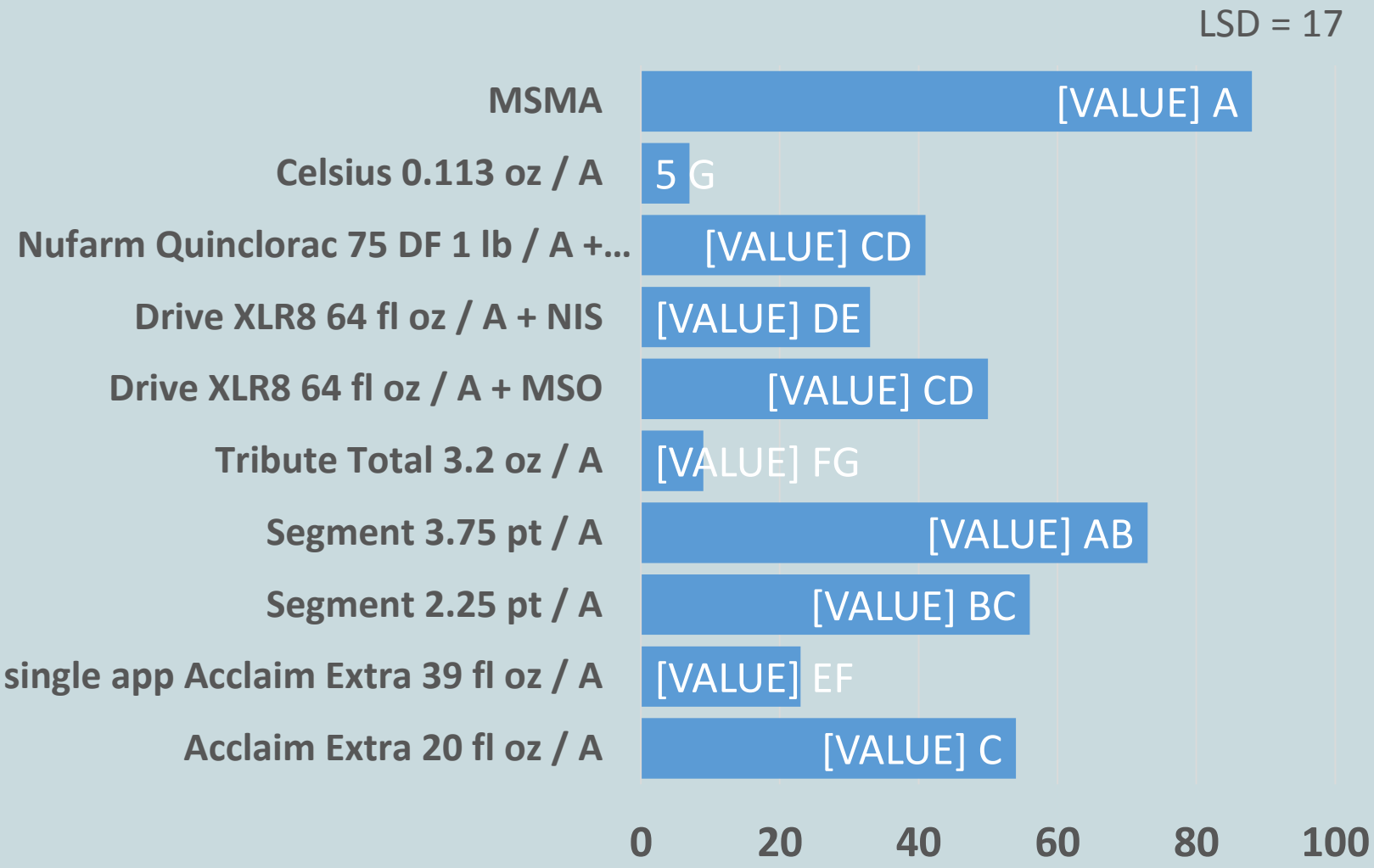

SPECT(i)CLE FLO


BAYER
Spect(i)cle TOTAL

POST smooth crabgrass control.

- Initiated July 1, 2014
- Two applications: July 1 and July 24
- Rated Weekly
- Final rating: August 29

August 29, smooth crabgrass control



POST Crabgrass Control

*Do not apply quinclorac containing products on centipedegrass, St. Augustinegrass, or Bahia. Restricted to 128 fl oz Drive/A/year or 2 lb 75DF/A/year.

POST Crabgrass Control

*Note that Segment is labelled for use in centipedegrass and fine fescue at 1.5 pt / acre. Acclaim is labelled for most cool season grasses and Zoysia.

Pylex™ herbicide

Pylex 2.8 L - Topramezone an HPPD inhibitor like mesotrione (*Tenacity*).
Residential (spot treatment only) and non-residential turf.
Turf tolerance: KY Bluegrass, Fescue, Perennial Rye, and Centipedegrass. *Bentgrass is only marginally tolerant (0.25 fl oz/A).

