

### Warm-Season Sports Turf WEED MANAGEMENT



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### An Effective Program Requires:

- Emphasis upon PRE herbicides.
- Proper herbicide selection.
- Weigh the inherent risk of herbicide injury.
- Avoid herbicide resistance using maximum weed control.



### Objectives

Make proactive decisions concerning:

- Weed control
- Wear tolerance
- Overseeding
- New herbicides



### Pre-Emergence Herbicides

- Effective against annual weeds
- Timing is critical
- Prevent seeds from becoming plants



### Complications and Considerations

**Warm season** means greater weed pressure, year round emergence.

**Growth and recovery** often do not coincide with use.

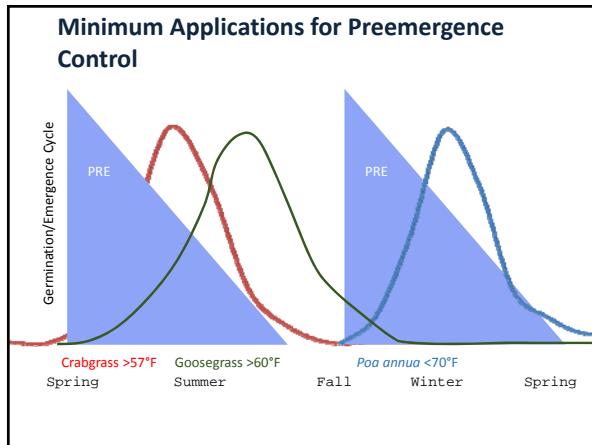
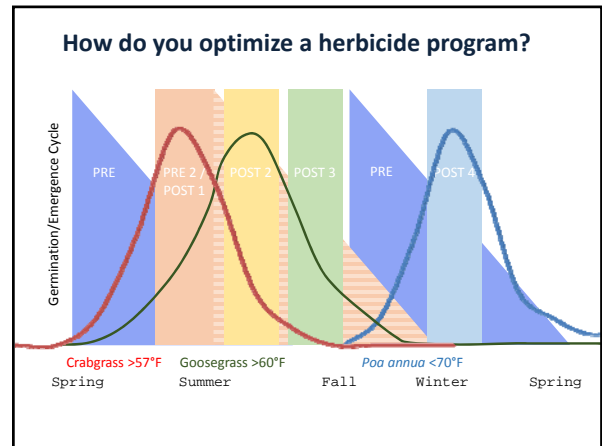
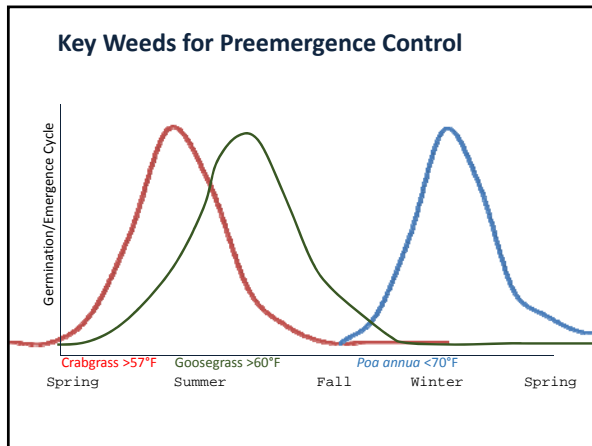
**Overseeding** with perennial ryegrass complicates herbicide selection.

**Perennial turf species** means limited reestablishment options.



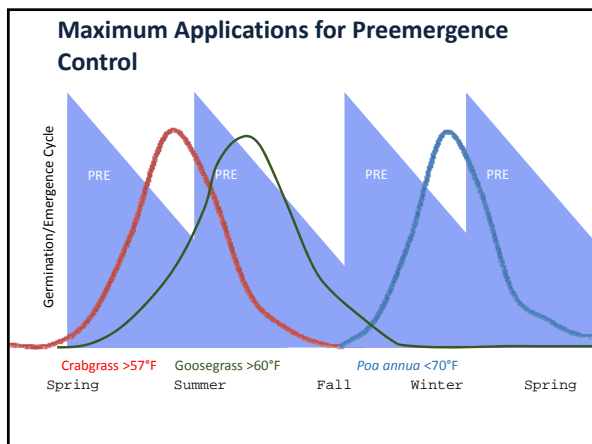
Many PRE herbicides inhibit root growth of desired grass!





