SUMMER SPOILERS OF 2010

It’s been a Challenging Summer for Lawns & Athletic fields

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2010 has been a particularly hot and brutal year for turfgrass managers in the Midwest. Lawns and athletic fields have been inundated with weeds and many have lost grass cover due to excessive heat and stress. The following article has been produced by the turfgrass science team at The Ohio State University to address some of these issues.

THE EFFECTS OF HOT WEATHER ON COOL-SEASON TURF

Cool-season turfgrasses prefer to grow in air temperatures between 60-75 degrees F and soil temperatures between 50 and 65 degrees F. While it is not uncommon for temperatures in Ohio to exceed these limits each summer, 2010 has been particularly challenging. A summary of air temperatures for both 2009 and 2010 can be seen in Table 1. In addition, it is important to note that the average soil temperature this year, at the 2” depth, was consistently above 70, increasing to a consistent 80 degrees by the end of June right through to August. By Comparison, in 2009, soil temperatures were above 70 by mid-June into July, and only got slightly above 80 in August. The higher day and night-time temperatures relative to most years resulted in significant stress on both the shoots and root system of all our typical cool-season grasses like Kentucky bluegrass, perennial ryegrass, fine fescue and bentgrass. Most people forget that the underground root system of turfgrasses is the key for absorbing nutrients and water. At soil temperatures above 75 F the roots of cool-season grasses begin to slow in growth and become less physiologically active, resulting in the onset of the “hidden turfgrass stress” called root dysfunction. At the reported soil temperatures in late June to late August (greater than 80 F) roots actually began to become dysfunctional, decline, and dieback causing additional overall turfgrass stress. The high (stifling) humidity and high temperatures both DAY and NIGHT resulted in doubling of turfgrass stress. Normally, cooler, less humid nights helps the turfgrass plant rebound from the daytime stresses. The turfgrass plant did not get this environmental nighttime rest period. The weakened turfgrass plant was more susceptible to heat stress, disease and weed invasion (i.e. crabgrass). Adequate rain during the summer in most areas of Ohio increased the potential for more weeds.

Goosegrass on a Soccer Field
Table 1: Monthly Average High Air Temperatures and Days Above 75, 85 and 90 Degrees Fahrenheit, for both 2009 and 2010

<table>
<thead>
<tr>
<th>Month</th>
<th>2009</th>
<th></th>
<th>2010</th>
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<tbody>
<tr>
<td></td>
<td>Max Daily Temp (F)</td>
<td>Avg. High Temp</td>
<td>Max Daily Temp (F)</td>
<td>Avg. High Temp</td>
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<tr>
<td></td>
<td>Days &gt;75</td>
<td>Days &gt;85</td>
<td>Days &gt;90</td>
<td>Days &gt;75</td>
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<tr>
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<td>0</td>
<td>19</td>
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<td>June</td>
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<tr>
<td>July</td>
<td>27</td>
<td>2</td>
<td>0</td>
<td>31</td>
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<td>August</td>
<td>20</td>
<td>8</td>
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Ref: OARDC Columbus, OH Weather Station: http://www.oardc.ohio-state.edu/newweather/

In relation to heat and drought tolerance, tall fescue (*Festuca arundinacea*) persists much better than Kentucky bluegrass (*Poa pratensis*), which in turn persists better than perennial ryegrass (*Lolium perenne*). This is why tall fescue is recommended as the turf of choice for home lawns in Ohio (Figure 1). Fine fescues persist well in drought but are not overly tolerant of heat stress. Rough bluegrass (*Poa trivialis*) and annual bluegrass (*Poa annua*) are neither heat nor drought tolerant.

![Figure 1:](image)

Tall fescue (middle) persists better during heat and drought stress than Kentucky bluegrass (r) and perennial ryegrass (l). Photograph taken August 2010. No supplemental irrigation applied.

While timely rains have kept most grasses alive, green, and growing this summer, when a drier spell hit in August some non-irrigated perennial ryegrass and Kentucky bluegrass areas went dormant or died. K. Bluegrass can remain dormant for several weeks and recover, as long as the base (crown) of the plant is kept hydrated.
GRASSY WEEDS

Rough bluegrass (*Poa trivialis*) typically goes dormant early to mid August – just prior to the high school football season starting. Each year we receive calls and emails from people fearing they have a turf disease issue or a problem with their irrigation system, when in fact it is rough bluegrass collapsing and going dormant. This year, rough bluegrass started to deteriorate in June, which is much earlier than usual. Dormant rough bluegrass looks like a mat of straw-brown turf (Figure 2). If the straw mat is pulled back, close inspection of the crown area will show thin, white, healthy stems, and some green tissue that will start to grow again when temperatures cool down in the fall. Rough bluegrass is a major grassy weed on lawns and sports fields but there is unfortunately no selective control at the moment.

