

TEXAS A&M
AGRILIFE

THE DALLAS
CENTER

Program Approach to Weed Control

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Getting Started: *Weed Identification*



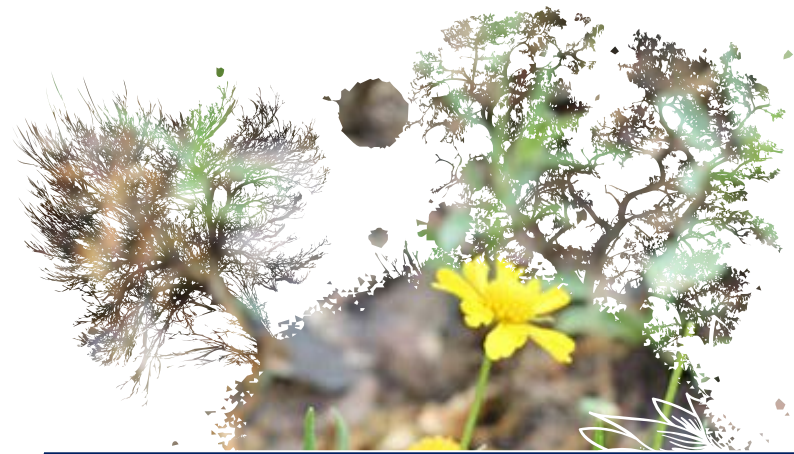
Weed Identification

With proper identification, you can learn many things:

- Underlying environmental and management stresses
- Appropriate mechanical and cultural control practices
- Appropriate chemical control options
- Plant life cycle and control timing



These things inform a strong **integrated weed management (IWM) program**



Weed Identification

Key things to know

» Classification

- Monocot v dicot?
- Grasses v. sedges v. rushes

» Life Cycle

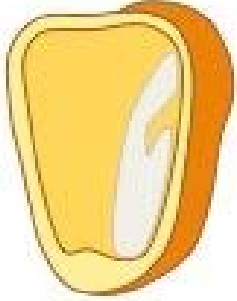
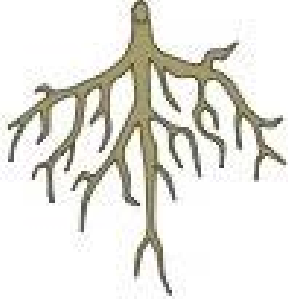
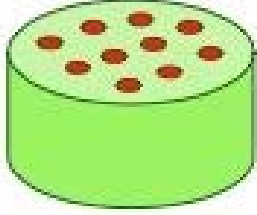
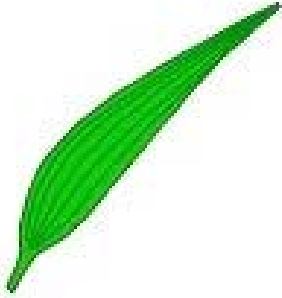

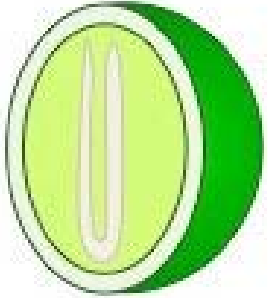
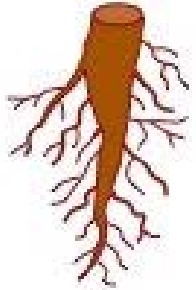
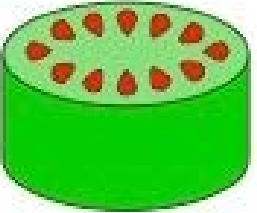
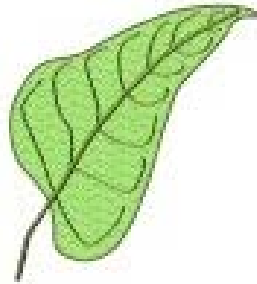

- Annual, biennial, perennial
- Active time of year (winter/summer)

» Growth Habit & Key Structures

- Spreading, upright, bunch-type, etc
- Rhizomes, stolons, tubers, bulbs, etc



Classification: Monocots vs. Dicots

	Seed	Root	Vascular	Leaf	Flower
Monocot					
	One cotyledon	Fibrous roots	Scattered	Parallel veins	Multiples of 3
Dicot					
	Two cotyledon	Tap roots	Ringed	Net-like veins	4 or 5

Venation

The arrangement of veins in the leaf

» Pinnately netted



» Palmately netted

» Parallel



Classification: Monocot v. Dicot



Virginia Buttonweed
Diodia virginiana L.
(dicot)



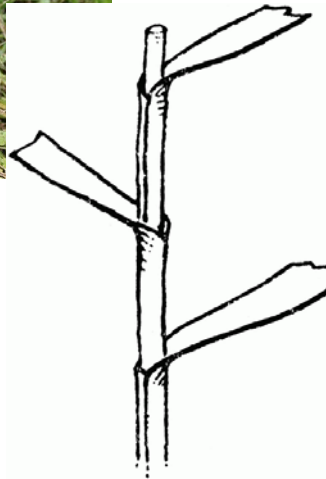
Doveweed
Murdannia nudiflora (L.) Brenan
(monocot)



Classification: Grasses v. Sedges v. Rushes

Characteristic	Grasses <i>Poaceae</i>	Sedges <i>Cyperaceae</i>	Rushes <i>Junacaceae</i>
Stem/Culm	Typically hollow, cylindrical, or flattened	Typically solid and 3-sided	Cylindrical, filled with sponge-like pith
Nodes (points of growth)	Conspicuous	Indistinct	Indistinct
Leaf Arrangement	Two-Ranked	Three-Ranked	Principal leaves are basal
Leaf Blade	Usually flat, often folded, glabrous (shiny) or pubescent (hairy)	Flat, plicate, or bristle-like; rarely pubescent (hairy)	Channeled or round; usually glabrous (shiny)
Leaf Margins	Smooth, scabrous, or ciliate	Usually scabrous	Smooth

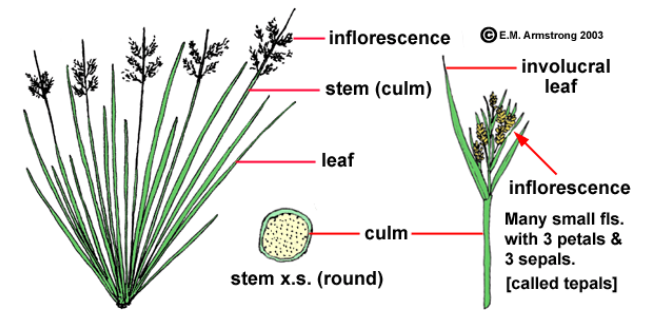
Classification: Grasses v. Sedges v. Rushes



Sedges



Figure 1. Cross-section of triangular stem (left) and three-ranked leaf arrangement (right) of sedge and kyllinga species.



