By **Greg Breeden & James T. Brosnan, Ph.D.**

» **Left: Figure 1.** LARGE CRABGRASS (Digitaria sanguinalis).
» **Inset: Figure 2.** SMOOTH CRABGRASS (Digitaria ischaemum).

Preemergence crabgrass control on athletic fields

CRABGRASS SPECIES are annual grassy weeds that are problematic on most every athletic field. If left uncontrolled, crabgrass infestations will decrease the aesthetic and functional quality of any athletic field.

The forthcoming loss of an effective, economical postemergence herbicide like MSMA renders the use of preemergence herbicides for crabgrass control increasingly more important. While registrants of MSMA for use on sports turf can no longer sell the product, distributors will be 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 sports field turf until they are exhausted provided that these uses comply with the EPA-approved label and labeling of the affected product1. Once supplies have been exhausted, preemergence herbicide applications will be one of the main tactics used to control crabgrass infestations on athletic fields.

CRABGRASS CHARACTERISTICS

There are two primary crabgrass species that infest athletic fields: large crabgrass (Figure 1) and smooth crabgrass (Figure 2). Large and smooth crabgrass can be differentiated by examining the leaves and stems of each species. Large crabgrass has pubescence (hairs) on its leaves and stems, while the leaves and stems of smooth crabgrass have very little pubescence except on the collar region (the intersection of the leaf and stem of the plant). Both large and smooth crabgrass are summer annuals that germinate primarily in the spring, grow through the summer, produce seeds in the fall, and die following the first killing frost.

GERMINATION AND PREEMERGENCE HERBICIDES

Correct application timing is an integral part of controlling crabgrass with preemergence

The blooming of the forsythia plant, also known as golden bells (Figure 3), is a visual indicator that soil temperatures are increasing to a level conducive for crabgrass seed germination. Using this visual indicator, the first preemergence herbicide application of the season should be made before the last forsythia bloom falls from the tree.

Forsythia branch image courtesy of istockphoto.com

» **Figure 3.** FORSYTHIA in bloom.

herbicides. A common misconception is that preemergence herbicides act by preventing weed seeds from germinating. These herbicides actually prevent germinating seedlings from developing into mature plants. For preemergence herbicides to work properly, they must be applied before seed germination and need approximately 0.5 inch of rainfall or overhead irrigation within 24-48 hours after application in order to be activated.

Large and smooth crabgrass seed germinates in the spring when soil temperatures exceed 55 F for 4 consecutive days and nights. Initial applications of preemergence herbicides for crabgrass control should be made before these temperatures occur in your region. In the transition zone applications are normally made in late February through early April.

The blooming of the forsythia plant, also known as golden bells (Figure 3), is a visual indicator that soil temperatures are increasing to a level conducive for crabgrass seed germination. Using this visual indicator, the first preemergence herbicide application of the season should be made before the last forsythia bloom falls from the tree.

Preemergence herbicides will generally provide crabgrass control for 12-16 weeks after application depending on application rate. However, the level of control provided will dissipate over time. Using a split application strategy where an herbicide is applied twice at a lower rate can extend the length of residual control provided by that application. Additionally, a split application strategy will offer improved preemergence goosegrass control.

Preemergence crabgrass herbicides

THERE ARE SEVERAL PREEMERGENCE HERBICIDES marketed for crabgrass control on athletic fields. The following information is provided as a guide for herbicide selection. Always refer to the product label for specific information on proper product use, tank-mix compatibility, and turfgrass tolerance.

Trade Name: Dimension
Chemical Name: dithiopyr
Family: Pyridine
Use Areas: Golf course (except putting greens), athletic fields, sod farms, residential and non-residential areas.
Turf Safety: All major established turfgrass species.
Rate: Dimension EC - 2 qt/a (0.5 lb ai/a)
Application Type: Sprayable and Granular

Trade Name: Echelon
Chemical Name: prodiamine + sulfentrazone
Family: Dinitroaniline + protox-inhibitor
Use Areas: Golf course (except putting greens), athletic fields, sod farms, residential and non-residential areas.
Turf Safety: All major established turfgrass species
Rate: Echelon 4SC – 18-36 oz/a (0.57-1.125 lb ai/a)
Application Type: Sprayable

