

# Turf Weed and Herbicide Update

8:30 – 9:30 am Presentation at the Oct 19 (Tulsa) and Nov 4<sup>th</sup> (Oklahoma City) Fall  
2010 Pesticide Applicator Continuing Education Workshops

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Oklahoma State University

# Types of Turfgrass Weeds

## Broadleaves

- Net venation, opposite, alternate or whorled leaves, showy flowers.



## Grasses

- Parallel venation, alternate or 2-ranked leaves, rounded or flattened stems.



## Sedges

- Parallel venation, 3-ranked leaves, triangular stems



Image credit: Dr. John Boyd, Univ of Arkansas



boat-shaped leaf  
tip

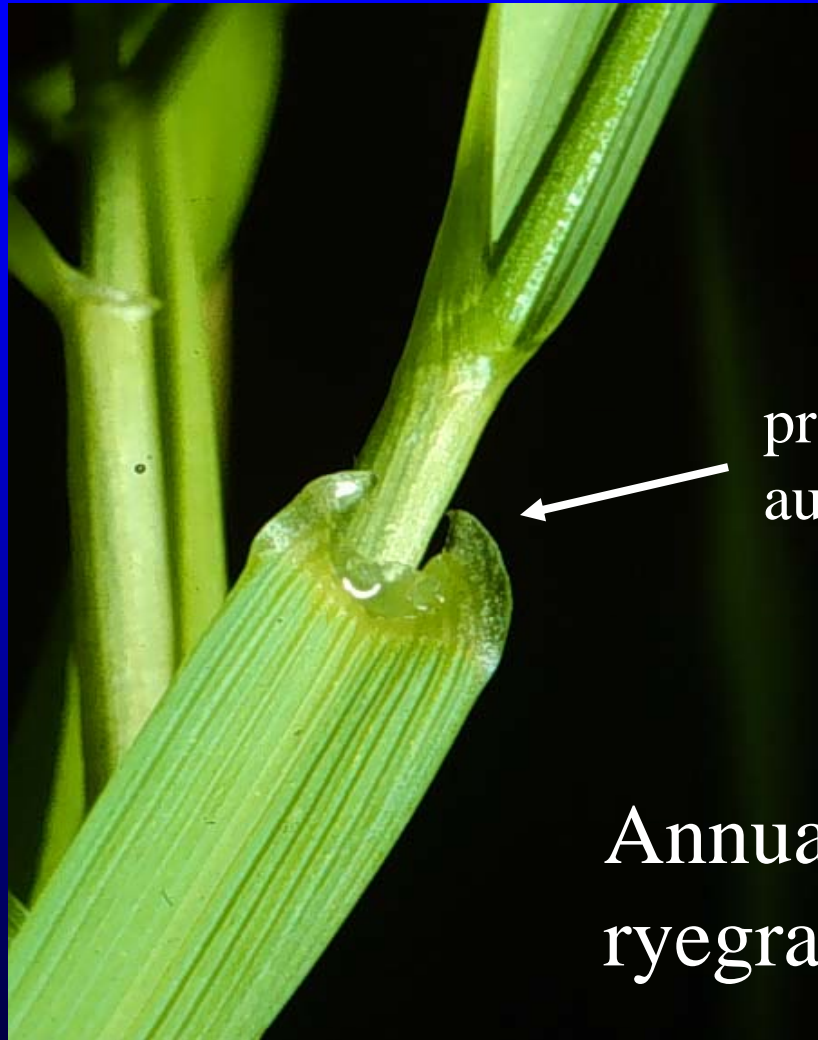
winter annual



annual bluegrass

Image credit: Dr. John Boyd, Univ of Arkansas

winter annual



prominent  
auricles

Annual  
ryegrass



Image credit: Dr. John Boyd, Univ of Arkansas

winter annual



parsley piert

Image credit: Dr. John Boyd, Univ of Arkansas



fruit

**lawn burweed**



winter annual

Image credit: Dr. John Boyd, Univ of Arkansas



winter annual

Image credit: Dr. John Boyd, Univ of Arkansas



winter annual

sticky chickweed

Image credit: Dr. John Boyd, Univ of Arkansas





winter  
annual

common chickweed

Image credit: Dr. John Boyd, Univ of Arkansas

## Johnny Jump-up violet



**Winter  
Annual  
Broadleaf**

winter annual



field madder

Image credit: Dr. John Boyd, Univ of Arkansas



seedling

winter annual      corn speedwell

Image credit: Dr. John Boyd, Univ of Arkansas

winter annual



hairy bittercress –  
winter annual

Image credit: Dr. John Boyd, Univ of Arkansas



winter annual

field madder



# Noxious Weed - must control to keep it from setting seed as per the law

1st year: vegetative growth

2nd year: flowers and dies.