Most programs should rely upon preemergence herbicides.

- Prime considerations are: season of sport?
- What are the historic weed problems?
- Do you want to overseed?
- What is the condition of the surface?



### Common Sports Field PRE Treatments

No.	Example Product	Active Ingredient	Rate estimates	Labelled Overseeding Interval
3	Barricade 4L	proflaminate	21 fl oz/A	6 weeks* to 4 months
3	Pendulum Aquascan	pendimethalin	3.1 pt/A	3 months
3	Dimension 2EW	dithiopyr	2 pt/A	6 to 8 weeks
3	Kerb SC T&O	pronamide	2.5 pt/A	90 days
3+14	Echelon	proflaminate + sulfentrazone	24 fl oz/A	4 months
5	Aatrex 4L	atrazine	2 pt/A	6 months
5	Princep 4L	simazine	2 pt/A	6 months
14	Ronstar Flo	oxadiazon	80 fl oz/A (dormant turf only)	--
14	Ronstar 2G	oxadiazon	100 lb/A	60 days
14	Sureguard WG	flumioxazin	8 oz/A (dormant turf only)	--
15	Tower	dimethanamid	2 pt/A	6 weeks
15	Pennant Magnum	metolachlor	2.5 pt/A	4 months
29	Specticle Flo	indaziflam	6 fl oz/A (established >16 mo)	12 months

**Barricade 4FL**

**Ingredients:** prodiamine (4 lb/gallon)  
**Mode of Action:**  
 Mitotic Inhibitor – root growth inhibitor

**Target pests:**  
 Preemergence control of annual grasses and broadleaves.

**Application:**  
 16 to 32 fl oz / acre  
 \$20 to 40 / acre

**Notes about use:** Roughly 4 month interval between application and overseeding. In AZ, CA, NV, TX, you could make an application 6 to 8 weeks before overseeding at low rate. Another option is an application 4-8 weeks after overseeding. In general, make application after more than two mowing events.

TURFGRASS MANAGEMENT STATE

**Dimension**

**Ingredients:** dithiopyr 2 lb / gallon)  
**Mode of Action:**  
 Mitotic Inhibitor – slightly different action than dinitroaniline herbicides.

**Target pests:**  
 Preemergence control of annual grasses and broadleaves.  
 Early postemergence control of crabgrass (< 5-leaf or first tiller; apply with surfactant for POST control).

**Application:**  
 1.5 to 2 pt / acre  
 \$40 to 55 / acre

**Notes about use:**  
 Initial application 6 to 8 weeks before overseeding followed by second application of 1 to 2 pint 120 days after overseeding.

TURFGRASS MANAGEMENT STATE

**Pendulum**

**Ingredients:** pendimethalin (3.8 lb/gallon)  
**Mode of Action:**  
 Mitotic Inhibitor – root growth inhibitor

**Target pests:**  
 Preemergence control of annual grasses and broadleaves.

**Application:**  
 3.1 to 6.3 pt / acre  
 \$28 to 65 / acre

**Notes about use:** 3 month overseeding interval is labelled. Labelled for application on established perennial ryegrass but offers no guidance on time after seeding or establishment – likely similar to prodiamine, so preferably ~6 weeks after seeding or after 2<sup>nd</sup> mowing.

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**RONSTAR G**

**Ingredients:** oxadiazon (2% ai on a granular carrier)  
**Mode of Action:**  
 Protox Inhibitor / PPO Inhibitor

**Target pests:**  
 Preemergence control of annual grasses and broadleaves.

**Application:**  
 100 to 150 lb / acre  
 \$188 to 282 / acre

**Notes about use:**  
 Product needs to be watered in to be “activated”.  
 It is labelled on established perennial ryegrass.  
 Neither labelled for nor against application to newly established p rye.

TURFGRASS MANAGEMENT STATE

**Echelon 4SC**

**Ingredients:** sulfentrazone (1.3 lb/gal) and prodiamine (2.7 lb/gal)  
**Mode of Action:**  
 Protox Inhibitor and Mitotic Inhibitor

**Target pests:**  
 Preemergence control of annual grasses and broadleaves.  
 Early postemergence control of goosegrass, sedges, and broadleaves.

**Application:**  
 18 to 36 fl oz / acre  
 \$44 to 88 / acre

**Notes about use:** 3 month interval between application and overseeding. Labelled for application on established perennial ryegrass (8-12 fl oz/A) but offers no guidance on time after seeding or establishment.