Weeds: bermudagrass, crabgrass, goosegrass, foxtail, chickweed, dandelion.
Rate: 0.25 to 1.5 fl oz/A.
Addition of Triclopyr for bermudagrass control is advised.
Pylex should be applied with a crop oil concentrate.

A POST with very good control of young crabgrass and goosegrass and some PRE control of broadleaves and crabgrass.

It can be tank mixed with any PRE herbicides in order to have some reach-back control of already emerged weeds.


Bermudagrass suppression and crabgrass control with Pylex
Pylex™
herbicide


July 7
Non-Treated

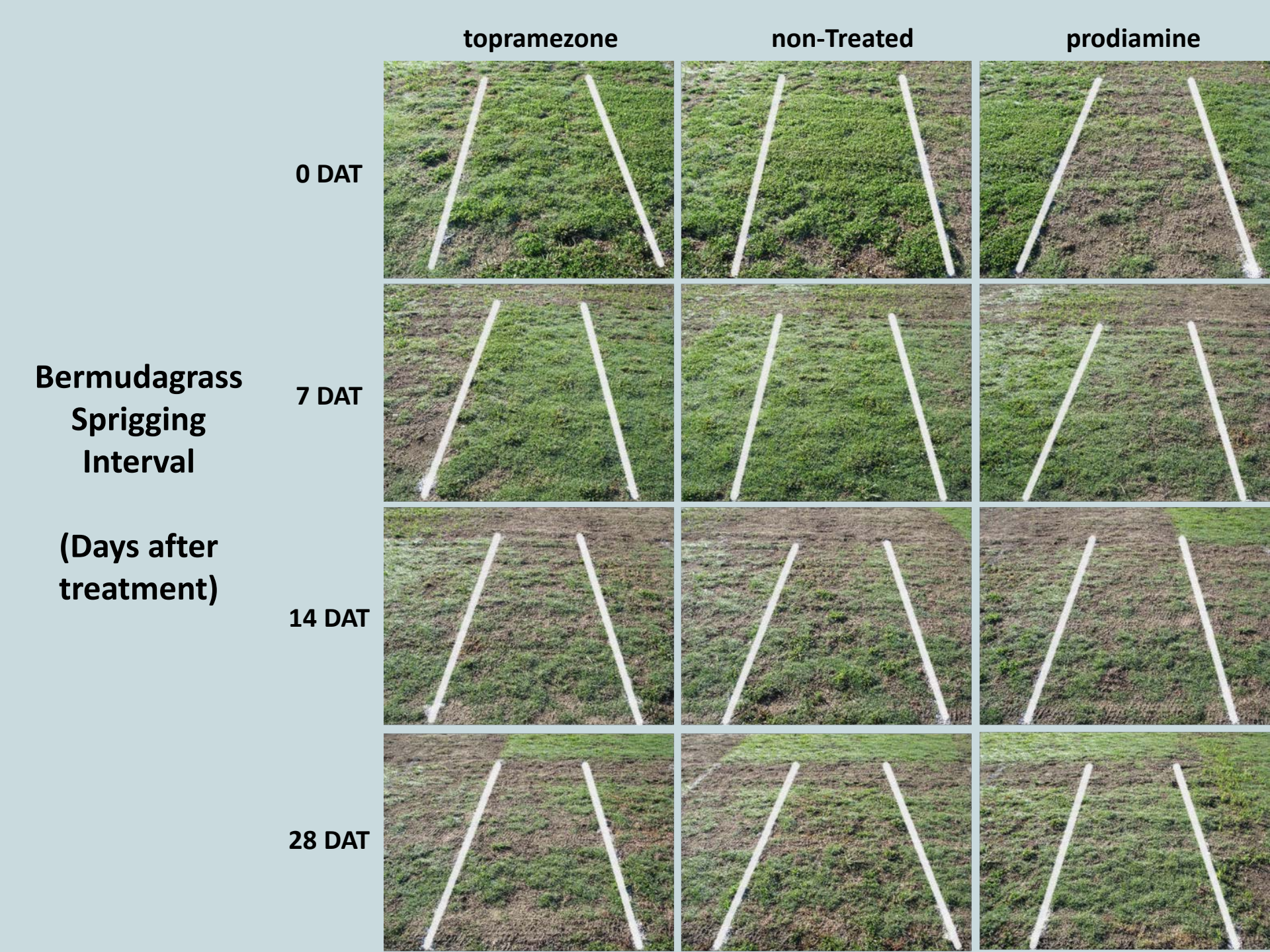

July 7, 7 Days after Pylex
1.5 fl oz / A


July 7, 7 Days after
Tupersan 32.7 lbs / A


Pylex also suppresses zoysiagrass

Evaluating Pylex as a PRE/POST during sprigging.