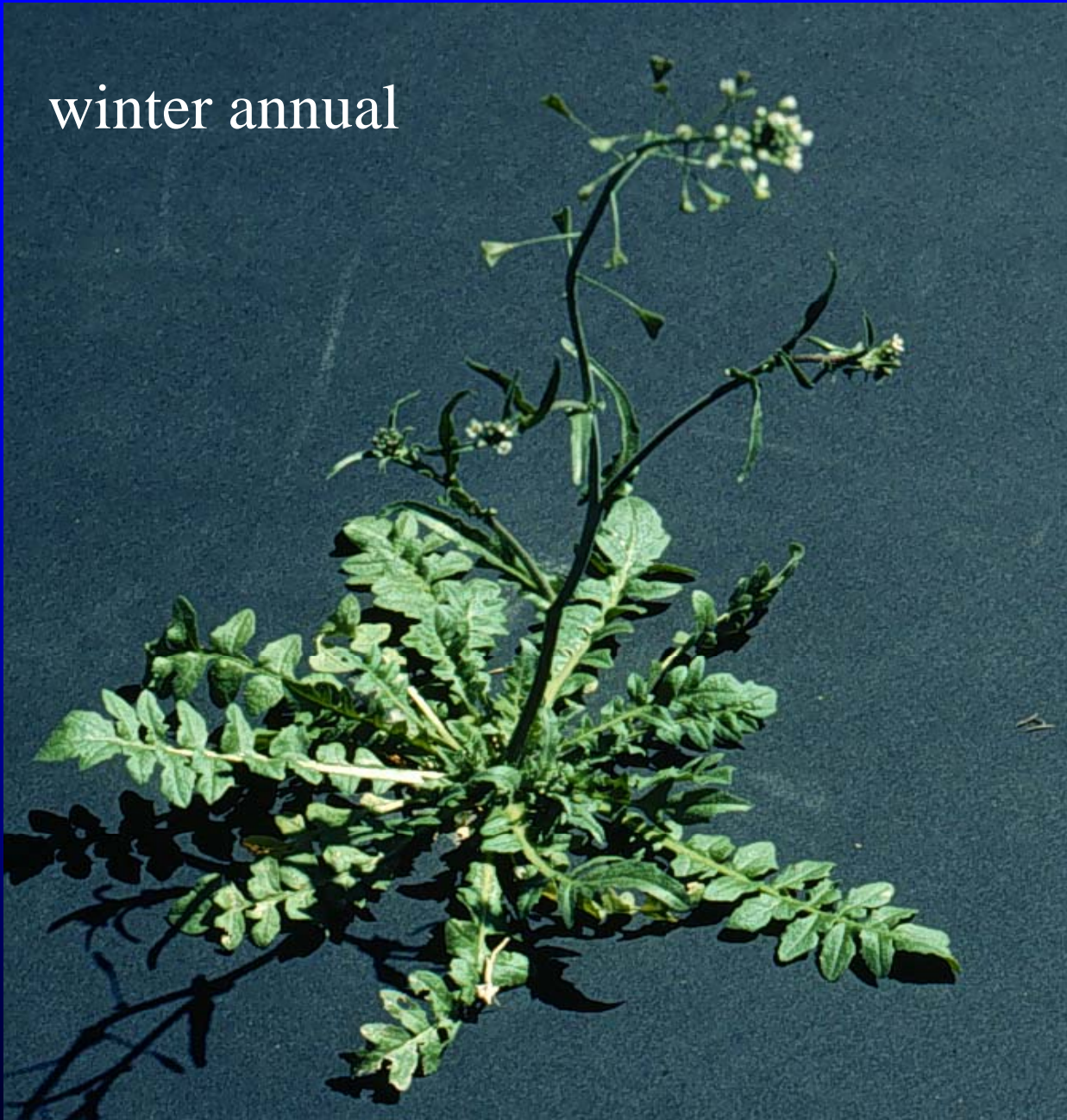


Musk thistle rosette -  
vegetative stage



Flower - reproductive  
stage

winter annual



shepherd's purse



fruit

Image credit: Dr. John Boyd, Univ of Arkansas



winter annuals



red deadnettle

henbit

Image credit: Dr. John Boyd, Univ of Arkansas

winter annual



Spotted burclover

Image credit: Dr. John Boyd, Univ of Arkansas



↑  
garlic

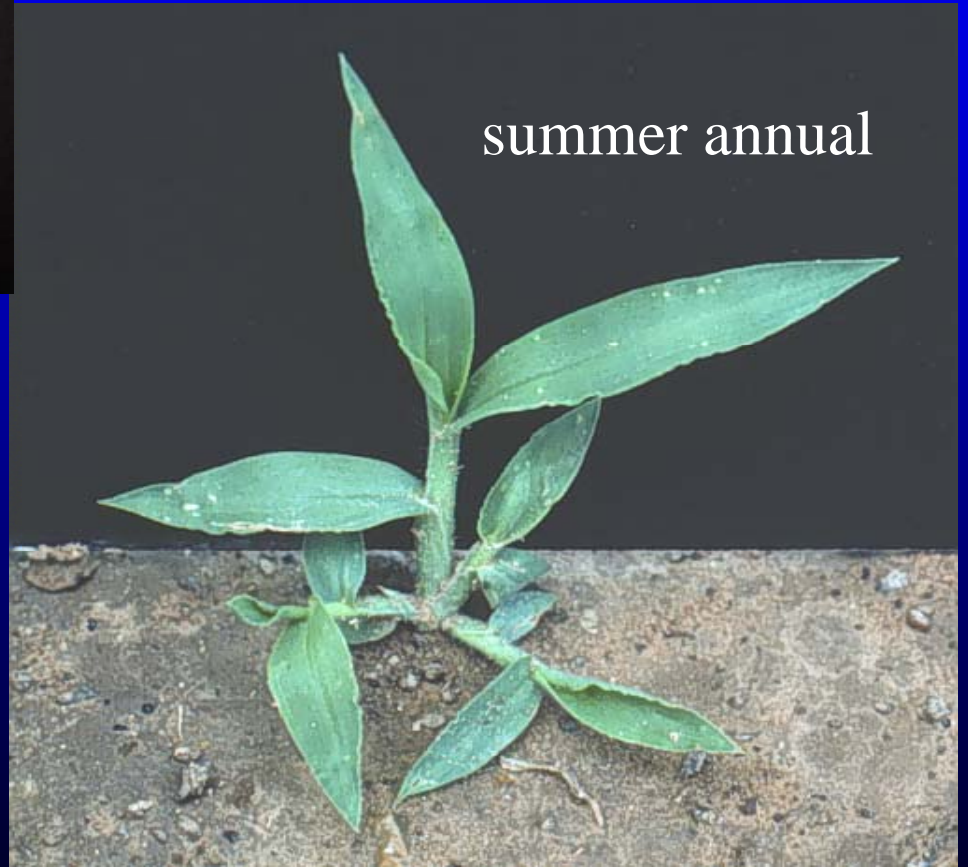
↑  
onion



wild garlic – winter perennial



large crabgrass



summer annual

Image credit: Dr. John Boyd, Univ of Arkansas

# Summer Annual Grassy Weeds





sandbur

summer perennial

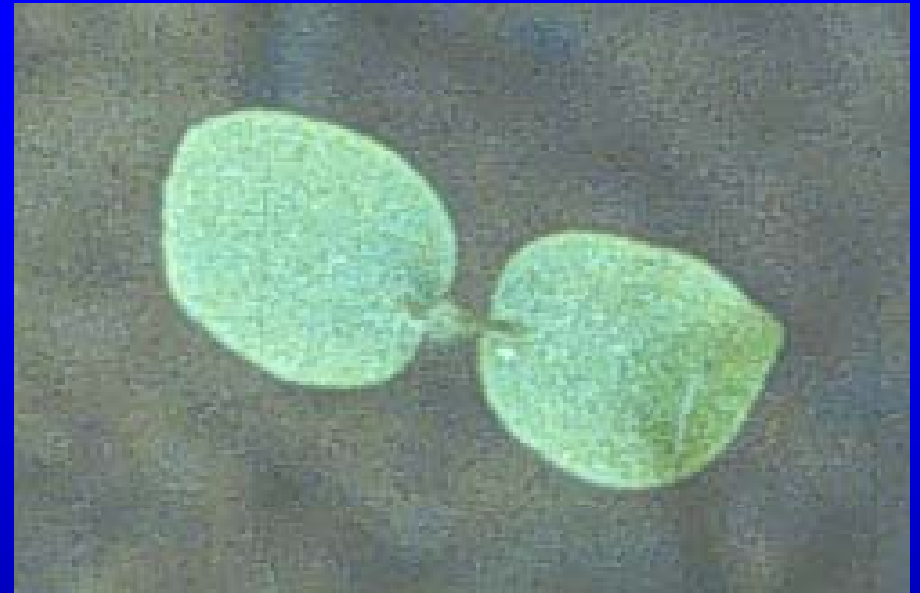
Image credit: Dr. John Boyd, Univ of Arkansas