Habit sketch and inflorescence of a rush (*Juncus*).

Life Cycle



Annual

Complete their life cycle within one growing season (typically summer or winter)



Biennial

Plants that complete their life cycle over **two** growing seasons: typically producing vegetative structures the first year, and reproductive structures the next.

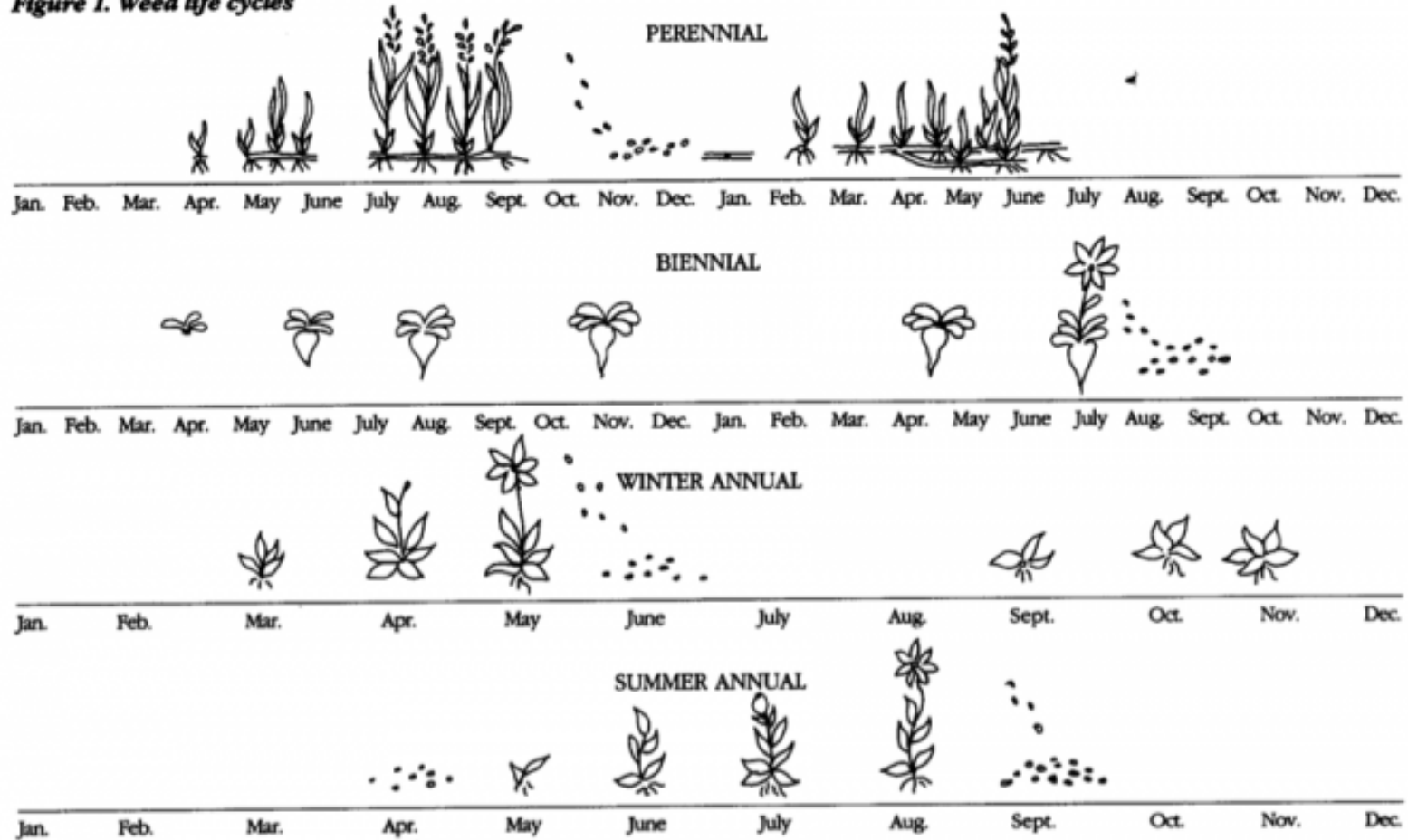


Perennial

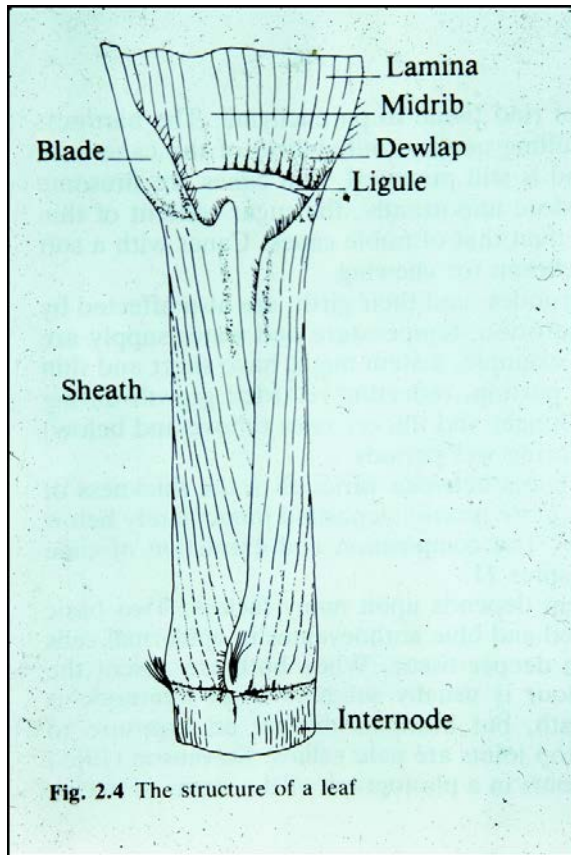
Lives for more than two to three years. Can be herbaceous or woody.

Life Cycle

Figure 1. Weed life cycles



Classification: Grass Morphology & ID



Ligule



Fringe of Hairs



Absent



Membraneous

Classification: Grass Morphology & ID

Auricles



**Long & Claw-like or
Clasping**



Short



Absent



Designing an IWM Program

The holistic approach for success

Integrated Weed Management (IWM)

Preventative Control

Responsible sourcing of seed, sod, compost, mulch and other introduced material that may contaminate the landscape with new weeds.