July 7, 2014


topramezone
non-Treated
prodiamine
0 DAT
7 DAT
14 DAT
28 DAT
Bermudagrass Sprigging Interval
(Days after treatment)

Dallisgrass Control without MSMA

Options are limited.

- Tribute Total
- Revolver plus Celsius
- Several experimentals currently being evaluated

All options take advantage of dallisgrass delayed dormancy relative to bermudagrass.

Tribute Total

Tribute Total 60.5 G – thiencarbazone, foramsulfuron, halosulfuron

Turfgrass Tolerance

Warm-season only; *Paspalum* spp. are not tolerant.

Bermudagrass and Zoysia; Label includes Emerald, Meyer, and Zeon Zoysias

Residential and Non-residential.

Application Rates

1 to 3.2 oz/A… Yearly maximum is 6.4 oz/A

Mode-of-Action

Acetolactate synthase inhibitor – prevents production of branch chain amino acids.

Postemergence activity on dallasgrass, goosegrass, *Poa annua*, and several problematic broadleaf weeds.

Tribute Total

Major points:

Fall application directly after bermudagrass dormancy.

Follow up applications will be necessary 2 to 4 weeks apart and during the spring.

Best applied by spot treatments.

Split applications of 2 oz rather than single of 4 oz

Picture taken
June 15

Recommend two fall apps followed by spring app.

Virginia buttonweed control.

- Initiated July 3, 2014
- Two applications: July 3 and July 24
- Rated Weekly
- Final rating: August 29


