

Make use of preemergence herbicides this spring

Summer annual weeds such as crabgrass and goosegrass commonly invade athletic field turf. The stress of foot traffic from athletic competition can leave athletic field turf susceptible to annual weed invasion (Figure 1). Crabgrass and goosegrass complete their life cycle in one year, germinating from seed in spring, growing throughout summer, and setting seed in fall. Summer annual weeds invading athletic fields need to be controlled in order to maximize field quality and safety.

An effective means for controlling summer annual weeds is the use of preemergence (PRE) herbicides in spring. A list of preemergence herbicides labeled for use on warm- and cool-season turfgrasses commonly found on athletic fields is presented in **Table 1**.

Weed control programs centered on the use of PRE herbicides offer many benefits to athletic field managers compared to eradicating these weeds with postemergence (POST) herbicides after they become established. For example:

- Athletic field managers have more herbicide options to control summer annual weeds PRE than POST.
- PRE programs are often more economical than POST programs that can require numerous sequential applications.
- Several PRE herbicides are available on fertilizer carriers allowing for granular applications to be made instead of liquid sprays.

Active Ingredient	Trade Name†	Formulations‡,¶	Labeled Species
prodiamine	Barricade	FL, WG	Bermudagrass Seashore Paspalum Tall Fescue Kentucky Bluegrass Perennial Ryegrass
dithiopyr	Dimension	EW, WP	Bermudagrass Seashore Paspalum Tall Fescue Kentucky Bluegrass Perennial Ryegrass
prodiamine + sulfentrazone	Echelon	SC	Bermudagrass Seashore Paspalum Tall Fescue Kentucky Bluegrass Perennial Ryegrass
pendimethalin	Pendulum	FL, G, EC	Bermudagrass Seashore Paspalum Tall Fescue Kentucky Bluegrass Perennial Ryegrass
pendimethalin + dimethenamid-P	FreeHand	G	Bermudagrass Seashore Paspalum
oxadiazon	Ronstar	G, FL, WSP	Dormant Bermudagrass (FL, WSP only) Bermudagrass (G only) Seashore Paspalum (G only) Tall Fescue (G only) Kentucky Bluegrass (G only) Perennial Ryegrass (G only)
indaziflam	Specticle	WSP, FL, G	Bermudagrass

† Active ingredients may be available under multiple trade names. Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the University of Tennessee Institute of Agriculture. The omission of a particular trade name is not intended to reflect adversely, or to show bias against, any product or trade name not mentioned.

‡ FL = flowable; WG = water dispersible granular; EW = concentrated emulsion; WP = wettable powder; WSP = water soluble powder; SC = soluble concentrate; G = granular (not on fertilizer).

¶ Many preemergence herbicides are sold on granular fertilizer carriers. Be sure to follow label instructions to ensure that the correct rates of active ingredient and nutrients are supplied to turf when using these materials.

▲ **Table 1.** List of herbicide active ingredients labeled for preemergence (PRE) control of annual grassy weeds in warm- and cool-season turfgrasses commonly used on athletic fields.

• Likelihood for undesirable turf injury with PRE herbicides is low compared to applying POST products to remove established weeds such as crabgrass and goosegrass.

THINGS TO REMEMBER WHEN USING PREs

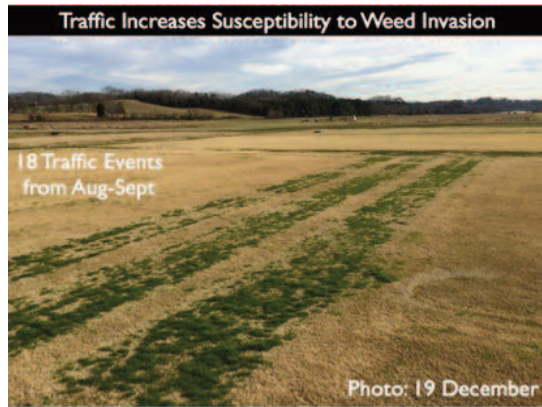
#1- Application Timing: Be sure to apply PRE herbicides before weeds have emerged from soil (i.e., before they are visi-

ble). These herbicides do not prevent weed seed germination; rather they prevent germinated seedlings from developing into mature plants. Considering that the time-frame between weed seed germination and weed emergence can be quite short, it is often recommended that PRE herbicides be applied once soil temperatures are favorable for crabgrass seed germination. Athletic field managers should make their first PRE herbicide application as soon as soil temperatures (at approximately 2 inches) measure $\geq 55^{\circ}\text{F}$ for a minimum of 3 days in spring.