Cultural Control

Appropriate irrigation, fertilization, and cultivation to promote healthy and competitive plant material.

Mechanical Control

Manual removal (hand-pulling), mowing, or the establishment of physical barriers to inhibit weed growth including the use of mulch, landscape fabric and even fencing.

Biological Control

Can refer to the introduction of natural predators to impede weed growth or preferentially feed on weeds.

Chemical Control

Refers to the use of both natural and synthetic herbicides including preemergence, postemergence, systemic and contact herbicides

Chemical Control: Herbicides

A substance that is toxic to plants, used to destroy unwanted vegetation.



Herbicide Terminology

Term	Definition	Examples
Systemic Herbicide	Absorbed by foliage or roots and translocated to other parts of the plant.	Glyphosate, 2,4-D, quinclorac, atrazine, etc
Contact Herbicide	Kill/Injure only the parts of the plant they touch	Bentazon, diquat, glufosinate, organic arsenicals, other organic products (vinegar, oils)
Selective Herbicide	Herbicide formulated to control specific weeds or weed categories. A material that is toxic to some plant species but less toxic to others.	2,4-D, dicamba, quinclorac, atrazine, simazine, many others.
Nonselective Herbicide	Herbicide formulated to control both broadleaf and grass weeds. Toxicity is indiscriminate.	glyphosate, Nonanoic acid, glufosinate, diquat, paraquat

Herbicide Terminology

Term	Definition	Examples
Preemergence Herbicide	Inhibit seedling germination and/or emergence.	<ul style="list-style-type: none">• Dithiopyr• Pendimethalin• Prodiamine• Indaziflam
Postemergence Herbicide	Product used for weed control following emergence of a weed.	<ul style="list-style-type: none">• 2,4-D/Dicamba• Quinclorac• Glyphosate• Imazaquin• Metsulfuron-methyl

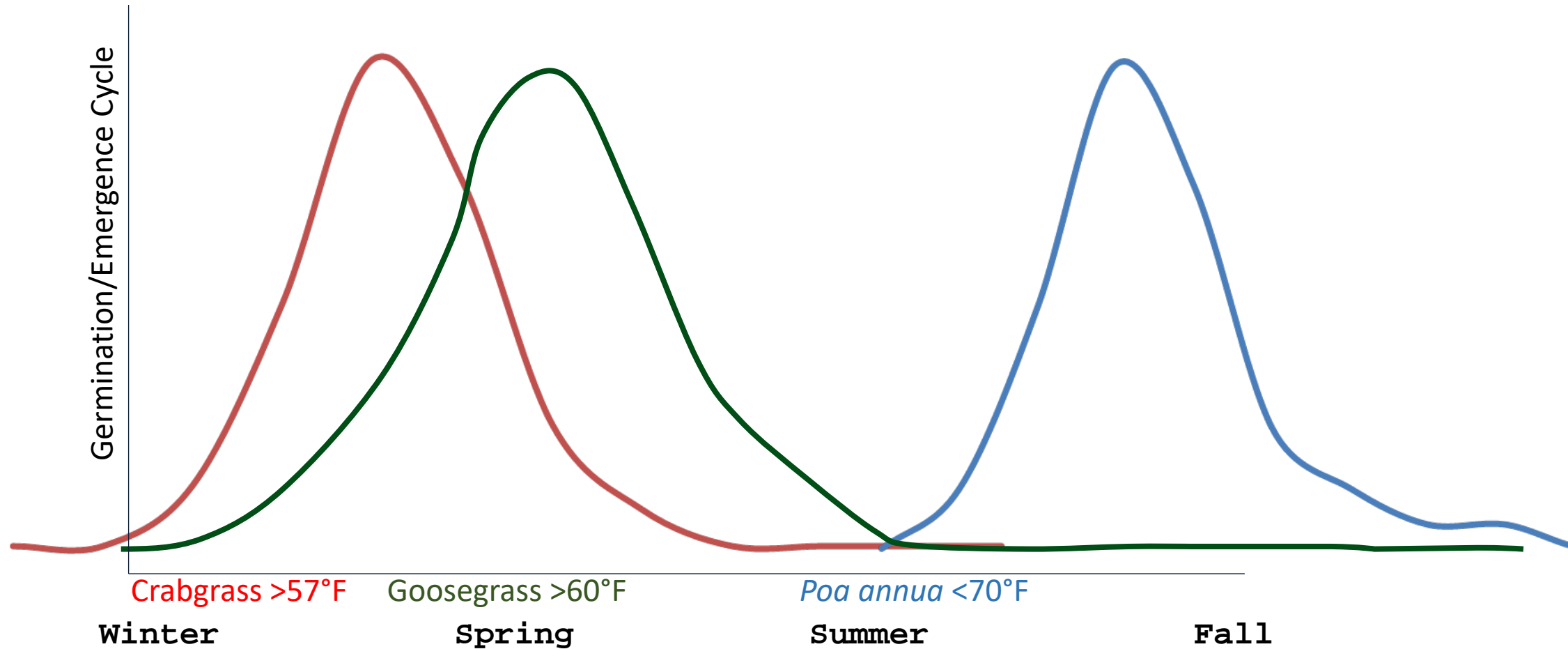
Herbicide Modes of Action

The **mode-of-action** is the overall manner in which a herbicide affects a plant at the tissue or cellular level. Herbicides with the same mode-of-action will have the same translocation (movement) pattern and produce similar injury symptoms. Selectivity on crops and weeds, behavior in the soil and use patterns are less predictable, but are often similar for herbicides with the same mode-of-action.