goosegrass seedling

Summer Annual Grass

This is a **monocot** because it has 1 seed leaf



henbit seedling

Broadleaf, Winter Annual

This is a **dicot** because it has 2 seed leaves

summer annual



goosegrass

Image credit: Dr. John Boyd, Univ of Arkansas



Annual or  
perennial



oxalis

Image credit: Dr. John Boyd, Univ of Arkansas

summer annual



prostrate spurge

milky sap



Image credit: Dr. John Boyd, Univ of Arkansas

# Summer Annual Broadleaf Weeds

- knotweed
- prostrate spurge



Summer perennials



yellow nutsedge

purple nutsedge

Image credit: Dr. John Boyd, Univ of Arkansas

# purple and yellow nutsedge flowers



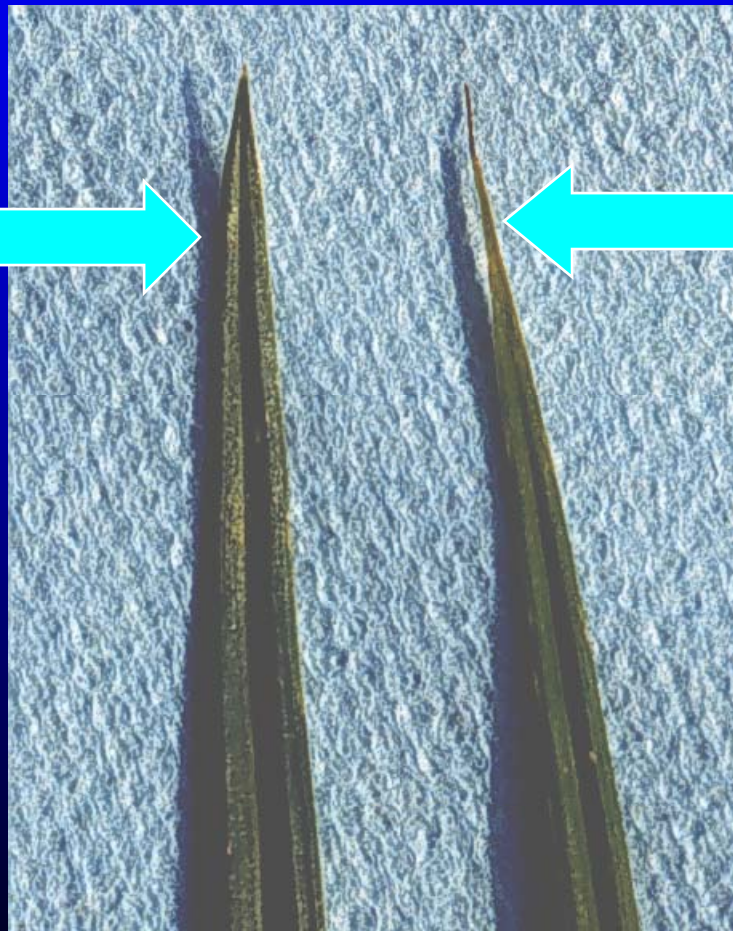
purple nutsedge



yellow nutsedge

# yellow and purple nutsedge leaf tips

purple nutsedge



yellow nutsedge



# yellow and purple nutsedge tubers



purple nutsedge tuber



yellow nutsedge tuber



Annual Sedge (*Cyperus compressus*)

Image credit: Dr. John Boyd, Univ of Arkansas



summer  
perennial

green kyllinga



Image credit: Dr. John Boyd, Univ of Arkansas



seedhead



rhizome

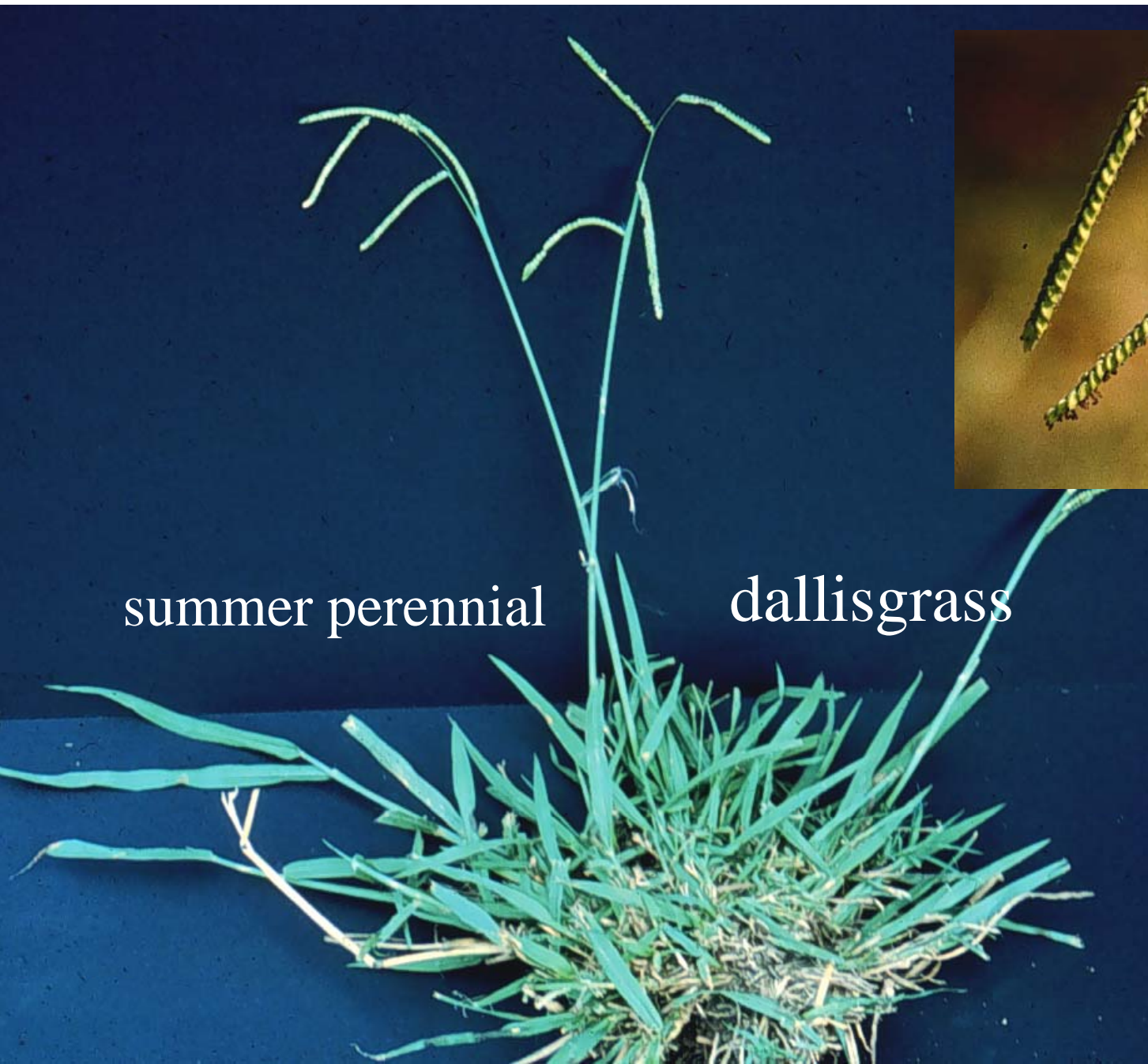
**bahiagrass – summer perennial**

Image credit: Dr. John Boyd, Univ of Arkansas



bermudagrass – summer perennial

Image credit: Dr. John Boyd, Univ of Arkansas



summer perennial

dallisgrass



Image credit: Dr. John Boyd, Univ of Arkansas



tall fescue

cool-season perennial



Image credit: Dr. John Boyd, Univ of Arkansas



Virginia buttonweed

summer perennial

Image credit: Dr. John Boyd, Univ of Arkansas

perennial

white clover



Image credit: Dr. John Boyd, Univ of Arkansas

winter perennial



dandelion

Image credit: Dr. John Boyd, Univ of Arkansas



perennial



ground ivy

Image credit: Dr. John Boyd, Univ of Arkansas



lespedeza

summer annual

Image credit: Dr. John Boyd, Univ of Arkansas

perennial



blackseed plantain

Image credit: Dr. John Boyd, Univ of Arkansas

perennial



buckhorn  
plantain

Image credit: Dr. John Boyd, Univ of Arkansas



perennial

violet

Image credit: Dr. John Boyd, Univ of Arkansas

# Phase II of MSMA Phase Out

- For golf courses:
  - Spot treatments only (100 sq feet per spot), not to exceed 25 percent of the total golf course acreage per year
  - One broadcast treatment for newly constructed courses only
- For sod farms:
  - 1-2 broadcast applications
  - 25 foot buffer around permanent water bodies
- For highway rights-of-way:
  - Two broadcast applications **ONLY** on highway rights-of-way
  - 100 foot buffer around permanent water bodies

# Golf Course, Sod Farm & Right-of-Way

- Sale of MSMA by Registrants is prohibited after December 31, 2012;
- Distributors can sell MSMA until the close of June 30, 2013.
- Use of MSMA on golf courses is prohibited after December 31, 2013.