Researchers studied how the blooming of 74 different ornamental plants in spring corresponded with the emergence of crabgrass in turf. They concluded that blooming of border forsythias is a helpful indicator of when to apply PRE herbicides for crabgrass control. Border forsythias produces distinctive yellow blooms at

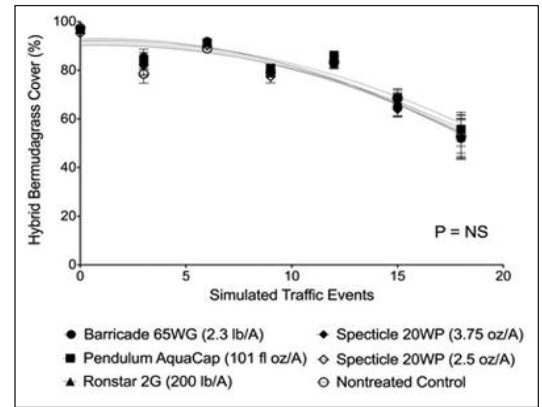
soil temperatures similar to those that facilitate crabgrass seed germination and emergence. Thus, athletic field managers should be sure to apply PRE herbicides before forsythia plants have completed flowering each spring.

#2- Irrigation: A key to effectively controlling weeds with PRE herbicides is to water them into the soil after application. Most labels require that 0.25 to 0.50 inches of irrigation or rainfall be applied within 24 to 48 hours after application. These her-



▲ **Left: Figure 1.** Effect of simulated traffic on weed encroachment into hybrid bermudagrass in Knoxville, TN during 2013.

Right: Figure 2. Effect of PRE herbicide treatments in spring on hybrid bermudagrass cover after being subjected to simulated traffic events in fall in Knoxville, TN in 2012 and 2013. Data were combined to present the effects of single and sequential application regimes at the rates tested in both years. Standard error bars presented as a means of statistical comparison.



Crabgrass plant's developmental stages



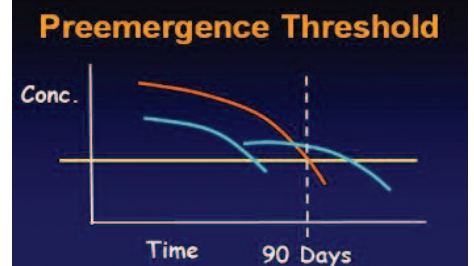
▲ **Forsythia** is in full bloom. The yellow petal drop has not started. *Photos and figure courtesy of Jeff Berger, Penn State*



▲ **Forsythia** yellow petal drop has begun. About this time crabgrass will start to germinate.



▲ **Newly germinated** crabgrass in the spring of the year.



▲ **A visual** representation of the preemergence herbicide concentrations in the top $\frac{1}{4}$ inch of the soil profile following an application in the spring of the year.

bicides are absorbed by germinating weed seedlings in the soil, so moving them into the rootzone is critical. Failure to irrigate after application can also lead to material being lost due to volatilization. On fields without irrigation, try to time PRE herbicide applications around a period of rainfall.

#3- Split Applications: Split (also referred to as “sequential”) application programs of PRE herbicides tend to provide more consistent control of summer annual weeds throughout a growing season, particularly in southern climates. These programs typically apply the total amount of active ingredient for the season in two equal rate applications spaced 8 to 10 weeks apart. A single herbicide application in spring for PRE control of crabgrass will slowly be broken down by soil microbial activity over the course of a summer often leading to crabgrass breakthrough by fall. Split application programs delivering active ingredient two times throughout a season tend to provide a longer period of control. Additionally, split application programs will control species germinating later in the year than crabgrass (e.g., goosegrass, etc.).

NO EFFECTS ON TRAFFIC TOLERANCE

Research has been conducted at the University of Tennessee Center for Athletic Field Safety (Knoxville, TN) evaluating the effects of four preemergence herbicides on Tifway hybrid bermudagrass traffic tolerance and recovery. Over the course of a 2-year study, no differences in smooth crabgrass control were detected among herbicide treatments after being subjected to athletic field traffic in spring; control measured 95 to 99% by 5 months after application. Additionally, these PRE herbicide applications for smooth crabgrass control had no effect on Tifway hybrid bermudagrass traffic tolerance to spring traffic.

Follow-up research at the University of Tennessee Center for Athletic Field Safety investigated the effects of PRE herbicide applications in spring on hybrid bermudagrass tolerance to traffic during the fall of the year. Similar to the initial study, PRE herbicide applications for summer annual weed control in spring had no effect on hybrid bermudagrass traffic tolerance in fall (**Figure 2**).

CONCLUSIONS

Numerous PRE herbicides are available for controlling annual grassy weeds on athletic fields. Always refer to the product label for specific information on proper use, tank-mixing compatibility and turfgrass tolerance. Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the University of Tennessee Institute of Agriculture. For more information on turfgrass weed control, visit the University of Tennessee’s turfgrass weed science website at www.tennesseeturfgrassweeds.org.

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