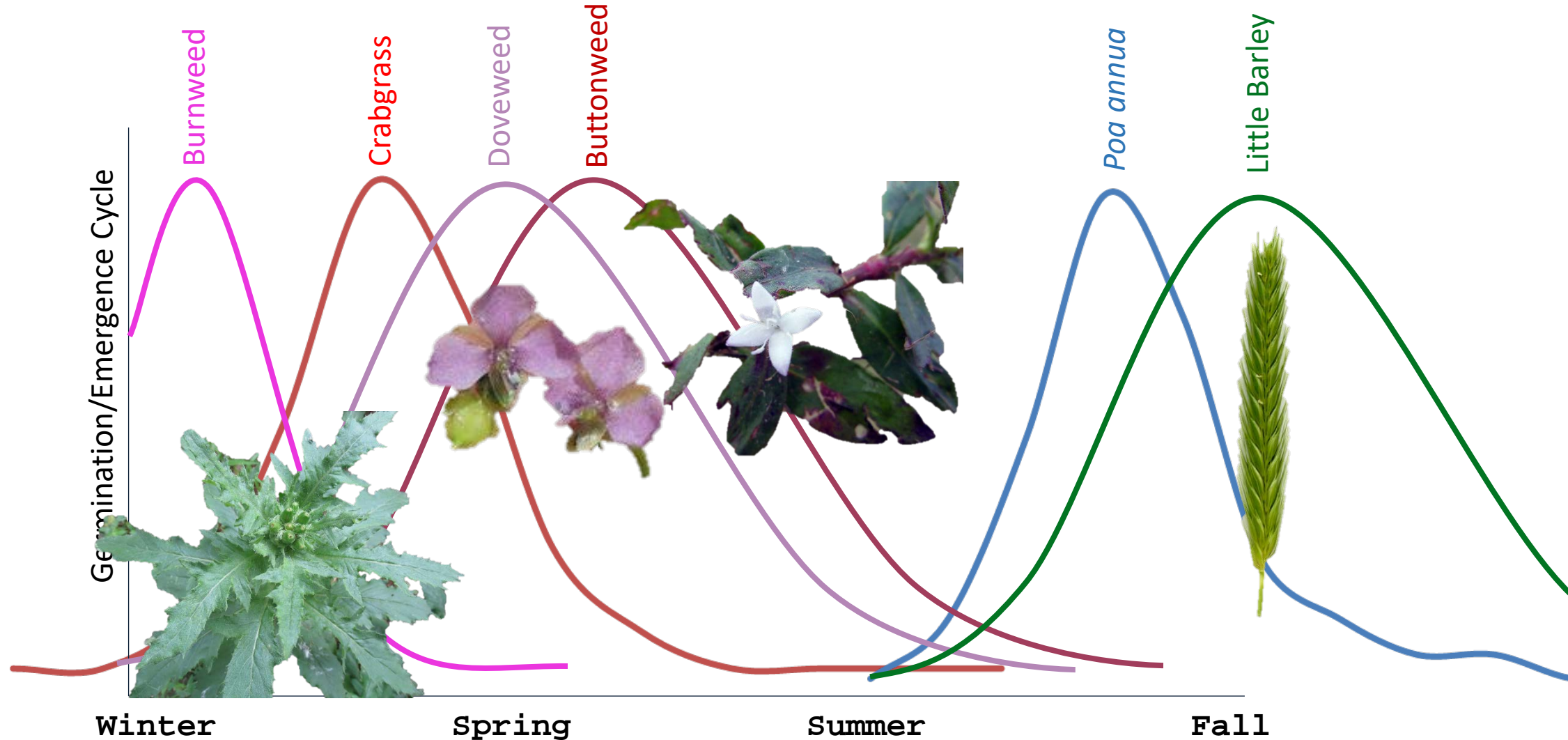
Preemergence Herbicides

- » Most effective on annual weeds that germinate from seed each year.
 - Crabgrass, goosegrass, annual bluegrass
- » Can be helpful with select perennial weeds, but must be combined with a postemergence program.
- » Very important when grassy weeds are the main issue.
- » Number of applications and timing will depend on:
 - Geographic Location
 - Target weeds/Site history
 - Product

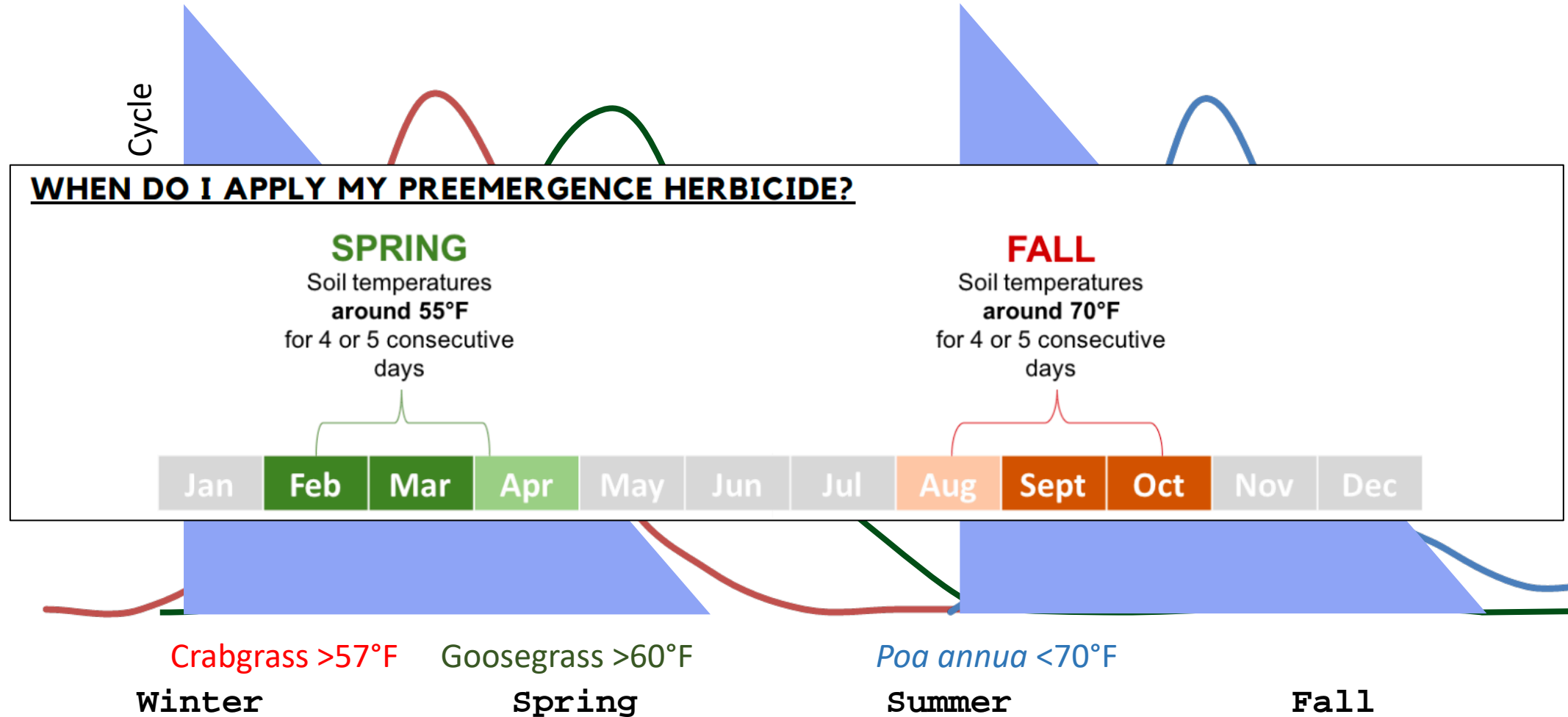
Key Weeds for Preemergence Control



Other Weeds for Preemergence Control



Typical Applications for Preemergence Control



Preemergence Herbicide Guide



PREEMERGENCE HERBICIDES FOR THE HOME LAWN

A quick guide for homeowners

DR. BECKY GRUBBS

ASSISTANT PROFESSOR & EXTENSION TURFGRASS SPECIALIST

FREQUENTLY-ASKED QUESTIONS

WHAT ARE PREEMERGENCE HERBICIDES?