TURFGRASS MANAGEMENT STATE

**Ronstar Flo**

**Ingredients:** oxadiazon (3.17 lb / gallon)  
**Target pests:**  
 Preemergence control of annual grasses and broadleaves.

**Mode of Action:**  
 Protox Inhibitor / PPO Inhibitor

**Application:**  
 5 pt to 7.6 pt / acre  
 \$100 to 150 / acre

**Notes about use:**  
 Liquid application will injure non-dormant turf.  
 Novel use on dormant turf in transition zone.

TURFGRASS MANAGEMENT STATE

**SPECTR/CLE**  
FLC

**Ingredients:** indaziflam (0.62 lb/gallon)

**Mode of Action:**  
Cellulose biosynthesis inhibitor.

**Target pests:**  
Preemergence control of annual grasses and broadleaves, some annual sedges.

**Application:**  
3 to 10 fl oz / acre (recommend 4.5 oz for initial with repeat application)  
\$42 to 130 / acre

**Notes about use:**  
Caution in thinned and new (<16 month old) turf.  
10 to 12 month overseeding interval.  
Warm-season turf only.  
Advantages when dealing with dinitroaniline resistance weed populations  
Some turf thinning may be expected in, especially in sandy soils.

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## Spring Weed Fundamentals

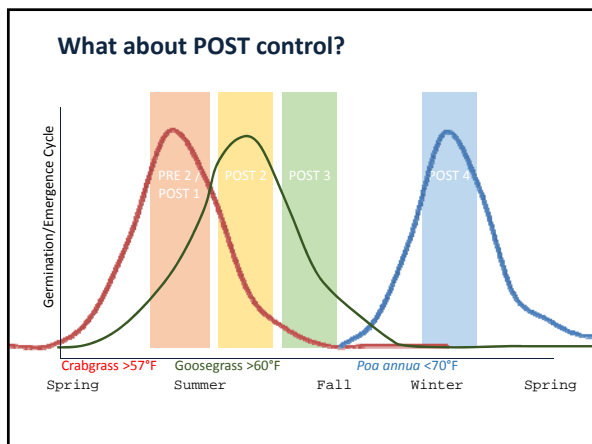
- Apply early PRE rather than late.
- Two PRE applications, possibly three.

**TURFGRASS MANAGEMENT** STATE

## Spring Weed Fundamentals

- Apply early PRE rather than late.
- Two PRE applications, possibly three.
- Second and third applications should have POST and residual control.
  - *Dithiopyr* (trade name Dimension) is the only option with PRE/POST activity on crabgrass.
  - *Quinclorac* (Drive XLR8) is one of the few options with POST activity on crabgrass.
  - *Revolver* or *Dismiss* have POST control of goosegrass.
  - *MSM-Turf* or *Trimec* for broadleaves.
  - *Monument*, *Dismiss*, *Sedgehammer* for Sedges

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### General Broadleaf Control

Herbicide Trade Name	Spurge	Buttonweed	Carpetweed	Wild Garlic
2,4-D	Poor	Poor	Poor	Fair
Avenue South		Fair		Excellent
Dicamba		Fair		Fair
Trimec Southern	Fair	Fair	Fair	Good
Image		Poor		Fair
Metsulfuron-methyl	Excellent	Excellent	Poor	Excellent
Monument	Excellent	Good	Good	Poor
Blindside	Excellent	Excellent		Excellent
Change-up		Excellent		Fair
Speedzone Southern		Poor		Good
Surge		Good		Fair
Celsius		Fair		Good
Atrazine	Good	Poor	Good	
Simazine	Fair		Good	

### Fall Preemergence Herbicide Fundamentals

Not all preemergence herbicides are created equal.

- Soil residual and overseeding interval differ.
- Standard PRE herbicides work well in the fall when properly timed as true preemergence applications.

