Crabgrass control in home lawns

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Crabgrass (*Digitaria* spp.) is one of the most problematic grassy weeds in turfgrass, especially in the summer when it is aggressively growing (Fig 1). Crabgrass, a summer annual plant, germinates in spring when soil temperatures are sustained between 55 and 60° F, begins flowering and setting seeds in July and is killed by frost in the fall. A mature crabgrass plant can produce up to 700 tillers and 150,000 seeds in areas like the upper Midwest. There are thirteen weedy *Digitaria* species in the United States, but the two most common species in Nebraska and the Upper Midwest are smooth crabgrass (*D. ischaemum*) and large or hairy crabgrass (*D. sanguinalis*). Both smooth crabgrass and large crabgrass have seedling leaves that are light green in color. The major distinction between the two is the presence or absence of hair on the leaves and stem. Smooth crabgrass generally tolerates lower mowing heights than large crabgrass but both will produce seed at typical lawn mowing heights.

Cultural Control

Crabgrass invades a lawn usually because growing conditions favor its growth over the desirable turf. Until these conditions are addressed, crabgrass will likely continue to be a nuisance. The most successful crabgrass control programs rely heavily on cultural methods to prevent crabgrass infestation. In other words, a healthy dense turf is the most effective way to control crabgrass.

The following are some practical methods that will help produce a healthy dense lawn:

- Maintain your mowing height between 3.0 and 3.5 inches.
- Mowing should be frequent enough to remove only 1/3 of the turfgrass leaf at one time. This means you may have to mow once or twice a week in the spring, but every two weeks during the summer
- Deep and infrequent watering is important because daily, light irrigation promotes shallow rooting. Irrigation should be applied to wet the soil to the depth of turfgrass rooting and reapplied at the first signs of drought stress (when turfgrass turns bluish gray color or footprints remain in turf after walking).
- Fertilizer should be applied at a rate of 2 to 4 pounds nitrogen/1000 ft^2/year when turfgrass is actively growing. In our region, active cool-season turfgrass growth occurs in the spring from April through early June and again in the fall from September to November. Between 60 - 100% of the annual nitrogen should be applied in the fall, usually September and again in November after the final mowing. Minimize fertilization in the spring and summer when the turf

Figure 1. Lighter green and coarser leaved than the desired turf, crabgrass becomes most noticeable in mid-summer when it is outgrowing the desired turf.

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is actively growing. Encouraging more growth in the spring and summer will increase mowing frequency, reduce root growth, and quickly consume storage reserves required later in the year.

Not only will the previous practices encourage a healthy turf stand, they will directly reduce crabgrass infestations. Crabgrass essentially needs only water, sunlight, and soil temperatures at 55 to 60° F to germinate. Research has shown that increased mowing heights result in lower crabgrass infestations (Fig 2) (Dernoeden et al., 1993; Voigt et al., 2003). Raising the mowing height helps prevent sunlight from reaching the seed by shading the soil and also decreases soil temperatures. Light, frequent irrigation promotes crabgrass germination and development and is not conducive to a healthy dense turf. Summer fertility also encourages crabgrass growth and development as cool-season grasses are less active in the heat of the summer while warm-season crabgrass plants thrive on the added nitrogen.

Chemical Control

When cultural control alone cannot adequately manage crabgrass, the use of herbicides can be an effective and useful tool. Proper application rates and timings are important to obtain the best control. Always follow the herbicide label and use a calibrated sprayer or spreader to help ensure desired results are achieved.

Preemergence Control

Preemergence herbicides prevent crabgrass plants from emerging and therefore must be applied before crabgrass germination in the spring. There are several preemergence herbicides labeled for crabgrass control (Table 1), but dithiopyr, prodiamine, and pendimethalin are the most common. The high recommended label rate should be used to ensure consistent control year to year. The low label rates may work in cool summers or areas with low crabgrass pressure, but it is risky to predict what the weather will be for the entire season early in the spring (Fig 3). Typical preemergence applications are made at least two weeks prior to crabgrass emergence which means mid-April to early May applications in Nebraska and much of the north central US. Split or sequential applications should be used in areas that are prone to crabgrass invasion, such as thin turfgrass stands, next to sidewalks and driveways, and other "hot spots" as well as areas with a history of crabgrass. The first application should be made in the spring with a follow-up application in late May to June. Refer to your herbicide label for specific application rates. If preemergence have been used consistently for several years and crabgrass is under control, the use of an herbicide with pre/postemergence activity such as dithiopyr in mid-May to June at the first sign of crabgrass emergence would be a