A **preemergence herbicide** is an herbicide that is designed to control weeds by interfering with seedling **germination and emergence**. They are commonly referred to in the lawn care industry as “**weed preventers**”, and essentially form a **protective barrier** on your lawn during critical seasons when weeds are most actively germinating. Conversely, **postemergence herbicides** will control established weeds that have already germinated and emerged. Some herbicides have both pre- and postemergence activity.

HOW DO THEY WORK?

Herbicides are classified by their **site of action** which refers to the location within the plant where the herbicide interferes with development. Different preemergence herbicides may have different sites of action or manners in which they work. However, many of the preemergence herbicides found in lawn care products for homeowners are classified as **mitosis inhibitors**. In simpler terms, these products **inhibit cell division**, resulting in seedlings that are **stunted, deformed, and unable to emerge as healthy plants**.

Common lawn weeds that can be prevented with the use of preemergence herbicides.



Large Crabgrass
Digitaria sanguinalis (L.) Scop.



Annual Bluegrass
Poa annua L.



Spotted Spurge
Chamaesyce maculata L.

WHAT ARE THE POTENTIAL BENEFITS OF USING A PREEMERGENCE HERBICIDE?

- These herbicides provide protection during critical seasons when turfgrass may be less able to compete with weeds (spring and fall).
- Preemergence herbicides are generally the most effective chemical option for controlling **challenging annual weeds** like crabgrass (*Digitaria spp.*) and annual bluegrass (*Poa annua* L.).
- In some cases, preemergence herbicides can reduce the number of postemergence herbicide applications required to maintain a healthy lawn.
- When used as directed by the label, many preemergence products can be safer to use around established plants in the landscape compared with select postemergence products.

WHAT OTHER FACTORS SHOULD I CONSIDER BEFORE PURCHASING AND USING AND PREEMERGENCE HERBICIDE?

- Preemergence herbicides can injure newly-established or overseeded turfgrass lawns. Follow label recommendations and consult your **AgriLife County Extension Agent** when in doubt.
- Weed and feed products used for other purposes in the landscape may already contain preemergence herbicides. Application of separate preemergence herbicides in addition to these products may lead to over-application that can be harmful to your lawn.
- The performance of preemergence herbicides can be significantly affected by timing, precipitation, environmental conditions, and the specific weeds you are targeting. For the most effective program, work with your AgriLife County Extension office regarding their recommendations for your area.
- Avoid using weed and feed products during months when turfgrass is not actively growing, as this can lead to the application of nitrogen fertilizers at inappropriate times.

Download for FREE from
aggieturf.tamu.edu

Maximum Annual Rates

Annual Use Rates - Turfgrass

Barricade 4FL can be applied to the turfgrass species listed in the following table. **Restriction:** Do not apply more than the highest rate listed for each species in a calendar year.

Maximum Application Rate of Barricade Per Calendar Year by Turf Species		
Turf Species	Oz. Product/A	Oz. Product/1,000 sq. ft.
Bermudagrass ² Bahia grass Centipedegrass Kikuyugrass Seashore Paspalum St. Augustinegrass ³ Tall Fescue (including turf-type) Zoysiagrass	21-48 ¹	0.5-1.1
Buffalograss Kentucky Bluegrass Perennial Ryegrass	10-30 ¹	0.23-0.70
Fine Fescue	10-24 ¹	
Creeping Bentgrass (0.5 inch or more in height ⁴)	10-21 ¹	

¹ Barricade 4FL may be applied more than once a year as long as the total amount applied is not greater than the maximum rate for each turf species. All applications must be made before weed seeds germinate.

² May be used on newly sprigged or plugged bermudagrass at rates not to exceed 17 ozs./A (0.39 ozs./1,000 sq. ft.). Plugging bermudagrass stolon rooting may be temporarily inhibited.

³ Use an initial rate of 16-32 ozs./A per application.

⁴ To avoid grass injury, do not apply Barricade 4FL to creeping bentgrass mowed at less than 0.5 inch.



Postemergence Weed Control

- » Earlier is better.
- » Scout and apply during transition seasons (spring and fall). Avoid waiting until plants have gone to flower/seed
- » Multiple active ingredients is sometimes more effective for broad-spectrum control. Follow label instructions regarding timing, temperature, and sequential applications.
- » More likelihood of injuring other plants in the landscape with postemergence herbicides.

Established or perennial broadleaf weeds

» Group 4, Synthetic Auxin Herbicides

- 2,4-D, dicamba, MCPP, arylex, fluroxypyr
- Examples of products containing Group 4 herbicides: Trimec, GameOn, Celsius, SpeedZone Southern, Avenue South

» Select Group 2, ALS-inhibitor Herbicides

- Metsulfuron-methyl, penoxsulam, imazapic, imazaquin
- Examples of products containing Group 2 herbicides: Manor, Blindside, Sapphire, Image, Plateau

» Group 5 PSII Inhibitor Herbicides

- Simazine, atrazine
- Examples of products containing Group 5 herbicides: Aatrex, Princep



Grassy Weeds

» Group 2, ALS-Inhibitors

- Flazasulfuron, metsulfuron-methyl, rimsulfuron, sulfosulfuron, trifloxysulfuron, foramsulfuron
- Examples: Katana, Negate, Certainty, Monument, Revolver

» Group 1, ACCase inhibitor

- Fenoxaprop-P-ethyl, sethoxydim
- Examples: Acclaim Extra, Last Call, Segment

» Group 4, Synthetic auxin

- Quinclorac (Drive XLR8)

» Group 18, DHP Synthase Inhibitor

- Asulam
- Example: Asulox



Sedges

» Group 2, ALS-Inhibitor Herbicides

- Halosulfuron-methyl, imazaquin, sulfosulfuron, trifloxysulfuron
- Examples: Sedgehammer, Image, Certainty, Tribute Total, Monument

» Group 14, PPO Inhibitors

- Sulfentrazone
- Dismiss South, Blindside, Echelon





PROGRAM FAILURE

- Reduced Efficacy
 - May not find out until it's too late
- Wasted time, money, labor
- Risk of overcompensation
- Limited by Maximum Annual Use Rate
- Pooling elsewhere may increase risk of phytotoxicity

HITTING YOUR TARGET: PRE vs. POSTEMERGENCE



3 to 5 Tiller



For preemergence residual control of crabgrass, apply at least 0.5 inch of water after application; but in order to optimize postemergence control delay irrigation for 6 hours after application.