# Residential, Commercial & Sports Field Turf Areas

- Distributors are able to sell products purchased before December 31, 2009, until December 31, 2010.
- After December 31, 2010, existing stocks of MSMA can legally be used for weed control on residential, commercial and sports field turf until they are exhausted, provided that these uses comply with the EPA-approved label and labeling of the affected product.



# New Turf Herbicide Products

# Celsius

GROUP B-2 O-4 HERBICIDE



# Celsius™ WG

## HERBICIDE

A Herbicide for Control of Annual and Perennial Broadleaf Weeds and Grasses in Warm-Season Turf Types (St. Augustinegrass, Bermudagrass, Centipedegrass, Zoysiagrass) listed in this label in Commercial and Residential Sites\*

ACTIVE INGREDIENTS: Thiencarbazone-methyl (CAS Number 317815-83-1) .....	8.7%
Iodosulfuron-methyl-sodium (CAS Number 144550-36-7) .....	1.9%
Dicamba (CAS Number 1918-00-9) .....	57.4%
OTHER INGREDIENTS: .....	32.0%
TOTAL: .....	100.0%

CELSIUS™ WG is formulated as a 68% water dispersible granule

\*Do not use on bahiagrass or cool-season turf types, including tall fescue, fine fescue, Kentucky bluegrass, perennial ryegrass, or creeping bentgrass.

EPA Reg. No. 432-1507

EPA Est. No. 264-DEU-001

Net Contents  
**10 Ounces**  
79714858  
Product of Germany  
79925816 091022A

**BACKED**  
by **BAYER.**

**STOP - READ THE LABEL BEFORE USE**  
**KEEP OUT OF REACH OF CHILDREN**  
**CAUTION**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.  
(If you do not understand the label, find someone to explain it to you in detail.)

# Celsius WG

- From Bayer
- 68% WG formulation
- 8.7% Iodosulfuron-methyl sodium + 1.9% dicamba
- Combined post-emergent control of many broadleaves and a few annual grasses
- Moderate post brome control and large crabgrass. Small crabgrass not listed and have not tried it on smooth crabgrass
- Label claims post sandbur control at high rate, have not tried it for this use, repeat apps may be needed
- Labeled for St. Aug, bermuda, buffalo, centipede, zoysia.
- Do not use on bahia or cool-season grasses

## SUPPLEMENTAL LABELING

READ THE ENTIRE LABEL FOR CERTAINTY® TURF HERBICIDE BEFORE PROCEEDING WITH THE USE DIRECTIONS CONTAINED IN THIS SUPPLEMENTAL LABELING.

When using Certainty turf herbicide as permitted according to this supplemental labeling, read and follow all applicable directions, restrictions, and precautions on the label booklet provided with the pesticide container and on this supplemental labeling. This supplemental labeling must be in the possession of the user at the time of pesticide application.



EPA Reg. No. 524-534

Certainty is a registered trademark of Monsanto Technology LLC.

### Weed Control in Landscaped Areas and Ornamental Nurseries

Keep out of reach of children.

### CAUTION!

In case of an emergency involving this product, Call Collect, day or night, 314-694-4000.

#### DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

This labeling must be in the possession of the user at the time of herbicide application.

See "PRODUCT INFORMATION" and "MIXING" sections of the label booklet for Certainty turf herbicide for essential product performance information.

This product is for use in established woody ornamentals, perennial groundcovers and warm-season ornamental grasses growing in landscaped areas or field production nurseries. For selective control or suppression of weeds listed in this section, apply this product at 1.25 ounces per acre. A second application of 1.25 ounces per acre may be made 4 or more weeks after the initial treatment, if needed. Best results are obtained when target weeds are actively growing and not disturbed by mowing for at least 2 days before and 2 days after application.

**Barley, little**  
**Bedstraw, catchweed**  
**Beggarweed, Florida<sup>1</sup>**  
**Bluegrass, annual**  
**Bluegrass, bulbous**  
**Bluegrass, roughstalk**  
**Burweed, lawn**  
**Buttercup**  
**Chamber bitter**  
**Chickweed, common**  
**Clover, white**  
**Crowfootgrass**  
**Dandelion**  
**Dichondra, Carolina**  
**Fescue, tall**  
**Garlic, wild**  
**Geranium, Carolina<sup>1</sup>**  
**Henbit<sup>1</sup>**

*Hordeum pusillum*  
*Galium aparine*  
*Desmodium tortuosum*  
*Poa annua*  
*Poa bulbosa*  
*Poa trivialis*  
*Soliva pterosperma*  
*Ranunculus arvensis*  
*Phyllanthus urinaria*  
*Stellaria media*  
*Trifolium repens*  
*Dactyloctenium aegyptium*  
*Taraxacum officinale*  
*Dichondra carolinensis*  
*Festuca arundinacea*  
*Allium vineale*  
*Geranium carolinianum*  
*Lamium amplexicaule*

**Ivy, ground<sup>1</sup>**  
**Johnsongrass**  
**Kyllinga, false green**  
**Kyllinga, fragrant**  
**Kyllinga, green**  
**Mustard, wild**  
**Nutsedge, purple**  
**Nutsedge, yellow**  
**Pennycress, field**  
**Pennywort, lawn<sup>1</sup> (dollarweed)**  
**Quackgrass<sup>1</sup>**  
**Ryegrass, perennial**  
**Sedge, globe**  
**Sedges, annual**  
**Shepherd's-purse**  
**Violet, wild<sup>1</sup>**  
**Woodsorrell, yellow<sup>1</sup>**

*Glechoma hederacea*  
*Sorghum halepense*  
*Kyllinga gracillima*  
*Kyllinga sesquiflorus*  
*Kyllinga brevifolia*  
*Sinapis arvensis*  
*Cyperus rotundus*  
*Cyperus esculentus*  
*Thlaspi arvense*  
*Hydrocotyle siththorpioides*  
*Elytrigia repens*  
*Lolium perenne*  
*Cyperus croceus*  
*Cyperus spp.*  
*Capsella bursa-pastoris*  
*Viola pratensis*  
*Oxalis stricta*

<sup>1</sup> Suppression or partial control only

# Certainty receives supplemental label in landscape areas and ornamentals

- From Monsanto
- a.i. is sulfosulfuron
- Major use was post-nutsedge control in warm-season turfgrass
- Now has supplemental label in nursery/ornamentals for certain uses
- Over the top post-emergence application/control of nutsedge in Lirope or Monkeygrass



# Echelon™ 4SC

HERBICIDE

For Preemergence and early Postemergence Control of Crabgrass, Selective Preemergence and Postemergence Control of Annual Grasses, Broadleaf weeds and Sedges in Turf Sites Including Residential and Institutional Lawns, Athletic Fields, Commercial Sod Farms, Golf Course Fairways and Roughs, Roadsides, Utility right-of-ways, Railways and Industrial areas

EPA Reg. No. 279-3323 EPA Est. No. 62171-MS-001

<b>Active Ingredient:</b>	<b>By Wt.</b>
Sulfentrazone: N-[2,4-dichloro-5-[4-(difluoromethyl)-4,5-dihydro-3-methyl-5-oxo-1H-1,2,4-triazol-1-yl]phenyl]methanesulfonamide .....	13.6%
Prodiamine: [N3,N3-Di-n-propyl-2,4-dinitro-6-(trifluoromethyl)-m-phenylenediamine .....	27.3%
Other Ingredients: .....	59.1%
	100.0%

Echelon 4 SC contains 4.0 pounds of active ingredient per gallon  
U.S. Patent No. 4,818,275

## KEEP OUT OF REACH OF CHILDREN CAUTION

See additional precautionary information contained inside label booklet.