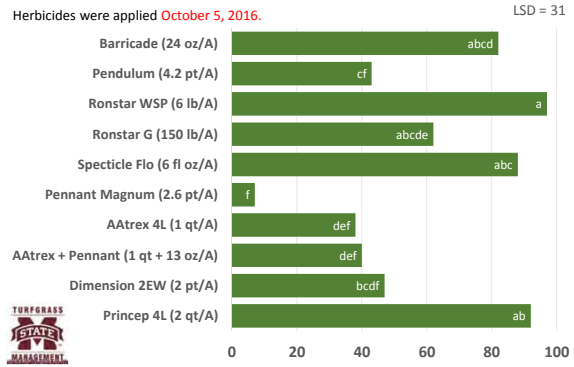


### Fall PRE | Non-Overseeded

Option	Timing	#	Herbicide	Rate	Cost (\$)
A	Sept 15	3	Barricade 4L	32 oz / A	140
	Dec 1	2+5	Monument + Simazine	0.35 oz + 1 qt / A	
B	Sept 15	29	Specticle FLO	4.5 fl oz / A	200
	Feb 1	2	Revolver	17.4 fl oz / A	
C	Sept 15	14	Ronstar G	100 lb / A	200
	Jan 15	5+9	Simazine + Roundup	1 qt + 32 fl oz / A	
D	Nov 15	3	Dimension 2EW	2 pt / A	143
		3	Kerb SC T&O	2 pt / A	



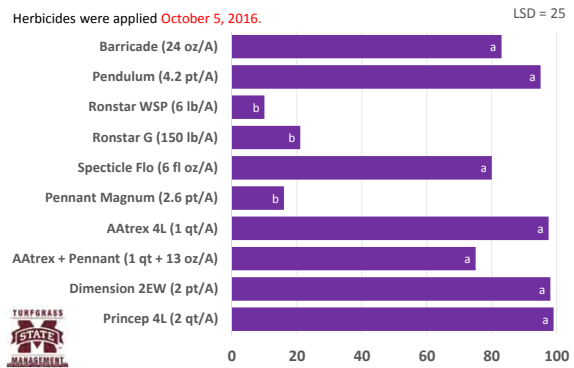
### January 2017, PRE *Poa annua* Control



### Example: Fall Preemergence Herbicide Rotation

Year	#	Herbicide	Rate	Timing
2015	3	Barricade 4L	32 fl oz / acre	September 15
	2+5	Monument + Simazine	0.5 oz / acre	December 1
2016	29	Specticle FLO	6 fl oz / acre	October 1
	10	Finale	4 qt / acre	February 1
2017	14	Ronstar G	150 lb / acre	September 15
	5+9	Simazine + Roundup	1 pt + 21 oz / acre	January 15

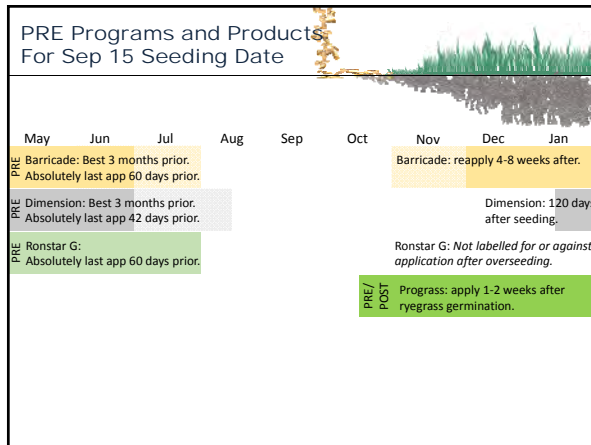
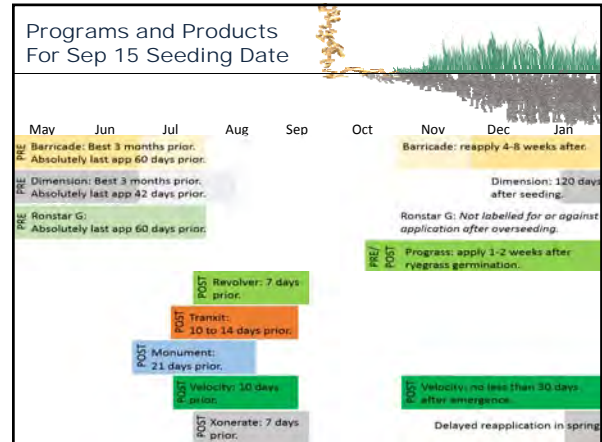
### January 2017, PRE Henbit Control



### What about Overseeding?

**Every preemergence and most postemergence herbicides have overseeding restrictions.**

Most PRE herbicides are months.  
Most POST herbicides are weeks to days.