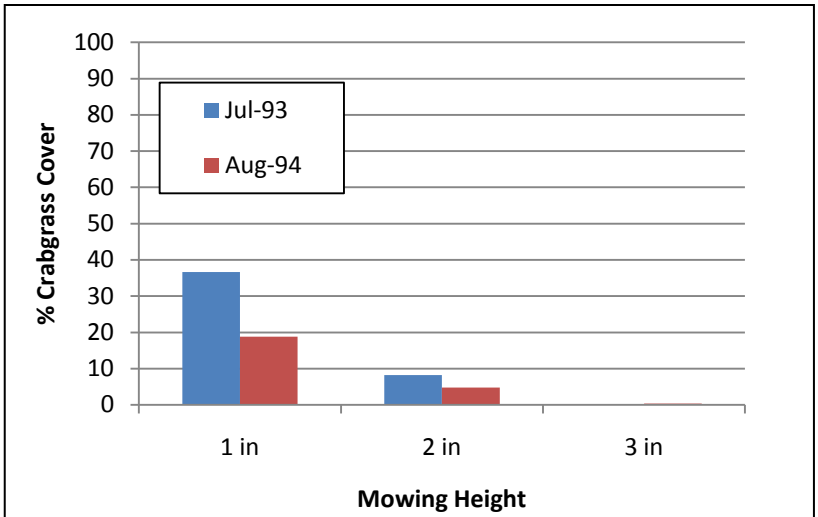

Figure 2. Effect of mowing height on % crabgrass cover in tall fescue turf in the upper Midwest (adapted from Voigt et al. 2001).

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viable option to reduce the amount of herbicide being used.

Many of the preemergence herbicides are combined with fertilizer as a weed and feed product. Nitrogen application should be limited in the spring and depending on the fall fertilizer application, little or no nitrogen need be applied. At most, 0.75 lbs N 1000 ft^{-2} should be applied with the preemergence herbicide. It is important to select the right product so the full herbicide rate is applied without applying too much nitrogen. Purchase products that contain as little N as possible and/or products that contain slow release N sources such as ureafomaldahyde products, isobutylidene diurea (IBDU), sulfur-coated products, or polymer-coated products. It is also important that preemergence herbicides are watered in to achieve the best results. In general, it is good practice to rotate the active ingredients used in an herbicide program every two to three years to reduce the possibility of forming herbicide resistant populations of crabgrass.

There are times or specific areas where the use of an organic herbicide is a desirable option. Corn gluten meal is a natural herbicide and fertilizer that has shown to be effective in controlling crabgrass (Gardner et al., 1997), but generally is not as effective as synthetic products. The major drawback to this product is that the high rates needed to achieve crabgrass control (Christians et al., 2008) also deliver high rates of nitrogen, which is not desired in the spring.

Postemergence Control

Postemergence herbicides will control crabgrass after it emerges. There are several postemergence herbicides available that effectively control crabgrass (Table 1). Ideally, postemergence herbicides should be sprayed when crabgrass is young and preemergence herbicides included with early-season applications. Once crabgrass matures beyond three to five tillers it becomes difficult to control (Fig 3). Multiple applications seven to fourteen days apart are necessary for mature and difficult-to-control crabgrass. As temperatures increase into summer, the risk of injuring desired turfgrass with postemergence herbicide applications increases. To prevent injury, turfgrass should be well-watered and not under drought stress. Ideally applications should be made on clear days with low humidity when temperatures are

Figure 3. Left to right, crabgrass plants in the 3-leaf, 5-leaf, and 3-tiller stage. Smaller crabgrass is easiest to control with postemergence herbicides with the least risk to the desired turf.

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Table 1. Herbicides primarily for crabgrass control in home lawns.

Pre-emergence	Post-emergence Herbicides
Dithiopyr	Dithiopyr
Pendimethalin	Monosodium methanearsonate (MSMA)
Prodiamine	Quinclorac
Benefin/trifluralin	
Corn Gluten Meal (Organic)	

Herbicides mentioned represent the latest information available. No criticism is intended of herbicides not mentioned, nor is endorsement implied by the University of Nebraska to those mentioned.

below 80 °F. Refrain from mowing or watering for 24 hours after herbicides are applied. After mid-July, it is best to allow crabgrass to die out with the frost rather than attempt herbicide control.

While complete crabgrass control is never possible, healthy dense turfgrass maintained through proper mowing, irrigation, and fertilization can help minimize crabgrass problems and make herbicides more effective if used.

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