FMC Corporation  
Agricultural Products Group  
Philadelphia PA 19103

## Net Contents

09-04-07

FIRST AID	
If inhaled	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.</li> <li>• Call a poison control center or doctor for further treatment advice.</li> </ul>
If on skin or clothing	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
If in eyes	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
If swallowed	<ul style="list-style-type: none"> <li>• Call poison control center or doctor immediately for treatment advice.</li> <li>• Do not give any liquid to the person.</li> <li>• Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
HOTLINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-331-3148 for emergency medical treatment information.	
For Information Regarding the Use of this Product Call 1-800-321-1FMC (1362).	

## PRECAUTIONARY STATEMENTS

### Hazards to Humans (and Domestic Animals)

#### CAUTION

Causes moderate eye irritation. Harmful if inhaled, swallowed, or absorbed through skin. Avoid breathing vapor or spray mist. Avoid contact with skin, eyes or clothing. Prolonged or frequently repeated skin contact while mixing or handling may cause allergic reactions in certain individuals.

#### Personal Protective Equipment (PPE)

Applicators and other handlers must wear long-sleeved shirt and long pants, waterproof gloves, and shoes plus socks.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

#### User Safety Recommendations:

- Users should remove clothing immediately if product gets inside. Then wash thoroughly and put on clean clothing.

#### Environmental Hazards

This product is toxic to marine/estuarine invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to terrestrial and aquatic plants in neighboring areas. Do not contaminate water when disposing of equipment wash waters or rinsate.

**Groundwater advisory:** Sulfentrazone is known to leach through soil into groundwater under certain conditions as a result of label use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Do not use on coarse soils classified as sand which have less than 1% organic matter.

**Surface water advisory:** Sulfentrazone can contaminate surface water through spray drift. Under some conditions, sulfentrazone may also

# Echelon 4SC

- From FMC
- Prodiamine + sulfentrazone in 2:1 ratio
- 4SC formulation: 2.67 lbs prodiamine and 1.33 lbs of sulfentrazone
- Combined pre and post-emergent annual grass, broadleaves and sedges
- Post-goosegrass and crabgrass control is pre and very early post
- Sedge pre-emergence but not full season
- Post control of many broadleaves present at time of application
- Label for warm and cool-season grasses



# Dismiss™

## TURF HERBICIDE

For Selective Weed Control in Turf Sites Including Residential and Institutional Lawns, Athletic Fields, Commercial Sod Farms, Golf Course Fairways and Roughs.

EPA Reg. No 279-3295

EPA Est. 279-IL-1

<b>Active Ingredient:</b>	<b>By Wt.</b>
Sulfentrazone*	39.6%
<b>Other Ingredients:</b>	<b>60.4%</b>
	100.0%

\*N-(2,4-dichloro-5-(4-(difluoromethyl)-4,5-dihydro-3-methyl-5-oxo-1H-1,2,4-triazol-1-yl)phenyl)methanesulfonamide.  
Contains 4.0 pounds of active ingredient per gallon.  
U.S. Patent No. 4,818,275

**KEEP OUT OF REACH OF CHILDREN  
CAUTION**

See other panels for additional precautionary information.



FMC Corporation  
Agricultural Products Group  
1735 Market Street  
Philadelphia PA 19103

**Net Contents:**

2-25-08-C

### FIRST AID

<b>If inhaled</b>	<ul style="list-style-type: none"> <li>Move person to fresh air.</li> <li>If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth to mouth, if possible.</li> <li>Call a poison control center or doctor for further treatment advice.</li> </ul>
<b>If on skin or clothing</b>	<ul style="list-style-type: none"> <li>Take off contaminated clothing.</li> <li>Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>Call a poison control center or doctor for further treatment advice.</li> </ul>
<b>If in eyes</b>	<ul style="list-style-type: none"> <li>Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If swallowed</b>	<ul style="list-style-type: none"> <li>Call a poison control center or doctor immediately for treatment advice.</li> <li>Do not give any liquid to the person.</li> <li>Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>Do not give anything by mouth to an unconscious person.</li> </ul>

### HOTLINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-331-3148 for emergency medical treatment information.

**For Information Regarding the Use of this Product Call 1-800-321-1FMC (1362).**

### PRECAUTIONARY STATEMENTS

#### Hazards to Humans (and Domestic Animals)

**CAUTION**  
Causes moderate eye irritation. Harmful if inhaled, swallowed, or absorbed through skin. Avoid breathing vapor or spray mist. Avoid contact with skin, eyes or clothing.

#### Personal Protective Equipment (PPE)

Applicators and other handlers must wear: long sleeved shirt and long pants, waterproof gloves, and shoes plus socks.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

#### User Safety Recommendations:

- Users should:
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.



# Dismiss herbicide

- From FMC
- a.i. is Sulfentrazone
- Labeled for residential, golf course, commercial lawns, sod farms, sports fields, plus.
- 4-12 fl oz/A rates
- Labeled for use in cool and warm-season turfgrasses
- Controls a number of sedges and broadleaf weeds, split apps sometimes needed
- Early post-goosegrass control, pre-tiller
- Surfactant not recommended

Not all products listed are available for purchase or authorized for use in every state. In addition, some states, counties and cities may require special licensing and training to sell, purchase or apply some of the products presented in this product literature. It is the responsibility of the distributor, retailer or professional applicator to verify, before product sale/purchase, that the product is approved for the use intended in their state, county and city.



# Katana™

## TURF HERBICIDE

ACTIVE INGREDIENT: Flazasulfuron\* ..... By Wt. 25.0%  
 OTHER INGREDIENTS: ..... 75.0%  
 TOTAL 100.0%

\*N-[4-(6-dimethoxy-2-pyridinyl)amino]carbonyl-3-(trifluoromethyl)-2-pyridinesulfonamide.  
 Contains 0.25 pounds active ingredient per pound of formulated product.

### KEEP OUT OF REACH OF CHILDREN CAUTION

Si Usted no entiende la etiqueta, busque a alguien para que se la explique a Usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Not Intended for Residential Use

#### READ ENTIRE LABEL CAREFULLY AND USE ONLY AS DIRECTED

#### PRECAUTIONARY STATEMENTS

**Hazards to Humans and Domestic Animals**  
**CAUTION:** Harmful, if swallowed or absorbed through skin. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling. Remove and wash contaminated clothing before reuse.

**Personal Protective Equipment (PPE)**  
 Applicators and other handlers must wear: long-sleeved shirt and long pants, shoes plus socks, protective eyewear and chemical resistant gloves made of any water proof material.

**User Safety Requirements**  
 Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

**User Safety Recommendations**  
 Users should:  
 • Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.  
 • Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.  
 • Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

First Aid	
If swallowed:	<ul style="list-style-type: none"> <li>• Call a poison control center or doctor for treatment immediately for treatment advice.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
If on skin or clothing:	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
If in eyes:	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
If inhaled:	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.</li> <li>• Call a poison control center or doctor for further treatment advice.</li> </ul>
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. <b>HOT LINE NUMBER:</b> For 24-Hour Medical Emergency Assistance call 1-877-800-6566.	