### REVOLVER

Herbicide

**Ingredients:** foramsulfuron (0.19 lb / gallon)

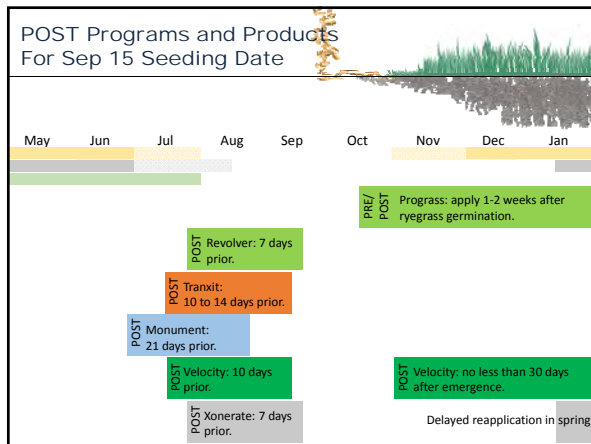
**Target pests:** POST control of goosegrass, annual bluegrass, henbit, little barley

**Mode of Action:** ALS Inhibitor

**Application:** 8.8 to 26.2 fl oz / acre  
\$68 to 203 / acre

**Notes about use:** Applied up to 1 week prior to overseeding.

TURFGASS MANAGEMENT STATE



### Rimsulfuron 25 DF

Dry Flowable Herbicide

**Ingredients:** rimsulfuron (25% DF)

**Target pests:** POST annual bluegrass, little barley, sedges, kyllinga, certain broadleaves

**Mode of Action:** ALS Inhibitor

**Application:** 1 to 2 oz / acre  
\$75 to 150 / acre

**Notes about use:** Applied 10 to 14 days prior to overseeding.

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**Certainty**  
Herbicide

**Ingredients:** sulfosulfuron (75% WDG)

**For use in:** Bermuda and Paspalum (at lower rates)

**Target pests:**  
POST control of annual bluegrass, sedges, kyllinga, few broadleaves

**Mode of Action:**  
ALS Inhibitor

**Application:**  
1.25 to 2 oz / acre  
\$90 to 144 / acre

**Notes about use:** Applied up to 1 week prior to overseeding.

TURFGRASS MANAGEMENT STATE

**Velocity**  
Herbicide

**Ingredients:** bispyribac-sodium (17.6% WG)

**For use in:** perennial ryegrass

**Target pests:**  
Postemergence control of annual bluegrass, rough stalk bluegrass, as well as some broadleaf weeds

**Mode of Action:** Acetolactate synthase inhibition

**Application:**  
6 oz / acre  
\$230 / acre

**Notes about use:** Apply no less than 30 days after ryegrass emergence, which limits use to early- to mid-winter and spring application in mid-south and gulf-coast, respectively. Extensive labelling for various scenarios. See Label.

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**Monument**  
Herbicide

**Ingredients:** trifloxysulfuron (75% WG)

**For use in:** Residential and non-residential turf. Safe on Zoysia and bermuda.

**Target pests:**  
POST annual bluegrass, little barley, sedges, kyllinga, certain broadleaves

**Mode of Action:**  
ALS Inhibitor

**Application:**  
0.35 to 0.53 oz / acre  
\$83 to 125 / acre

**Notes about use:** Applied up to 3 weeks prior to overseeding.

TURFGRASS MANAGEMENT STATE

**Xonerate**  
Herbicide

**Ingredients:** amicarbazone (70% DG)

**Target pests:**  
Postemergence control of annual bluegrass with some suppression and control of certain broadleaf weeds.

**Mode of Action:** Photosystem II Inhibition

**Application:**  
1 to 4 oz / acre on perennial ryegrass

**Notes about use:** Perennial rye can be overseeded 7 days after application. Do not apply to cool season scenarios during periods of high temperature. Extensive label for various scenarios.

TURFGRASS MANAGEMENT STATE

**PROGRESS**  
Herbicide

**Ingredients:** ethofumesate (1.5 lb / gallon)

**For use in:** perennial rye, dormant bermudagrass.

**Target pests:**  
Preemergence and early postemergence control of annual bluegrass

**Mode of Action:** Inhibition of lipid synthesis

**Application:**  
1/3 to 2 gallon / acre  
\$63 to 380 / acre

**Notes about use:** Do not apply within 8 weeks following application of other PGR's. Suggest 30 day reapplication interval. Not safe on bermudagrass, so don't apply while bermuda is non-dormant.