Non-treated


2,4-D

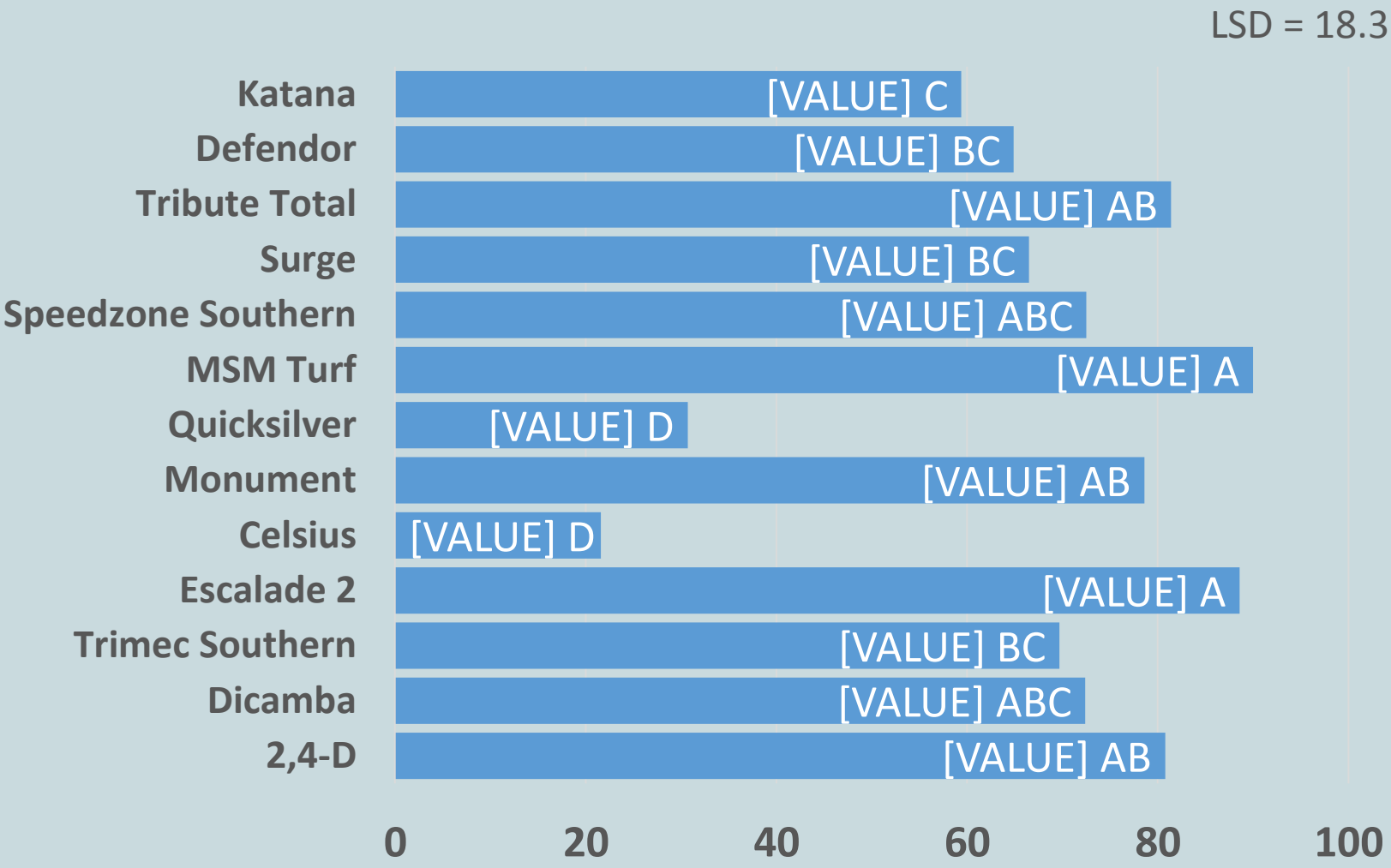

Escalade 2


Monument


MSM Turf


Tribute Total

August 29, Virginia buttonweed control



Other News and New Ideas

Last Call™

Last Call – Fenoxaprop (2.7%), fluroxypyr (3.89%), dicamba (2.7%)

Labelled for bermudagrass and numerous broadleaf weeds control in zoysiagrass as well as fine and tall fescue.

Mode-of-Action

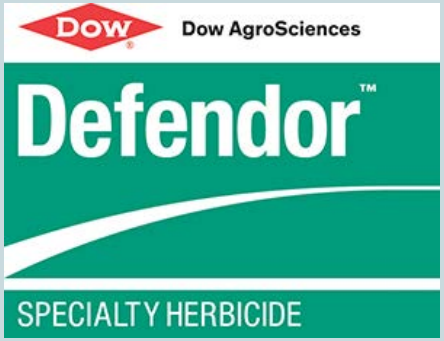
ACCase, auxin, auxin.

Application Rates

3.5 to 4 pts/A… Yearly maximum is 15 pts/A

3 to 4 apps / year

Last app should be in fall prior to dormancy.



Defendor – florasulam 0.42 SC

Labelled for all major warm- and cool- season turfgrasses.

Not labelled for greens or tees.

On new turf, apply after third mowing to avoid injury.

Mode-of-Action

Acetolactate synthase inhibitor – prevents production of branch chain amino acids.

POST activity on most perennial and annual broadleaf weeds, especially dandelions and clover. Soil and Foliar absorption.

*seems to have less activity on warm-season broadleaves (e.g. Lespedeza)

Application Rates

4 fl oz/A… Yearly maximum is 12 fl oz/A

Labelled for tank mixture with Dimension = reach back and reduced onsite


MISSISSIPPI TURFGRASS
SUMMER 2014
The Mississippi Turfgrass Association Magazine
PREVENTING AND MANAGING
HERBICIDE-RESISTANT WEEDS
Why Are Nematodes — Which Are Aquatic Animals — a Problem in Turf?
Prepping Sports Fields for the Next Harsh Winter

TURFGRASS RESEARCH FIELD DAY

AUGUST 25 | STARKVILLE, MS

7–8 a.m. Vendor arrival and set-up. This is an outdoor event. *Shade tents are encouraged.* Table and two chairs provided.

8 a.m. Registration with breakfast—coffee and pastries for attendees and vendors in the exhibit area.

8:45 a.m. Welcome to the 2015 MSU Turfgrass Research Field Day
Dr. Jay McCurdy, Assistant Professor, Turfgrass Extension Specialist

9–11:05 a.m.

Educational Section 1	Educational Section 2	Educational Section 3	Educational Section 4	Educational Section 5
Ultradwarf Putting Green Management Strategies	**Turf Technology: Fraze Mowing**	**Turf Disease Management**	**Turfgrass Weed Management**	**Native Landscapes for Mississippi**
View the latest research: cultivation technologies, genetics, growth-regulators.	This innovative renovation tool has potential to revolutionize warm-season turfgrass management.	The latest strategies for disease management on warm- and cool-season turf.	Resistance management, pre- and post-emergence strategies that work, new herbicides.	Innovative designs and plant selections that benefit wildlife and aesthetics.
Dr. Christian Baldwin Mr. Wayne Philley Mr. Jordan Craft Mr. Bryant Wait	Dr. Barry Stewart	Dr. Maria Tomaso-Peterson Mr. Jason Ruffin	Dr. Jay McCurdy Mr. Michael Richard	Dr. Guihong Bi Mr. Judson Lecompte

11:05 a.m.–1 p.m. Vendor expo, door prizes, and more
Field demonstrations and vendor meet-up. *Vendors are encouraged to bring door prizes for attendees.*

noon Lunch provided to registered attendees and special guests.
Presentation of honors and prizes. Closing remarks. Pesticide applicator points accreditation.

TWEET | #MSUTurfFieldDay15 DISCOVER | blogs.msucares.come/turfgrass

deep south TURF EXPO

October 13-15, 2015 | Biloxi, MS


Questions