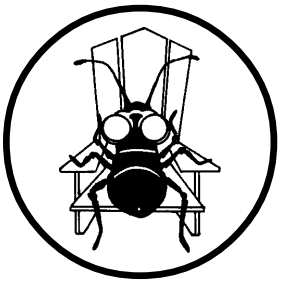
The Drought of 1995 and Weeds and Weed Control in 1996



Pest Watch

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Weed pressure in 1995 was, in a word, incredible! I toured many areas — golf courses, lawns, athletic fields, and institutional grounds — that were solid crabgrass, knotweed, clover, etc. In many of these areas, if there weren't weeds, there would have been no vegetation at all. In a year like that, the weeds are probably providing a valuable service by preventing erosion and providing some ground cover; but this is small consolation for the grounds manager or superintendent trying to explain why the weed treatments apparently failed.

What happened to produce such a glorious crop of weeds? The answer: DROUGHT! The record drought in much of New York did many things which encouraged weed growth including: reduced competition from the turfgrass, increased turf damage from insect and disease pests, poor preemergent herbicide performance, poor postemergent herbicide performance, and last (but not least) heavy seed set for weeds resulting in secondary infestations and virtually ensuring weedy fields in 1996. There was little anyone could have done about the weeds, but understanding what happened and the implications on future weed management will help in developing a more effective plan for 1996.

What Happened in 1995?

Cool season turfgrass growth rates typically slow down during warm weather. In very hot, dry weather cool season turfgrasses will go dormant giving many common summer annual and perennial weeds a chance to flourish unchecked by turfgrass competition. Many of these weeds are better able to cope with heat and drought than the turfgrasses. For example, crabgrass can maintain a growth rate of up to 1 cm a day during a drought severe enough to cause Kentucky bluegrass to go dormant. Similarly, legumes like white clover, black medic and hop clover are very drought tolerant; plus these weeds are able to fix nitrogen from the air to fuel their growth (after you have stopped fertilizing the turf due to the drought). Other weeds which tolerate drought very well include the plantains, prostrate knotweed, oxalis (woodsorrel), dandelion, healall, red sorrel, oxeye daisy, and goosegrass.

As turf goes dormant we tend to reduce management inputs such as mowing and fertilization. In doing this we allow some tap-rooted biennial weeds not ordinarily seen in fine turf to become established, including wild carrot, common mullein, bull thistle, teasel, and burdock. Reduced mowing also allows many annual and perennial weeds to grow unchecked and to produce more seed. Reduced turfgrass vigor and the hot weather also produced some rather dramatic increases in insect and disease damage. In particular, white grub and chinch bug damage was extensive. In some cases the number of insects was very high (I have heard reports of as many as 200 grubs per square foot!), much of the increased damage was due to the moisture and heat stress combining to make the grass plants less

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Cornell Cooperative Extension

Cornell University Turfgrass Times
20 Plant Science Building
Cornell University
Ithaca, NY 14853

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able to tolerate insect feeding — particularly root feeding insects. Several diseases not usually considered to be major problems in our area were very damaging. For example, diagnostic labs reported receiving many samples with anthracnose. Other stress-related diseases were also prevalent. Whenever turf is thinned by disease or insect pests, weeds can take over.

Poor Herbicide Performance.

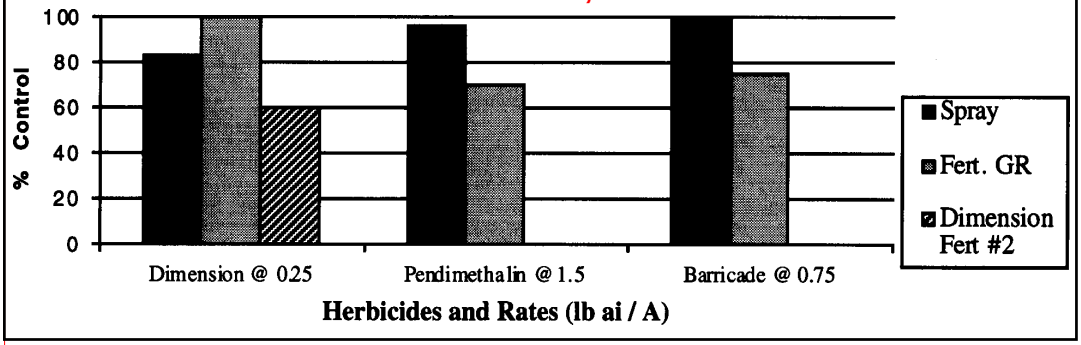
Although in upstate New York we rarely experience the kind of drought which reduces herbicide performance, our Long Island and more southerly colleagues are well used to heat and drought affecting their herbicide programs. The effectiveness of both preemergent and postemergent herbicides are reduced under drought conditions. It is easy to understand why postemergent herbicide performance is reduced — weeds have a waxy cuticle which reduces spray retention and absorption, less water in the plant results in limited translocation out of the leaves to the growing points, herbicide remaining on the surface of the leaves is degraded by sunlight, and high temperatures and humidity evaporate spray droplets and volatilize the herbicide. All of these factors result in poor postemergent herbicide performance.