TURFGRASS MANAGEMENT STATE

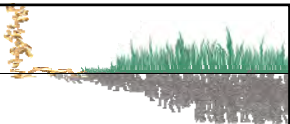
Fall *Poa annua* Programs Applied prior to Oct 15 Overseeding

Option	Timing	#	Herbicide	Rate	Price / A (\$)
A	July 15	3	Barricade 4L	16 fl oz / A	165
	Sep 24	2	Monument	0.53 oz / A	
B	Aug 16	14	Ronstar G	100 lb / A	320
	Oct 8	2	Revolver	17.4 fl oz / A	
C	July 15	3	Dimension 2EW	1.5 pt / A	160
	Oct 5	2	Rimsulfuron	1.5 oz / A	
D	Aug 16	14	Ronstar G	100 lb / A	385
	Jan 5	16	Progress	5.3 pt / A	




### Fall *Poa annua* Programs Applied prior to and after Oct 15 Overseeding

Option	Timing	#	Herbicide	Rate	Price / A (\$)
A	Sep 24	2	Monument	0.53 oz / A	175
	Nov 26	3	Barricade 4L	21 fl oz / A	
B	Oct 8	2	Revolver	17.4 fl oz / A	320
	Nov 26	14	Ronstar G	100 lb / A	
C	Nov 26	3	Barricade 4 L	21 fl oz / A	300
	Jan 5	16	Prograss	5.3 pt / A	

### Other options for *Poa*



In addition to preemergence and postemergence herbicides, there are several plant growth regulators used for control of annual bluegrass in overseeded perennial ryegrass.

### January 2017, *Poa annua* Control in Overseeded Perennial Ryegrass

Overseeding date = Oct 3, 2016



### New in 2017 and 2018 Industry and Product Update


*Company names and logos do not indicate company approval of information presented.*




### January 2017, *Poa annua* Control in Overseeded Perennial Ryegrass

Overseeding date = Oct 3, 2016 LSD = 7 to 16

Herbicide	Rate	Timing	Control Level
Barricade 4L	16 oz	Aug 25	a
Ronstar G	100 lb	Aug 25	a
Dimension 2EW	1.5 pt	Aug 25	ab
Monument	0.53 oz	Sep 8	a
Tranxit	2 oz	Sep 20	a
Velocity	6 oz	Sep 20	b
Revolver	17.4 oz	Sep 22	a
Xonerate	8.4 oz	Sep 22	ab
Prograss	1 gal	Dec 14	a
Proxy	1.7 gal	Dec 14	ab
Trimmit	16 oz	Dec 14	ab




### Fahrenheit




**Ingredients:** metsulfuron and dicamba  
**For use in:** Residential and non-residential turf.  
 Warm season turf possibly with limited cool season use.

**Target pests:** Broadleaf weeds

**Mode of Action:** ALS inhibitor and auxin





 **halauxifen-methyl**

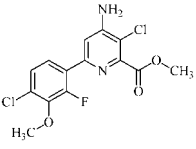
**Ingredients:** halauxifen-methyl

**For use in:** Warm and Cool Season turf

**Target pests:** Broadleaf weeds

**Mode of Action:**  
Auxin mimicking herbicide

**Application:**  
Extremely low rates. May require special formulations.



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 **Celero**

**Ingredients:** imazosulfuron

**For use in:** Warm and Cool Season turf


**Target pests:** Sedge and Kyllinga with limited broadleaf control.

**Mode of Action:**  
Acetolactate Synthase Inhibiting Herbicide

**Note:**  
Marketed in combination with Change-Up in order to catch broadleaf weeds. Similar to halosulfuron (Sedgehammer), this product does not have grass control.

**TURFGRASS MANAGEMENT STATE**

**EH-1587**

 **Ingredients:** halauxifen-methyl, fluroxypyr, dicamba

**For use in:** Warm and Cool Season turf

**Target pests:** Broadleaf weeds

**Mode of Action:**  
Auxin mimicking herbicide

**Note:**  
This product is currently being registered by EPA and does not have a trade name.


**TURFGRASS MANAGEMENT STATE**



**2017 Events**

Field Day – August 22  
Deep South – November 7-9

**TURFGRASS MANAGEMENT STATE**

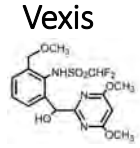
 **Vexis**

**Ingredients:** pyrimisulfan

**For use in:** May be in combination with other actives

**Target pests:**  
Broadleaves, grasses, and sedges.

**Mode of Action:**  
ALS inhibitor



**TURFGRASS MANAGEMENT STATE**



**Questions**