#### Environmental Hazards

This product is toxic to fish. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash waters or rinsate.

This product may contaminate water through drift of spray in wind, or drift of soil from treated areas. This product has a high potential for runoff for several months or more after application. Poorly drained soils and soils with shallow water tables are more prone to produce runoff that contains this product. Runoff of this product would be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours.

There is potential for injury to sensitive plants irrigated with run-off water containing flazasulfuron.

No bee caution required.

#### Physical or Chemical Hazards

Do not use or store near heat or open flame.

#### DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

**Agricultural Use Requirements**  
 Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.  
 Do not enter or allow worker entry into treated areas during the Restricted Entry Interval (REI) of 4 hours.  
 PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is: Coveralls, chemical-resistant gloves made of any waterproof materials, and shoes plus socks.  
 Sod and seed farms are within the scope of the Worker Protection Standard.

**Non-Agricultural Use Requirements**  
 The requirements in this box apply to uses of this product that are not within the scope of the Worker Protection Standard for agricultural pesticides, 40 CFR part 170. The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses. Turf grasses on golf courses and other non-residential turf areas such as industrial parks, tank farms, professionally managed college and professional sports fields and commercial lawns are not within the scope of the Worker Protection Standard. Do not enter or allow others to enter the treated area until sprays have dried.

#### Use Information

Katana™ Turf Herbicide is a selective herbicide for removal of overseeded cool-season grasses as well as control of annual and perennial grasses, sedges, and broadleaf weeds in Bermudagrass, zoysiagrass and certain other warm-season turfgrasses. This product has post-emergence and some pre-emergence activity. Katana Turf Herbicide may be used on golf courses (fairways, roughs, and tees) and the following non-residential turf areas: industrial parks, tank farms, sod farms, seed farms, cemeteries, professionally managed college and professional sports fields and commercial lawns for control of cool-season grasses and weeds from tolerant grasses.

Weed growth stops within hours after the application, however symptom progress from discoloration or chlorosis to necrosis generally requires from 3 to 8 weeks. Speed of control is generally a function of weather with faster action during warmer weather and actively growing weeds and turf.

Katana Turf Herbicide controls weeds by inhibiting the acetolactate synthase (ALS) biochemical process. Some weeds may contain naturally occurring populations that are resistant to ALS inhibiting herbicides. Applications of ALS inhibiting herbicides, when used alone, over a period of time may lead to biotypes that are resistant to ALS herbicides. This then leads to a reduction in the level of control obtained through the use of these herbicides. To prevent or delay the build-up of ALS resistant weeds, weed management programs should include the use of appropriate registered herbicides for control of these weeds that have a different mode of action. Applications of herbicides with a different mode of action should be used during the same year or in sequential years.

#### Application Restrictions

- Do not apply Katana Turf Herbicide aerially.
- Do not apply Katana Turf Herbicide through any irrigation system.
- Repeat applications may be made at 2 to 6 weeks after the application for optimum weed control.
- The maximum yearly application rate is 9.0 oz. per acre.
- Use only on turfgrasses listed below (unless listed under weeds controlled) or severe injury may result.
- Do not apply to new seeded, sodded or sprigged turfgrass until well established.
- Allow at least 2 weeks from the last application to the time of overseeding when applied at 1.5 oz./A. Allow 4 weeks for rates above 1.5 oz./A.
- Do not use on golf course putting greens.

# Katana

- From PBI Gordon
- a.i. is flazasulfuron, a sulfonyleurea
- 1.5 to 3 oz/A use rate
- Post-emergent on some broadleaves, tall fescue clump removal in bermudagrass, some sedge suppression
- Good safety on many bermudagrasses and zoysagrasses.
- Do not use in cool-season turf

Group 4 Herbicide

# Onetime®

HERBICIDE

**Active Ingredients:**

quinclorac: 3,7-dichloro-8-quinolinecarboxylic acid .....	15.95%
mecoprop (+)-(R)-2-(2-methyl-4-chlorophenoxy) propionic acid .....	7.98%
dicamba (3,6-dichloro-o-anisic acid) .....	2.13%

**Other Ingredients:** .....

**Total:** ..... 73.94%  
100.00%

**Equivalent to:**

1.50 lbs quinclorac: 3,7-dichloro-8-quinolinecarboxylic acid equivalent per gallon  
0.75 lb (+)-(R)-2-(2-methyl-4-chlorophenoxy) propionic acid equivalent per gallon  
0.20 lb 3,6-dichloro-o-anisic acid equivalent per gallon  
Isomer-specific by AOAC Methods  
Contains the single isomer form of mecoprop-p

EPA Reg. No. 7969-267

EPA Est. No.

**KEEP OUT OF REACH OF CHILDREN  
WARNING/AVISO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

See inside for complete **First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty**, and state-specific crop and/or use site restrictions.

**In case of an emergency endangering life or property involving this product, call day or night, 1-800-832-HELP (4357).**

**Net Contents:**

BASF Corporation  
26 Davis Drive  
Research Triangle Park, NC 27709

**BASF**  
The Chemical Company

# Onetime

- From Bayer
- Quinchlorac + MCPP + dicamba
- 1.5 + 0.75 + 0.2 lbs per gallon
- 32 fl oz/A use rate
- Post-emergent crabgrass + wide spectrum of broadleaf weeds
- Good tolerance but slight discoloration of bermudagrasses, zoysiagrass, buffalograss, tall fescue, Kentucky bluegrass and perennial ryegrass. St. Augustinegrass is sensitive
- Note phytotoxicity increase with higher temperatures
- 21 to 64 fl oz/A use rate

Not all products listed are available for purchase or authorized for use in every state. In addition, some states, counties and cities may require special licensing and training to sell, purchase or apply some of the products presented in this product literature. It is the responsibility of the distributor, retailer or professional applicator to verify, before product sale/purchase, that the product is approved for the use intended in their state, county and city.



<b>ACTIVE INGREDIENTS:</b>	
Quinclorac	8.43%
Sulfentrazone	0.69%
2,4-D, dimethylamine salt	11.81%
Dicamba, dimethylamine salt	1.49%
<b>INERT INGREDIENTS:</b>	<b>77.58%</b>

TOTAL 100.00%

**THIS PRODUCT CONTAINS:**  
 0.75 lb. 3,7-dibromo-5-quinolinecarboxylic acid per gallon or 8.43%.  
 0.06 lb. N-(2,4-dichloro-5-[4-(dimethylamino)ethyl]-4,5-dihydro-3-methyl-6-oxo-1H-1,2,4-triazol-1-yl) pyrimidin-2-amine per gallon or 0.69%.  
 0.99 lb. 2,4-dichlorophenoxyacetic acid equivalent per gallon or 9.81%.  
 0.10 lb. 3,5-dibromo-4-nitrobenzoic acid equivalent per gallon or 1.24%.  
 Formulated by ADAC Methods.  
 CAS Registry Numbers: Quinclorac (84087-01-6), Sulfentrazone (122836-35-9), Dicamba, dimethylamine salt (2300-66-6), 2,4-D, dimethylamine salt (2008-39-1).  
 U.S. Pat. # 6,840,679

**KEEP OUT OF REACH OF CHILDREN  
CAUTION**

Si Usted no entiende la etiqueta, busque a alguien para que se la explique a Usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)



**READ THE ENTIRE LABEL FIRST.  
OBSERVE ALL PRECAUTIONS AND  
FOLLOW DIRECTIONS CAREFULLY.**

**PRECAUTIONARY STATEMENTS**

**Hazards to Humans and Domestic Animals**  
**CAUTION:** Causes moderate eye irritation. Avoid contact with eyes or clothing. Harmful if swallowed.