In addition to rough bluegrass, annual bluegrass (*Poa annua*) is present in Ohio as both a true annual and as a perennial biotype. The true annual type cannot tolerate heat and drought and it is shallow rooted, so cannot survive extended dry periods. In extreme heat it will die (Figure 3).

Weed grasses that have done particularly well this year include Goosegrass (*Eleusine indica*), Bermudagrass (*Cynodon dactylon*) and Nimblewill (*Muhlenbergia shreberi*). These are warm-season grasses adapted to more southern states. They thrive in high temperatures and have an aggressive growth habit that makes them very difficult to control. In Ohio, they are active from
mid-May to the first frost, around October. Their most active growth time is June, July &
August, when our cool-season grasses are under the most stress. It’s not hard to conclude then,
why they are able to out-compete the desirable cool-season grasses during the summer months.

A SUMMER FOR CRABGRASS

Another warm-season grassy weed that has been a major challenge, possibly THE major
challenge this year, is crabgrass (*Digitaria sp.*, Figures 4 & 5). While individual weather events
this summer have not been that unusual, the overall season has been and this has greatly
contributed to the increase in crabgrass pressure that we are seeing today. First, March and April
were considerably warmer than normal. In Columbus, OH in April the average monthly
temperature was 58 F, compared to the long term average of 51. In April there were 7 days that
the temperature exceeded 80 degrees and another 9 days with highs in the 70’s. The net result of
this was that crabgrass germinated about two weeks earlier than normal. Anybody who did not
get preemergence herbicides down by about April 5 saw a decrease in control, unless they used
herbicides that contained dithiopyr or a combination of prodiamine and sulfentrazone that had
early postemergence activity. In a typical year crabgrass germinates in the middle of April, but
some of these early seedlings are damaged or killed by late season frost/freezes. The normal last
date of frost in Columbus is around the 10th of May. This year, the last time we saw
temperatures below freezing in Columbus was on April 10. Therefore there was nothing to
inhibit early germinating crabgrass. In a typical year we also will have a period of extended
drying in May or June. Not necessarily a drought, but a period of time in which lawns begin to
go dormant due to lack of water. This year we have had timely rains. The net result of this is
two things: 1) No seedling crabgrass died due to lack of moisture and 2) Conditions for crabgrass
germination remained ideal for a much extended period of time – day and night time
temperatures, humidity and timely rains. Now that it is the middle of summer it is warm, but
what is unusual is that it continues to be not necessarily wet, but we still are getting timely rains.
Right now cool season grasses are not going dormant due to lack of rainfall. However, the
temperatures are warm enough that cool season grasses are stressed and not necessarily thriving.
Crabgrass, on the other hand, is a tropical warm season grass. While it does have a competitive
advantage over cool season turf in normal summers because it is a warm season grass and more
tolerant of heat, it actually prefers warmer and wetter conditions (think Florida). The net result of
the above is the “perfect storm” of crabgrass cover we are currently experiencing. At our
research station, we saw preemergence herbicides that normally give us 95% control begin to fail
in about the last week of July, currently giving us perhaps 75% control.
Later in the fall when there is frost, crabgrass will die and leave unsightly brown dead patches in
lawns and athletic fields (Figure 6).
TURFGRASS DISEASES

Due to the weather conditions described in this article, many diseases were active this year and at high levels not seen for many years. Since the pathogens that cause turfgrass diseases are either present in the turf from year to year or are introduced into turf annually by air currents and wind, the key factor that triggers diseases outbreaks is the weather. The hot weather patterns experienced this summer was nearly ideal for certain disease pathogens (fungi) to grow and at the same time severely weakened the cool-season turfgrasses, leaving turf extremely vulnerable to decline and damage from disease.

Following are some of the major problems encountered in 2010.

