

CUTT

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Management of Annual Grassy Weeds

Annual grasses have been and continue to be among the most serious of all weed management issues in landscape, golf course and athletic field turfs. The most common of the warm season or summer annuals include large and smooth crabgrass (*Digitaria* spp.); green, yellow or giant foxtail (*Setaria* spp.); barnyardgrass (*Echinochloa crusgalli*); and goosegrass (*Eleusine indica*). Understanding more about the ecology and biology of these weeds will help one to develop a plan for effective management over time.

Crabgrass

Several species of crabgrass exist in the US, and two main species exist in the Northeast: large crabgrass (*Digitaria sanguinalis*) and smooth crabgrass (*Digitaria ischaemum*). Crabgrass is seemingly ubiquitous in the landscape and is often unsightly due to its coarse leaves, becoming light green or brown as the season progresses. It generally dies in early autumn following the first killing frost. Although crabgrass thrives in areas of high fertility and soil moisture, it also tolerates a wide range of soil conditions, and is associated with areas where soil and maintenance practices are poor. As you may recall, crabgrass reproduces from seed which germinates from mid-spring to late summer, depending on soil temperatures.

Researchers at the University of Maryland and Cornell University have found that the density of turf stand will impact soil tempera-

tures below the turf stand and thus influence crabgrass germination as well. In a dense stand of turf receiving medium maintenance, soil temperatures greater than 73° were generally required for significant emergence. It has also been reported that minimum temperatures of 55–58° at daybreak in the upper inch of soil for 4–5 days will encourage the initiation of crabgrass germination. Other research has shown that mean soil temperatures of 62–65° are required for germination. Research also suggests that under average turf density, crabgrass emergence can continue for up to 12 weeks during a typical growing season in the Northeast. We have seen that application of a preemergence herbicide too early in the season, before soil temperatures warm adequately, may result in the need for additional crabgrass control measures later in the season.

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Crabgrass can set seed at exceptionally low mowing heights, and in optimal conditions can produce several hundred seeds per plant. Viable crabgrass seed will persist in the soil from year to year, although the majority of seed decomposes during one growing season. However, if seed production is prevented, one can significantly reduce seed present in the weed seed bank over a longer period of 5 years or more. Collecting lawn clippings while mowing when crabgrass is setting seed may reduce the spread of seed in the landscape.

Goosegrass, Barnyardgrass and Foxtails

Goosegrass is sometimes referred to as silver crabgrass and can be confused with crabgrass due to its coarse, prostrate growth habit. However, goosegrass has very flat leaf sheaths which have a silver color and a deeper fibrous root system. Like crabgrass, it has fingerlike seedheads producing ample quantities of seed, but these seed stalks have a distinct zipper-like appearance, if one looks closely. Typically one finds goosegrass on compacted soils low in fertility. Goosegrass is often unsightly in a fine turfgrass mixture due to its coarse appearance. Reducing soil compaction with aeration or cultivation followed by overseeding can reduce the infestation of this weed over time. In athletic fields, goosegrass can present a significant prob-

lem for players, as uniform field surface conditions are influenced by its presence, and it can be a safety concern for players moving at high rates of speed. Soil temperatures of over 68° are generally required for germination of goosegrass.

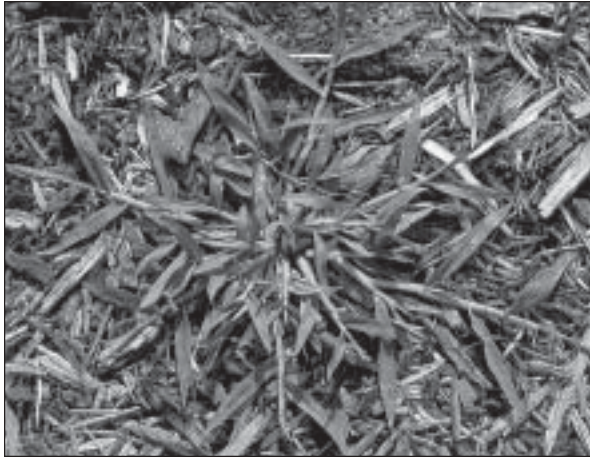
Barnyardgrass and foxtails are also summer annual species which infest agronomic and horticultural cropping systems, besides turfgrass. These species tend to infest turfgrass which is less densely established, and in newly seeded or mowed stands, and can be very unsightly. These weeds also tend to germinate at soil temperatures greater than 65°.

Management Practices

What is the best way to manage these weeds from a long-term perspective? Clearly, any practice that encourages the establishment of a dense, vigorously growing turf will discourage the germination and successful infestation of annual grasses through competition for space, moisture and light. The choice of an improved turfgrass cultivar or mixture will play a key role in successful weed management as well. Newly improved turfgrasses have been selected for their ability to readily establish and form dense turfs with strong aesthetic appeal. In comparison to older cultivars or clones, cultivars recommended for this state are often more competitive with annual weeds. Certain turfgrasses,

Crabgrass infestation in a highly-trafficked area where turf is thin.





Large crabgrass. (photo credit: Weeds of the Northeast by R. Uva, J. Neal and J. DiTomaso.)

areas less conducive to turf growth, such as heavy shade where stands are less dense and weeds can interfere, the use of an alternative groundcover more adapted to that setting may be an important consideration. If you have to disturb the soil surface, consider performing core cultivation, dethatching or power raking during the fall when turf is actively growing and weed seeds are less likely to germinate.