**Personal Protective Equipment (PPE)**  
 Some materials that are chemical-resistant to this product are natural rubber, natural rubber blends and laminates. If you want more options, follow the instructions for category A on an EPA chemical-resistance category selection chart.

All mixers, loaders, applicators, and other handlers must wear:  
 • long-sleeved shirt and long pants,  
 • protective eyewear (such as goggles, face shield, or safety glasses),  
 • shoes and socks,  
 • chemical-resistant gloves (except for applicators using ground boom equipment) and  
 • chemical-resistant apron when mixing or loading, cleaning up spills or equipment, or otherwise exposed to the concentrate.

**User Safety Requirements**  
 Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

**User Safety Recommendations**

- Users should wash hands thoroughly with soap and water before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Users should remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. If pesticide gets on skin, wash immediately with soap and water.
- Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

First Aid	
<b>If in eyes:</b>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If swallowed:</b>	<ul style="list-style-type: none"> <li>• Call a poison control center or doctor immediately for treatment advice.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not induce vomiting unless told to do so by a poison control center or doctor.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
<b>If on skin or on clothing:</b>	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-800-800-5556 for emergency medical treatment information.	

**Environmental Hazards**  
 This pesticide may be toxic to fish and aquatic invertebrates. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Do not contaminate water when disposing of equipment wash waters or rinsate.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Application around a cistern or well may result in contamination of drinking water or groundwater.

**Physical and Chemical Hazards**  
 Combustible. Do not use or store near heat or open flame.

**DIRECTIONS FOR USE**

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

**Agricultural Use Requirements**  
 Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170.

This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- coveralls worn over short-sleeved shirt and short pants,
- chemical-resistant footwear plus socks,
- chemical-resistant gloves made of any water-proof material and,
- protective eyewear

# Q4 Plus

- From PBI Gordon
- a.i. are quinchlorac (0.75 lb), sulfentrazone (0.06 lb), 2,4-D (0.88 lb) and dicamba (0.10 lb per gallon)
- Post-emergent crabgrass, early post goosegrass, post nutsedge, post-emergent against most broadleaf species
- Labeled for use in cool-season grasses. Currently only labeled for dormant application to bermuda, zoysiagrass and buffalograss
- 5 – 7 pints/A use rate



# Solitare®

## HERBICIDE

For Selective Weed Control in turf Including Residential, Commercial and Institutional Lawns, Athletic Fields, Commercial Sod Farms, Golf Course Fairways and Roughs, and Other Non-crop Sites

EPA Reg. No. 279-3355

EPA Est. 279-IL-1

<b>Active Ingredient:</b>	<b>By Wt.</b>
Sulfentrazone* .....	18.75%
Quinclorac* .....	56.25%
Other Ingredients: .....	25.00%
<b>Total:</b>	<b>100.0%</b>

\*Solitare Herbicide contains 0.75 pounds of active ingredient per one pound of product (0.1875 pounds a.i. of Sulfentrazone and 0.5625 pounds a.i. of Quinclorac)

U.S. Patent No. XXXXXXXXXX

**KEEP OUT OF REACH OF CHILDREN  
CAUTION**

See other panels for additional precautionary information.



FMC Corporation  
Agricultural Products Group  
1735 Market Street  
Philadelphia PA 19103

**Net Contents: 1 Pound**

### FIRST AID

IF SWALLOWED	<ul style="list-style-type: none"> <li>Call a poison control center or doctor immediately for treatment advice.</li> <li>Have person sip a glass of water if able to swallow.</li> <li>Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>Do not give anything by mouth to an unconscious person.</li> </ul>
IF ON SKIN OR CLOTHING	<ul style="list-style-type: none"> <li>Take off contaminated clothing.</li> <li>Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
IF IN EYES	<ul style="list-style-type: none"> <li>Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
IF INHALED	<ul style="list-style-type: none"> <li>Move person to fresh air.</li> <li>If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.</li> <li>Call a poison control center or doctor for further treatment advice.</li> </ul>

### HOTLINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-331-3148 for emergency medical treatment information.

For Information Regarding the Use of this Product Call 1-800-321-1FMC (1362).

### PRECAUTIONARY STATEMENTS

#### Hazards to Humans (and Domestic Animals)

##### CAUTION

Harmful if swallowed. Avoid contact with skin or clothing. Causes moderate eye irritation.

##### Personal Protective Equipment (PPE)

Applicators and other handlers must wear: long sleeved shirt and long pants, waterproof gloves, and shoes plus socks.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

#### User Safety Recommendations:

Users should:

- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

#### Environmental Hazards

This pesticide is toxic to marine/estuarine invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to terrestrial and aquatic plants in neighboring areas. Do not contaminate water when disposing of equipment washwaters or rinsate.

**Groundwater advisory:** The active ingredients in this product are known to leach through soil into groundwater under certain conditions as a result of label use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground water contamination.



# Solitare

- From FMC
- a.i. are Sulfentrazone 18.75% + quinchlorac 56.25%
- Post-crabgrass, post-broadleaf, early post goosegrass, some pre-emergent control, post nutsedge control
- See label for rates and species.
- Labeled across most warm and cool-season turfgrass species
- 16 to 32 fl oz/A use rate

# **SPECTICLE 20WSP** Herbicide

Preemergent Herbicide for the Control of Annual Grasses, Annual Sedges, and Broadleaf Weeds in Turfgrass, Landscape Ornamentals, Christmas Trees, and Hardscapes

**DO NOT USE FOR THE MANUFACTURING OF FERTILIZER**

**ACTIVE INGREDIENT:**

Indaziflam.....20%

**OTHER INGREDIENTS:**

.....80%

Total.....100%

EPA Reg. No. 432-1499

EPA Est. 000264-DEU-001

## **KEEP OUT OF REACH OF CHILDREN CAUTION**

For **MEDICAL** and **TRANSPORTATION** Emergencies **ONLY** Call 24 Hours A Day 1-800-334-7577  
For **PRODUCT USE** Information Call 1-800-331-2867

### **FIRST AID**

<b>If swallowed:</b>	<ul style="list-style-type: none"><li>• Call a poison control center or doctor immediately for treatment advice.</li><li>• Have person sip a glass of water if able to swallow.</li><li>• Do not induce vomiting unless told to do so by a poison control center or doctor.</li><li>• Do not give anything to an unconscious person.</li></ul>
<b>If in eyes:</b>	<ul style="list-style-type: none"><li>• Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing.</li><li>• Call a poison control center or doctor for treatment advice.</li></ul>
<b>If on skin or clothing:</b>	<ul style="list-style-type: none"><li>• Take off contaminated clothing.</li><li>• Rinse skin immediately with plenty of water for 15-20 minutes.</li><li>• Call a poison control center or doctor for treatment advice.</li></ul>

**Have the product container or label with you when calling a poison control center or doctor or going for treatment.**

### **PRECAUTIONARY STATEMENTS**

#### **HAZARD TO HUMANS**

#### **CAUTION**

Harmful if absorbed through the skin. Harmful if swallowed. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing.