The reasons why preemergent herbicide do not perform well under drought are more complex. If the herbicide was applied very uniformly and early enough to be incorporated by the April rains, the product worked. However, if treatments were less uniform and/or were applied in mid to late April (after which rains were minimal), preemergent herbicides did not provide adequate crabgrass control. Why? In order for preemergent herbicides to work they must be uniformly incorporated into the soil surface before crabgrass seeds germinate. In a typical year, sufficient rainfall will occur in April and early May to achieve this, even when products are not applied uniformly. However, when minimal rainfall occurs (as in 1995) the herbicide is not moved laterally in the soil surface, creating non-uniform herbicide distribution and gaps in the preemergent barrier. Additionally, without adequate moisture, weed seeds will not germinate. They wait in the soil until moisture is available — often after the preemergent barrier has broken down (particularly in those gaps just mentioned).

Weed Control During Droughts

So, how do you control weeds under such a drought? There was very little any turf manager could have done to achieve acceptable levels of weed control in 1995. Extensive irrigation, enough to keep the cool season turf growing, would have improved the efficacy of postemergent herbicides. However, applications of most postemergent products would have resulted in more turf injury due to the heat stress. Where irrigation is limited, irrigate one to two days before spraying postemergent herbicides and again two days after treatment. In many respects, this season was a testimony to well timed applications of quality preemergent herbicides. In 1995 we compared spray and granular "weed & feed" formulations of pendimethalin, Barricade and Dimension (see Figure 1). All treatments were applied in late April; crabgrass control was rated in September.

Figure 1. Comparison of Spray and Fertilizer Formulations for Preemergent Crabgrass Control in Turf, 1995.



The fertilizer formulations of pendimethalin and Barricade produced poor crabgrass control whereas spray applications provided essentially 100% control. This was highly unusual, as I typically see no difference between spray and granular applications with these products. An explanation of this anomaly is seen in the Dimension data where two fertilizer formulations were compared to the spray. In this case, the uniformly loaded, high quality fertilizer granule

controlled crabgrass 100%; whereas, a lower quality (non-homogenous) fertilizer granule (Fert. #2) provided only about 60% control. Similarly, the Barricade and pendimethalin granules tested in 1995 were non-homogenous blends with nonuniform particle sizes and poor spreading characteristics. From these data we see that very uniform applications of high quality products produced excellent control while less uniform treatments (of lower quality and cheaper formulations) resulted in unacceptable levels of crabgrass control. Moral: you get what you pay for.

How Will The 1995 Season Affect Weeds and Weed Control in 1996?

One of the most important factors affecting annual weed populations is the number of weed seeds present. Clearly the heavy seed set in 1995 of summer annual weeds such as crabgrass, prostrate knotweed, spurge and others, virtually assures that they will be back in 1996. The perennial weeds which grew unchecked in 1995 are well established and can out-compete the recovering turfgrass.

Speaking of recovering turf, much of the turf was damaged by drought, insects and disease. These thin turf areas are an invitation to weed establishment. The turf will need all the help we can give it to become established before the summer of 1996. We must remove weed competition to allow the turf to fill in those thin areas but we need to be careful not to damage the turf with herbicides. In particular, where turf was overseeded in the fall or will be overseeded in the spring, be cautious with the use of herbicides. Much of the fall-seeded turf will not be well enough established to tolerate early spring applications of preemergent herbicides.

Of the preemergent herbicides registered for turf, only Tupersan (siduron) is safe on newly seeded turf. Dacthal (DCPA) can be applied to seedling turf after it is 2 inches tall (I suggest waiting until the seedlings have been mowed twice). While Dacthal rarely provides full season crabgrass control, it does provide better control than Tupersan. All of the other preemergent herbicides should only be applied to established turf. Postemergent crabgrass control presents special problems in seedling turf also. Both Acclaim (fenoxaprop) and MSMA will injure seedling turf. Applications should be delayed until the new turfgrass seedlings are well tillered and the lowest labeled rates should be used to improve turf tolerance.

Perennial ryegrass and fescues are more tolerant of Acclaim than is Kentucky bluegrass. Bentgrass is very sensitive to Acclaim and should only be treated if turf is well established, and then only with the special reduced rates for bentgrass turf (specified on the label). Postemergent broadleaf weed control is fairly simple even in newly seeded turf. "Three-way" herbicides (2,4-D + MCPP + dicamba) and similar products can be applied to seedling turf after the new seedlings have been mowed 3 or 4 times. To get the most out of these herbicides, treat when weeds are actively growing. Usually applications in early to mid-May are effective. Although our preferred time for postemergent broadleaf weed control is between mid-September and early October, the broadleaf weed pressure present this spring may necessitate May applications.

Last, but not least, let's hope we don't have a repeat of 1995 conditions!

JOSEPH C. NEAL
DEPT. OF FLORICULTURE AND ORNAMENTAL HORTICULTURE

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