Trade Name: Ronstar
Chemical Name: oxadiazon
Family: Oxadiazole
Use Areas: Golf course (Except tees and putting greens), athletic fields, sod farms, and non-residential areas [Not labeled for residential lawn use].
Turf Safety: All major established turfgrass species.
Rate: Ronstar G - 100 to 200 lb/a (2 to 4 lb ai/a)
Application Type: Granular or Sprayable to Dormant Turf Only

Trade Name: Pendulum Aquacap
Chemical Name: pendimethalin
Family: Dinitroaniline
Use Areas: Golf course (except tees and greens), athletic fields, sod farms, residential and non-residential areas.
Turf Safety: All major established turfgrass species.
Rate: Pendulum Aquacap - 1.5-3 qt/a (1.5 to 3 lb ai/a)
Application Type: Sprayable and Granular

Trade Name: Barricade 4FL and 65 WG
Chemical Name: prodiamine
Family: Dinitroaniline
Use Areas: Golf course, athletic fields, sod farms, residential and non-residential areas.
Turf Safety: All major established turfgrass species.
Rate: Barricade 4 FL- 10 to 48 oz/a (0.5 to 1 lb ai/a)
Application Type: Sprayable and Granular

Preemergence herbicides must be applied before seed germination and need approximately 0.5-inch of rainfall or overhead irrigation within 24-48 hours

RESEARCH

Each year the University of Tennessee evaluates numerous preemergence crabgrass herbicides in different locations and environmental conditions. In most years, labeled rates of prodiamine (Barricade), dithiopyr (Dimension), pendimethalin (Pendulum Aquacap), oxadiazon (Ronstar), and prodiamine + sulfentrazone (Echelon) all provide effective crabgrass control (> 90%) throughout the season when applied properly.

Some preemergence herbicides do provide activity against crabgrass plants that have emerged from the soil seedbank. Early postemergence applications of Dimension (1 tiller or less) and Echelon (1-3 leaf) have been found to provide a level of smooth crabgrass control similar to applications of the same herbicides at recommended preemergence timings. While these are the only two preemergence crabgrass herbicides that exhibit postemergence activity, control from these applications has been reported to be inconsistent in other locations. In general, preemergence herbicides should be applied before crabgrass seed germination. Any postemergence activity should be considered an added bonus when these herbicides are made at later than optimal timings

DEVELOPING A PREEMERGENCE PROGRAM

Step 1. Choosing a preemergence herbicide. While many athletic field managers hold strong opinions as to which preemergence herbicides work better than others, research data collected at the University of Tennessee has found all of these products to perform similarly when applied properly. Therefore, be sure to select a product that is available in a formulation that is compatible with your application equipment. In many cases granular products may be better suited than sprayable formulations for some turf managers.

Step 2. Apply in a timely manner. After choosing a preemergence herbicide make sure it is applied in a timely manner. Keep in mind

Establishment of grassy weeds, like crabgrass, can often be prevented with a timely preemergence herbicide application in the spring of the year.

that all preemergence herbicides need rainfall or irrigation to be activated. The optimal time to apply preemergence herbicides for crabgrass control varies greatly from region to region. Contact your local Extension office for more information regarding crabgrass seed germination timing in your area. For extended residual activity make a second application 6-8 weeks after the initial application.

Establishment of grassy weeds, like crabgrass, can often be prevented with a timely preemergence herbicide application in the spring of the year. Research has found that these herbicides perform similarly when applied correctly at the proper timing. Using a split application strategy can extend the length of residual control provided by a single preemergence herbicide. With the forthcoming loss of an effective, economical postemergence herbicide like MSMA, preemergence control of crabgrass will become increasingly important.

Always refer to the product label for specific information on proper product use, tank-mix compatibility, and turfgrass tolerance. For more information on turfgrass weed control, visit the University of Tennessee's turfgrass weed science website, http://tennesseeturfgrassweeds.org. ■

Greg Breeden is weed science extension assistant and Dr. James T. Brosnan is assistant professor-turfgrass weed science at the University of Tennessee.