Chemical Controls

Chemical controls for crabgrass include the use of standard preemergence herbicides, generally timed for application 8–10 days before crabgrass is expected to germinate. After considering the safety of the herbicide in terms of turfgrass injury, consider products such as pendamethalin, benefin, DCPA, and oxadiazon, which are generally safe on Kentucky bluegrass, ryegrass and tall fescue but may injure fine fescues. Other products such as proflam and dithiopyr have longer soil

such as the fescue spp. also appear to possess allelopathic potential to reduce weed germination through production of bioactive root exudates, which reduce seed germination of summer annual grasses.

Obviously, mowing, fertilization and irrigation will all impact density of turf establishment. Check your soil pH and fertility to determine if liming or fertilization should be supplied to enhance the vigor of your turf. Adequate nitrogen applied in spring and fall should be considered, as well as phosphorus fertilization in newly seeded turf to encourage turfgrass vigor. Mowing at too low a height, repeatedly, will also tend to reduce the competitiveness of the turf, and result in enhanced establishment of annual grasses. Try to mow less frequently, if possible, and maintain turf height greater than 2 inches to allow the turf to effectively compete with grass weeds.

Irrigation should be applied deeply, if at all, to encourage turfgrass root and shoot growth. Frequent and lighter watering encourages germination and establishment of many shallow-rooted annual weeds, at the expense of the turfgrass. In addition, management practices that discourage the infestation of insects and diseases in turf settings also will result in reduced weed interference. Eliminating any potential niche that annual grasses can invade, due to turfgrass injury and resulting gaps in the turf, will prevent rapid germination by these weeds. In ar-



Yellow foxtail. (photo credit: Weeds of the Northeast by R. Uva, J. Neal and J. DiTomaso.)

persistence and generally provide a longer period of control of crabgrass. Dithiopyr (Dimension) can also be applied as an effective postemergent herbicide for crabgrass, if applied before the 3 tiller stage. In some cases, one application of these more persistent products may provide nearly full-season control.

In general, preemergence herbicides should be applied uniformly and watered in within 2–3 days of application if rainfall does not occur. One thing to consider is that goosegrass germi-

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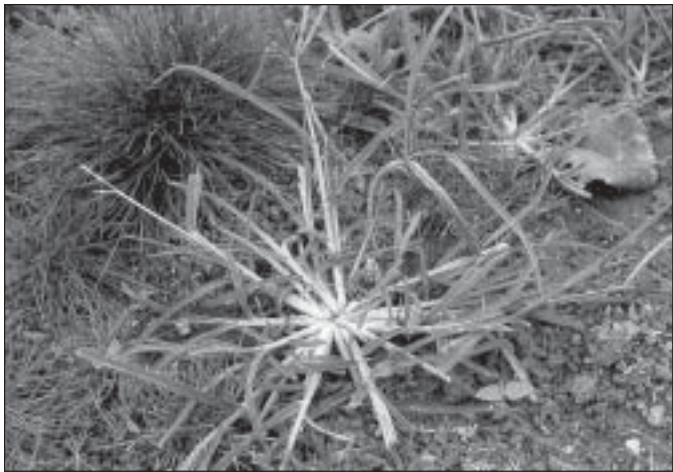
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nates later than crabgrass so preemergence herbicide applications specifically designed to control goosegrass should occur several weeks after crabgrass control materials are applied. To obtain season long control, reapplication of a product is often required within 6–8 weeks following initial application. With late season applications, poor control may be obtained depending on weather conditions. In these cases, postemergent herbicides could be used to control preexisting grass weeds.



Above: goosegrass. Below left: barnyardgrass. (photo credit: Weeds of the Northeast by R. Uva, J. Neal and J. DiTomaso.)

Postemergent products can be effectively used to control established grass weeds in turf. In some cases, spot application can be used to treat only the area where emergence has occurred. Postemergent products are often more costly than preemergent herbicides. For these products to be effective, the annual grass weed must be uniformly covered by the herbicide, so application should be made when these weeds are clearly visible. Use a surfactant, if the product is not already formulated with a surfactant, to enhance foliar spreading.

The methanearsonates (MSMA and DSMA) are an old family of herbicides which may injure desirable turf species at high temperatures over 80°. Repeat applications may also be needed for complete control of established grassy weeds. Fenoxaprop-ethyl (Acclaim) is a slowly-translocatable product which can effectively control established summer annual grasses in one application. It is generally safe on most cool-season turfs but can cause injury on Kentucky bluegrass. Remember, this product is less effective when tank mixed with 2, 4 D or other phenoxy herbicides.

Summary

The maintenance of a dense, vigorous turf is the best line of control for annual grasses in turfgrass settings. When needed, herbicide applications can be utilized to reduce weed populations to reasonable levels. Although new preemergence turf herbicides for enhanced broadleaf control are available at this time, older products currently offer adequate solutions for annual grass management. Preventative preemergence products are very effective in reducing numbers of most annual grasses over time, with the exception of annual bluegrass.

Consult the *Cornell Turfgrass Recommends* for further specifics regarding herbicide use in turfgrass settings. By utilizing cultural practices to prevent weeds from setting seed, weed seed numbers present in the soil weed seed bank can be significantly reduced over time. With careful management, crabgrass, in particular, as well as other summer annual grasses, can be eliminated as serious weed problems from landscape and turf settings.

Leslie Weston, Ph.D.



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