Infectious Diseases:
- **Leaf Spot & Melting Out.** There are many different type and all grasses can be affected.
- **Brown Patch** on tall fescues, perennial ryegrass, and lush turf of all varieties, especially if wet or over-irrigated.
- **Pythium Blight** on lush turf of all varieties and new seedlings.
- **Dollar Spot** on Kentucky bluegrass and perennial ryegrass, especially if growing slowly.
- **Rust** on perennial ryegrass and some Kentucky bluegrass varieties, and many grasses. More severe on grasses that are growing slowly.
- **Patch Diseases: Necrotic Ring Patch & Summer Patch** on Kentucky bluegrass, especially sodded turf on poor quality soils and weak root systems. Patch diseases have been a serious problem in many areas this summer. Symptoms of Necrotic Ring Patch (NRP) and Summer Patch are very similar and both can occur. Historically, Necrotic

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*Figures 4:*

Crabgrass (*Digitaria sp.*) has thrived in the hot and moist weather of 2010.

*Figures 5 & 6:*

L: Close-up of mature crabgrass in July

R: Crabgrass killed by frost in October
Ring Patch has been the most common in Ohio. The common symptom involves a ring of dead grass with a green center (Figure 7). However at times there may be half circles or streaks of affected turf. Since these diseases infect the crown and root system there is reduced translocation of water from the soil to the top of the plant. During hot summer weather the infected plants quickly wilt and die. The hotter and more severe the summer conditions the more severe the symptoms and damage. Therefore this has been a year with extensive development. Turf with a poor root system is particularly plagued by these patch diseases. Factors that can lead to a poor or weak root system are sites with poor quality soil, compacted soil, excessive thatch, buried stone and building material, or sites exposed to extremes in heat such as south facing hills, areas along streets and sidewalks/drives etc. These turf areas are the first to show symptoms and usually have the most severe cases of patch disease (Figure 8).

**Figure 7:**
Patch disease in a Kentucky bluegrass turf showing the classic “frog-eye” pattern of a ring of dead grass with a green center

**Figure 8:**
Overview of damage from patch disease in a Kentucky bluegrass lawn on a south-facing slope.

Management of patch disease is difficult and there are often no easy or quick solutions. The following are some suggestions.

1) Properly prepare the site/soil before sodding or seeding.
2) Avoid low mowing.
3) Reduce excessive thatch buildup, maintain under ½ inch.
4) Heavily core aerate the turf several times a year to reduce compaction and improve the root system and manage thatch.
5) Use light, frequent watering several times a day during hot dry periods to avoid wilt and heat stress.
6) Use slow-release nitrogen, over 75% of nitrogen as slow release.
7) Use resistant Kentucky bluegrass and perennial ryegrass mix to repair damaged areas.
8) Fungicides may help but should be applied preventatively in the spring before the fungus invades the plants. For chemical controls see http://turfdisease.osu.edu/publications Management of Turfgrass Diseases Bulletin (L-187 Disease Section Updated 2010).

Environmental Stress Damage to Turf in 2010:
- Drought and heat stress
- Mowing damage on wilted or drought stressed turf
- Traffic & wear damage
- Damage from excessive heat. E.g.: car exhausts while parked on lawns, metal or plastic items such as pools and slip-n-slides left on lawns
- Chemical damage from miss-applications of pesticides or fertilizers on stressed turf
- Pet urine injury

As long as weather patterns are favorable for the different fungi to grow, disease problems will persist. However, with cooler temperatures and adequate rain fall it will become clear what grass is dead and how much renovation will be needed to restore lawns. To help determine this check the crown of turfgrass plants. This is at the base of the plant. Check for new leaves and green growth. The crown itself should be moist and a white color. If dry and a brown color most likely there will be little recovery and renovation may be needed.

INSECT PESTS

The summer of 2010 has had some abnormal affects on the normal turfgrass-infesting insects! May and early June was normal to above normal in rainfall so billbug damage went largely unnoticed, especially in lawns. However, it appears that the early start to warm weather has encouraged the billbugs to undergo a partial second generation that caused some turf, especially Kentucky bluegrass to turn straw color and "melt" out. This has been mistaken for disease, summer dormancy or some other kind of strange malady. However, upon pulling on the grass stems in such areas, you will readily find the tell-tale signs of billbug activity – broken stems packed with a fine sawdust-like material (Figures 9 &10). There is little that can be done this late in the season other than reseed the very thin areas and plan for controls next May.