Specimen Label



Dimension[®]

2EW

SPECIALTY HERBICIDE

®Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow



HERBICIDE MOVEMENT: RUNOFF

INDAZIFLAM GROUP 29 HERBICIDE



Spect(i)cle[®]
FLO

HERBICIDE

Preemergence Herbicide for the Control of Grasses, Annual Sedges and Broadleaf Weeds in Warm Season Turfgrass, Landscape Ornamentals, Hedgerows, Hardscapes, and Natural Areas
DO NOT USE FOR THE MANUFACTURING OF FERTILIZER
ACTIVE INGREDIENT: Indaziflam..... 7.4%
OTHER INGREDIENTS:..... 92.6%
TOTAL:..... 100.0%
This product is a Suspension Concentrate containing 0.622 lb active ingredient per gallon.
Shake well before use.
EPA Reg. No. 432-1608

KEEP OUT OF REACH OF CHILDREN
For **MEDICAL** and **TRANSPORTATION** Emergencies **ONLY** Call 24 Hours A Day 1-800-334-7577
For **PRODUCT USE** Information Call 1-800-331-2867
See Back Panel for First Aid Instructions and Booklet for Complete Precautionary Statements and Directions for Use.

Net Contents
1 Gallon
86775387
86699648A 190417AV1

ENVIRONMENTAL HAZARDS

This product is toxic to fish, aquatic invertebrates, and plants. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean watermark. Do not contaminate water when disposing of equipment rinsate or washwater. This product may enter water through spray drift or runoff. Follow directions for use to avoid spray drift and runoff. A level well maintained vegetative buffer strip between areas to which this product is applied and surface water features including ponds, streams, and springs will reduce the potential for getting into water from rainfall-runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours.

This product may enter water through spray drift. Follow precautions for use to avoid spray drift.

SOIL MOISTURE, IRRIGATION, AND RAINFALL AFTER APPLICATION

To activate SPECTICLE FLO HERBICIDE, irrigate lightly after application to move the herbicide into the soil. Rainfall within several days after application will negate the need to irrigate. Avoid application to saturated soil. Postpone application if rainfall that may cause visible run-off is anticipated.

HERBICIDE MOVEMENT: RUNOFF

METSULFURON METHYL GROUP 2 HERBICIDE



Manor[®]
Selective Herbicide
A Water Dispersible Granule.
Recommended for Use by Turfgrass Managers.


ACTIVE INGREDIENT:
Metsulfuron Methyl: Methyl 2-[[[4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]benzoate 60.0%
OTHER INGREDIENTS: 40.0%
TOTAL: 100.0%

**KEEP OUT OF REACH OF CHILDREN
CAUTION**
SEE INSIDE BOOKLET FOR FIRST AID AND PRECAUTIONARY STATEMENTS
For Chemical Spill, Leak, Fire, or Exposure, Call CHEMTREC (800) 424-9300
For Medical Emergencies Only, Call (877) 325-1840

EPA Reg. No. 228-373

Net Contents
8 oz.
(236 mL)

Manufactured for
Nufarm Americas Inc.
11901 S. Austin Avenue
Alsip, IL 60803



ENVIRONMENTAL HAZARDS

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 apply where runoff water may flow, during periods of intense rainfall or to water saturated soils as off-target movement and injury may occur. Do not contaminate water when cleaning of equipment or disposing of equipment washwaters. Do not apply this product through any type of irrigation system.

Surface Water Advisory Statement: This product may impact surface water quality due to runoff of rain water. This is especially true for poorly draining soils and soils with shallow ground water. This product is classified as having high potential for reaching surface water via runoff for several months or more after application. A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential loading of metsulfuron-methyl from runoff water and sediment. Runoff of this product will be greatly reduced by avoiding applications when rainfall or irrigation is expected to occur within 48 hours.

HERBICIDE MOVEMENT: VOLATILIZATION



BALAN * DF

A selective herbicide for preemergence control of annual grasses and broadleaf weeds.

ACTIVE INGREDIENT:		
<i>N</i> -butyl- <i>N</i> -ethyl- <i>a, a, a</i> -trifluoro-2,6-dinitro- <i>p</i> -toluidine	60%
OTHER INGREDIENTS:	40%
	TOTAL	100%

Contains 0.6 pound active ingredient per pound.

Incorporation

Before planting, Balan DF must be incorporated one time within 4 to 8 hours after application. A second incorporation is required with most equipment (see "Incorporation Equipment" below for specific instructions). If Balan DF is applied to a wet, warm soil surface or if the wind velocity is consistently greater than 10 mph, variable weed control may result. Variable weed control may also result if incorporation is delayed more than 8 hours in the eastern United States or 4 hours in the western United States. Operate equipment to mix Balan DF into the top 2 to 3 inches of the final seedbed. Generally, incorporation equipment will mix Balan DF approximately half as deep as equipment is operated. For example, operating equipment 4 inches deep will mix Balan DF into approximately the upper 2 inches of the seedbed.

Special Note: In the western United States, extremely high temperatures and intense sunlight may be present at the time of application. Under such conditions, Balan DF should be incorporated within 4 hours after application to prevent loss of herbicidal activity.

Storage & disposal examples

Drexel

MSMA 6 Plus

MSMA Liquid Plus Surfactant

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE: Storage should be under lock and key and secure from access by unauthorized persons and children. Storage should be in a cool, dry area away from any heat or ignition source. High heat may form volatile arsenic compounds. Do not stack over 2 pallets high. Move containers by handles or in cases. Do not move containers from one area to another unless they are securely sealed. Keep container tightly sealed when not in use. Keep away from any puncture source. Avoid storage near water supplies, food, feed, seed, fungicides, insecticides and fertilizers to avoid contamination. Store in original containers only. If the contents are leaking or material is spilled, follow these steps while wearing protective clothing:

1. Contain spill. Absorb with an inert material such as sand or sawdust.
2. Collect and place in suitable containers for disposal.
3. Wash area with soap and water to remove remaining pesticide.
4. Follow washing with clean water rinse.
5. Place a leaking container in a plastic tub and transfer content as soon as possible, to an empty, original container.
6. Do not allow runoff to enter sewer or contaminate water supplies.
7. Dispose of waste as indicated below.