#### **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Applicators and other handlers must wear long-sleeved shirt and long pants, chemical resistant gloves made of any waterproof material such as nitrile or butyl gloves, and shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

#### **ENGINEERING CONTROLS STATEMENTS:**

When handlers use closed systems or enclosed cabs in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

# Specticle 20 WSP

- Bayer Environmental Science
- Active ingredient indaziflam
- Labeled for most warm season turfgrasses including bahia, bermuda, buffalo, centipede, St. Augustine, and zoysiagrass.
- Do not use on cool-season turfgrasses
- Pre-emergent for many annual grasses including crabgrass, goosegrass, tufted lovegrass, and many annual broadleaves.
- 2.5 to 5 fl oz/A use rate

CLICK HERE TO JUMP TO USE DIRECTIONS

**GORDON'S**  
PROFESSIONAL  
TURF & ORNAMENTAL PRODUCTS

# TRIMEC<sup>1000</sup>

**LOW ODOR**  
**BROADLEAF HERBICIDE**

Controls Dandelion, Clover, Knotweed,  
Henbit, Chickweed, Plantain, Spurge  
and many other broadleaf weeds.

Mixed • Amine  
Formula

ACTIVE INGREDIENT:	
2,4-D, diethanolamine salt (DEA) .....	94.59%
2,4-D, dimethylamine salt (DMA) .....	1.22%
MCPP-p, dimethylamine salt (DMA) .....	8.17%
Dicamba, dimethylamine salt (DMA) .....	2.68%
INERT INGREDIENTS: .....	53.34%
	TOTAL 100.00%

THIS PRODUCT CONTAINS:  
2.37 lbs. 2,4-dichlorophenoxyacetic acid equivalent per gallon or 24.45%  
0.65 lb. (+)-(R)-2-(2-methyl-4-chlorophenoxy)propionic acid  
equivalent per gallon or 6.67%  
0.22 lb. 3,6-dichloro-o-anisic acid equivalent  
per gallon or 2.23%.

Isomer Specific by AOAC Methods.

TRIMEC® is a registered trademark of PBI Gordon Corporation.



## KEEP OUT OF REACH OF CHILDREN WARNING-AVISO

Si Usted no entiende la etiqueta, busque a alguien para que se la explique a Usted en detalle. (If you do not understand the label, find some one to explain it to you in detail.)

### KEEP FROM FREEZING

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170.



READ THE ENTIRE LABEL FIRST.  
OBSERVE ALL PRECAUTIONS AND  
FOLLOW DIRECTIONS CAREFULLY.

### PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

**WARNING:** Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Harmful if swallowed.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are natural rubber. If you want more options, follow the instructions for category A on an EPA chemical-resistance category selection chart.

All mixers, loaders, applicators and other handlers must wear:

- protective eye wear (goggles, face shield, or safety glasses),
- long-sleeved shirt and long pants,
- shoes and socks,
- chemical-resistant gloves (such as natural rubber, selection category A)
- chemical-resistant apron when mixing or loading, cleaning up spills or equipment, or otherwise exposed to the concentrate.

See engineering controls for additional requirements.

Engineering Control Statements

When handlers use closed systems or enclosed cabs in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

### User Safety Requirements

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

### User Safety Recommendations

- Users should wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Users should remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. If pesticide gets on skin, wash immediately with soap and water.
- Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

### First Aid

If in eyes:	<ul style="list-style-type: none"><li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li><li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li><li>• Call a poison control center or doctor for treatment advice.</li></ul>
If swallowed:	<ul style="list-style-type: none"><li>• Call a poison control center or doctor immediately for treatment advice.</li><li>• Have person sip a glass of water if able to swallow.</li><li>• Do not induce vomiting unless told to do so by the poison control center or doctor.</li><li>• Do not give anything by mouth to an unconscious person.</li></ul>

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-877-800-5556 for emergency medical treatment advice.

**NOTE TO PHYSICIAN:** Probable mucosal damage may contraindicate the use of gastric lavage.

### Environmental Hazards

This pesticide is toxic to fish and aquatic invertebrates and may adversely affect non-target plants. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Do not contaminate water when disposing of equipment wash waters or rinsate.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Application around a cistern or well may result in contamination of drinking water or groundwater.

### DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

### Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170.

This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 48 hours.

(cont. on next page)

PULL HERE TO OPEN ►

GROUP 27 HERBICIDE



# Tenacity™

*A herbicide for the selective contact and residual control of weeds in ornamental turfgrasses*

Active Ingredient:

Mesotrione\* ..... 40.0%

Other Ingredients: ..... 60.0%

Total: ..... 100.0%

Contains 4 lbs. of active ingredient mesotrione per gallon.

\*CAS No. 104206-82-8

## 1 gallon

Net Contents

syngenta®

**KEEP OUT OF REACH OF CHILDREN.**

### CAUTION

See additional precautionary statements and directions for use in attached booklet.

EPA Reg. No. 100-1267

EPA Est. 100-NE-001

SCP 1267A-L1B 0209  
307098

# Tenacity

- From Syngenta
- a.i. is mesotrione
- Labeled for use in post-crabgrass and some pre/post broadleaves in cool-season turf
- Not for use in bermuda or zoysiagrass
- Foliar bleaching symptoms of sensitive species
- See label for various restrictions
- Labeled for a number of turf use sites but spot treatments only on cool-season lawns
- 4 – 8 fl oz/A use rate, sequential application allowed.

## Supplemental Label



### Amended use directions in turfgrass on golf courses

<b>Active Ingredients</b> <sup>***</sup> :	
dimethenamid-P; (S)-2-chloro-N-[(1-methyl-2-methoxy)ethyl]-N-(2,4-dimethyl-thien-3-yl)-acetamide .....	63.9%
<b>Other Ingredients</b> <sup>***</sup> :	36.1%
<b>Total:</b> .....	100.0%

<sup>\*</sup> Contains 6.0 pounds of active ingredient per gallon  
<sup>\*\*</sup> Contains petroleum distillates

EPA Reg. No. 7969-239

#### Directions For Use

Refer to the Tower<sup>®</sup> herbicide main label, EPA Reg. No. 7969-239, for complete Directions For Use and all applicable restrictions and precautions. When following the instructions on this supplemental label, the user must have this label and the entire Tower container label in possession at the time of pesticide application.

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

Tower may be used as part of a preemergence weed management program in maintained turfgrass on golf courses. Tower applied as directed will provide preemergence control or suppression of weeds listed in Table 3. Weeds Controlled on the main container label for Tower. Tower may be applied to both cool-season and warm-season turfgrass species as described in the Tolerant Turfgrass Species table following. Turfgrass species not listed on this label may be evaluated for tolerance by testing a small area prior to large-scale use. User assumes all risk.

#### Tolerant Turfgrass Species

<b>Cool Season</b>	Bentgrass <sup>*</sup> ; Bluegrass, annual <sup>*</sup> ; Bluegrass, Kentucky; Bluegrass, roughstalk <sup>*</sup> ; Fine fescue; Perennial ryegrass; Tall fescue
<b>Warm Season</b>	Bahiagrass; Bermudagrass, common; Bermudagrass, hybrid; Buffalograss; Centipedegrass; Kikuyugrass; St. Augustinegrass; Seashore paspalum; Zoysiagrass

<sup>\*</sup> Only established stands of 1/2-inch height or taller. Applications to annual bluegrass may result in yellowing and stand reduction.

# Tower

- From BASF
- Active ingredient Dimethenamid-P
- 6 lbs ai/gallon
- Not currently labeled for lawns, grounds or sports fields
- Currently turf usage is for Golf Course Turf only, through a supplemental label, not on putting greens
- Pre-emergent for spurge, goosegrass, annual sedges
- 21 – 32 fl oz/A in up to 2 split applications



# Questions?

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- This presentation will be mounted to the web at [www.turf.okstate.edu](http://www.turf.okstate.edu) shortly.