Figure 9:
Pulling out billbug-damaged grass stems will result in easily broken off bases, packed with sawdust-like frass.
Though we were wetter than last year early in the season, we definitely had hot weather in July and August with some brief drought periods. This is exactly what turf-infesting caterpillars thrive on! While high-cut turf doesn't display the damage from sod webworms, black cutworms and light populations of armyworms, the intensely manicured turf of golf courses show activity very quickly. The summer generation of sod webworms have been "off the scale" on golf greens and tees in August (Figure 11). While their damage usually looks like some strange disease that makes short dark streaks and blotches on putting greens, birds know that there may be a tasty morsel in the soil and they can do considerable damage pecking the turf surface.

In late August, we see the vagabond sod webworms (Figure 12) emerging across Ohio lawns and their presence is often blamed for any turf dormancy, patches in lawns that have turned brown (see the rough bluegrass discussion), or thinning due to the extreme heat this summer. However, this species, while easily spotted when mowing or walking across the turf is one of the least damaging sod webworms! The larvae feed only in the fall and early spring when the turf is most actively growing. They pupate in mid- to late May and remain as a dormant pupa in the soil for the entire summer! This is why they are not killed with spring or early summer surface insecticides! On golf courses, we are seeing three generations of black cutworms when we normally see only two. These pests can also damage the putting greens.

Figure 10:
Billbug larvae burrow down grass stems to the crown. When they destroy the crown, the entire plant will collapse.

Figure 11:
Sod webworm larvae and their green frass pellets are often easy to find in drought-stricken lawns, but they are not the cause of the summer dormancy!
We also didn't see much damage from the hairy chinch bug in June and early July (the first generation), but the second generation is causing some major damage in mid- to late August. Again, their damage is being mistaken as drought or disease (Figure 13). Only when the turf is pulled back are the hundreds of nymphs and adults observed. Even if discovered late, a treatment is needed to prevent further death of the turf. The top performing pyrethroid, bifenthrin, will take them out within days. Products with beta-cyfluthrin or lambda- or gamma-cyhalothrin also work quite well.

Finally, where are the grubs? The rains in June seem to have discouraged Japanese beetle adults from feeding and many areas of Ohio saw very few of these pests. However, they were still laying eggs in the turf. The night-flying species were also "healthy" in numbers and these have also laid eggs in our turf. So, the final spoiler this season is likely to be some pretty large, though localized, populations of white grubs! So be prepared to perform some rescue treatments in September.
LAWN & ATHLETIC FIELD REJUVENATION

With many of the problems discussed previously behind us, it is time to assess the status of the turf and begin the fall rebuilding process. Below are various scenarios of current turf conditions and suggested remedies.

**Scenario 1:** The turf is generally thin and basically looks worn out. Fertilization will be the most impart remedy for this type of situation. In the second or third week of September apply 1 pound of actual nitrogen per 1000 sq.ft of a well balanced (starter) fertilizer. The recommended fertilizer should include a balance of quick and slow release nitrogen. An additional application of 1 to 1.5 pounds of nitrogen per 1000 square feet applied as a balanced fertilizer should be made as a late fall application. Additionally, continue to mow at the proper mowing height through the fall until the turf stops growing. Mowing stimulates tillering that will promote increased turf density.

**Scenario 2:** The turf is clumpy, and not very uniform. Lawns & athletic fields that are predominantly tall fescue or perennial ryegrass may become bunchy and coarse looking. The leaf coarseness is due to the lack of density, which allows the leaf blades to widen from the lack of competition. In this situation, the turf should be overseeded to fill in the gaps. When seeding use a high quality seed. A common mistake is to buy a cheap or low quality seed that is predominantly annual ryegrass. Annual ryegrass is quick to germinate and establish but dies quickly in the heat and drought of summer – which was evident in many lawns this past summer. The cardinal rule of turf establishment, whether in turf establishment or renovation is good seed/soil contact. Seed germinating in the thatch layer will have poor germination and high seedling mortality. There are multiple ways of getting good seed/soil contact including seeding with a slit-seeder, verticutting to remove thatch (in this instances we would recommend exposing 30 percent of the soil) and coring extensively. The best success is seeding with a slit seeder versus spreading seed by a rotary or drop spreader. Fertilize with the recommended program in scenario 1. Once seedlings are established mow to promote tillering and thus increase density.

In summary, the heat & humidity of 2010 have presented a great challenge for turfgrass managers in the Midwest. Crabgrass and turfgrass diseases have thrived and have been extremely difficult to control. A strong fertilizer and seeding program this fall will help lawns and athletic fields to recover before winter.

For more information of turfgrass management, visit our website: [http://Buckeyeturf.osu.edu](http://Buckeyeturf.osu.edu)