PESTICIDE DISPOSAL: Pesticide wastes are toxic. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA regional office for guidance.

CONTAINER HANDLING:

Nonrefillable Container (rigid material; less than 5 gallons): Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container one-fourth full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Dispose of empty container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

Nonrefillable Container (rigid material; 5 gallons up to < 250 gallons): Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill container one-fourth full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Dispose of empty container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

Refillable Container (≥ 250 gallons & Bulk): Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.



ACCIDENTAL INJURY



Examples of Challenging Weeds

Large Crabgrass

Digitaria sanguinalis (L.) Scop

LARGE CRABGRASS: IDENTIFICATION

- GRASSY WEED (POACEAE)
- SUMMER ANNUAL
- PROSTRATE GROWTH HABIT
(TOLERATES MOWING)
- STOLONIFEROUS, NOT
RHIZOMATOUS

LARGE CRABGRASS: CULTURAL CONTROL

- COMPETITIVE WITH POORLY-MANAGED TURFGRASS
- PRIORITIZE:
 - APPROPRIATE MOWING
 - IRRIGATION
 - FERTILIZATION

LARGE CRABGRASS: CHEMICAL CONTROL

- GERMINATES IN THE SPRING WHEN SOIL TEMPERATURES REACH 53 – 58F
- PREEMERGENCE HERBICIDE PROGRAM IS VERY IMPORTANT





Large Crabgrass: Chemical Control



PREEMERGENCE CONTROL:
Apply when soil temperatures reach 50 – 55F for 4 to 5 consecutive days.

EARLY POSTEMERGENCE:
Select products will be effective if applied early.

LATE-SEASON POSTEMERGENCE:
Fewer products will be effective. Results will vary.

Large Crabgrass: Chemical Control

PREEMERGENCE CONTROL	POSTEMERGENCE
BENEFIN (BALAN)	INDAZIFLAM (SPECTICLE)*
BENSULIDE	DITHIOPYR (DIMENSION)*
DITHIOPYR (DIMENSION)	QUINCLORAC (DRIVE XLR8)
INDAZIFLAM (SPECTICLE)	SETHOXYDIM (SEGMENT)*
ORYZALIN (SURFLAN)	CELSIUS WG*
OXADIAZON (RONSTAR)	LAST CALL
PRODIAMINE (BARRICADE)	SOLITAIRE
+ MIXTURES	SQUARE ONE
	Pinoxaden (Manuscript)

*Effective in early growth stages.

A photograph of a Goosegrass plant, characterized by its dense, upright growth and long, narrow leaves. The plant is situated in a field of other grasses, with a patch of reddish-brown soil visible in the foreground. The text "Goosegrass" is overlaid on the image in a large, bold, black serif font.

Goosegrass

Goosegrass

Eleusine indica (L.)
Gaertn.

- » **Family:** Poaceae
- » **Life Cycle:** Annual
- » **Type:** Grass
- » **Description:** Summer annual grassy weed that grows in clumps, often in a decumbent manner with erect culms. Stems flattened with a **silver to white color in the center of the plant**. Spikelets on inflorescence resemble a “zipper”. Widespread weed that is often found in compacted soils, but can persist elsewhere including golf course putting greens.



Photo by Casey Reynolds, PhD.



Goosegrass

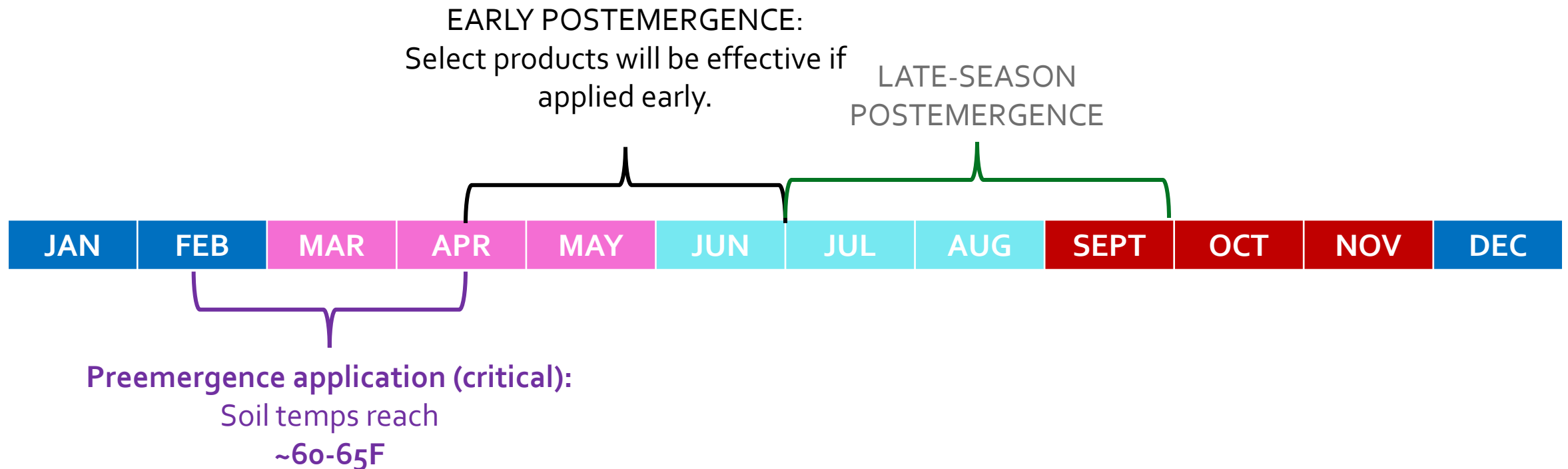
Eleusine indica (L.) Gaertn.

Cultural and Mechanical Management Recommendations:

- » Proliferates in **compacted** areas. Alleviate compaction to favor healthy turf. Aerification is one approach.
- » Can tolerate extremely low mowing heights – a common “greens” weed. Avoid excessively low mowing heights and/or scalping.
- » Often shows up where *Poa* has been.



Goosegrass: Chemical Control



Can germinate 4-6 weeks after crabgrass. Sometimes a second PRE application 6-8 weeks after first app is helpful.

goosegrass: Chemical COntrol

PREEMERGENCE CONTROL	POSTEMERGENCE
BENEFIN (BALAN)	Sulfentrazone (Dismiss) – apply pre-tiller
OXADIAZON (RONSTAR)	Foramsulfuron (Revolver) – 2 or 3 applications (17.4 fl oz/A) to young plants
PENDIMETHALIN (PENDULUM)	Mesotrione (Tenacity) – will injure bermudagrass
PRODIAMINE (BARRICADE)	Fenoxaprop-p-ethyl (Acclaim Extra) – See label. Use caution with zoysiagrass.
ORYZALIN (SURFLAN)	Topramezone (Pylex) – Temporarily whitens many turfgrasses (especially bermudagrass). Follow label.
DITHIOPYR (DIMENSION)	
INDAZIFLAM (SPECTICLE)	
METOLACHLOR (PENNANT MAGNUM)	

A photograph of a sandbur plant growing in a sandy area. The plant has long, narrow, green leaves and a central stem with a small, developing flower head. The ground is light-colored sand with some other small green plants and dry leaves scattered around. A semi-transparent white rectangular box is overlaid on the center of the image, containing the text "Sandbur" in a large, black, serif font.

Sandbur

Sandbur

Cenchrus Spp.

- » **Family:** Poaceae
- » **Life Cycle:** Annual or Perennial
- » **Type:** Grass
- » **Description:** Grassy weed with burs with a spike-like inflorescence that contains sharp, painful spines that can get caught on clothing, pets, animals, etc. Annual (*C. echinatus*) and perennial (*C. spinifex*) species are both common in Texas.



Sandbur

Cenchrus Spp.

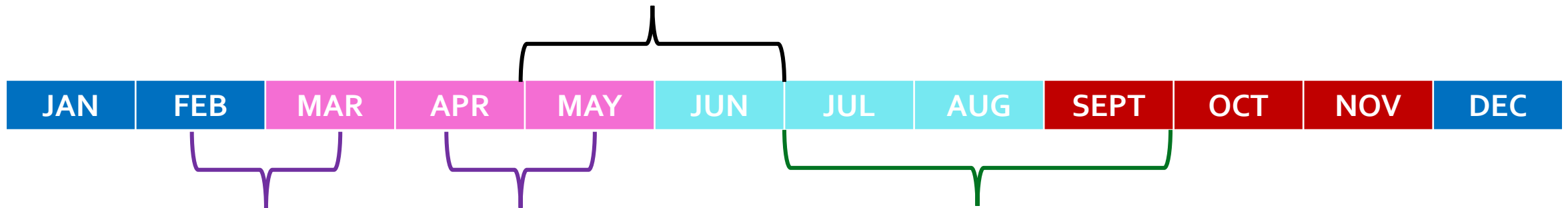
Cultural and Mechanical Management Recommendations:

- » Proliferates in poor soils. Fertilize and amend soils to improve soil quality and overall turfgrass performance.
- » Attempt to maintain adequate soil moisture where possible.
- » Mow *frequently* to **bag and remove** seedheads before they drop to the ground.



Sandbur: Chemical Control

EARLY POSTEMERGENCE:
Select products will be effective
if applied early.



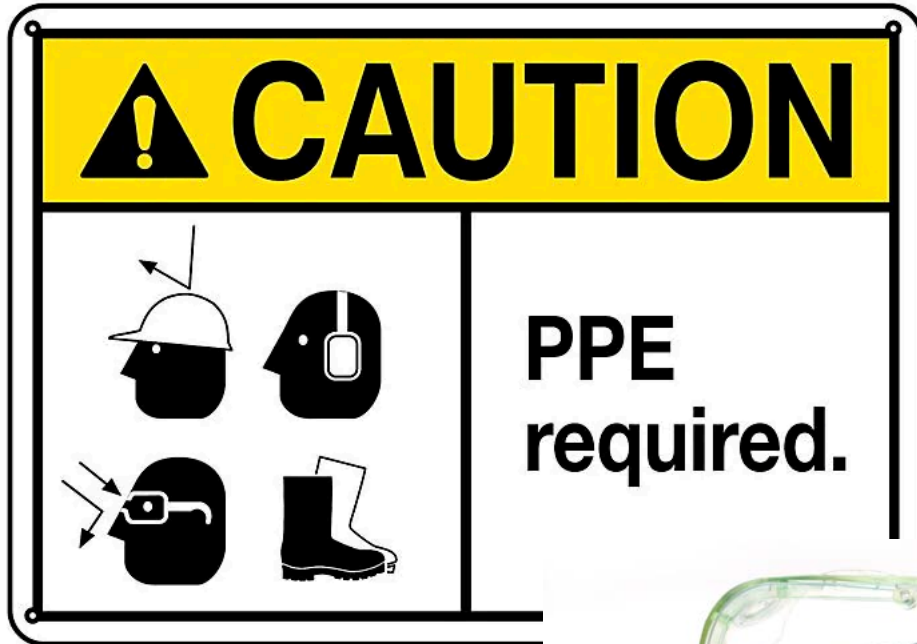
PREEMERGENCE CONTROL:
Sequential applications in early spring (soil
temp ~50-55) and late spring (soil temp
~70F) may be most effective.

LATE-SEASON POSTEMERGENCE

sandbur: Chemical COntrol

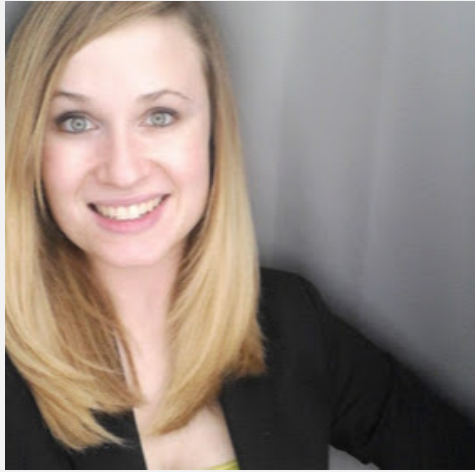
PREEMERGENCE CONTROL	POSTEMERGENCE
ORYZALIN (SURFLAN)	CELSIUS
DITHIOPYR (DIMENSION)	IMAZAQUIN (IMAGE)
INDAZIFLAM (SPECTICLE)	FLAZASULFURON (KATANA)
OXADIAZON (RONSTAR)	
PENDIMETHALIN (PENDULUM, OTHERS)	

Always Protect Yourself!





ALWAYS follow label requirements for appropriate **personal protective equipment (PPE)** regardless of the product you are using!

Never take a pesticide for granted. Even if it is **natural or organic!**



Thank You

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