



A CHALLENGING SUMMER FOR OHIO'S GOLF TURF MANAGERS -PERSPECTIVES FROM AGRONOMISTS AND A PLANT PATHOLOGIST-

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AGRONOMIC PERSPECTIVE

For golf course superintendents and other turf managers in Ohio and across the Midwest, 2011 has been another difficult and brutal summer for superintendents and golfers. Mother Nature perhaps in a more impressive way than the summer of 2010 again turned up the heat and humidity and coupled with some untimely heavy rains in many areas created summer turf nightmares. Phrases like "the perfect storm", "equal opportunity destroyer" and "turf loss of major portions" are being tossed around. In Ohio and other areas of the Midwest it was simply a "Consistent Relentless Heat and HumidityWave". Daytime temperatures were consistently **EXTREME** at 90 degrees F or higher. Nighttime temperatures were consistently **EXTREME** at 80 degrees F or higher. Relative humidity was **EXTREME** both day and night. Soil temperatures were also consistently **EXTREME** at 80-90 degrees F with little if any decline at night. Some golf greens were actually registering 100 degree F soil temperatures. NOT GOOD! This was especially true on short-cut bentgrass/bentgrass-Poa annua greens. Where untimely heavy rains occurred (e.g., northeastern Ohio), soils became wet and waterlogged taking soil moisture control away from the superintendent. The high humidity both day and night did not allow adequate evapotranspiration (loss of soil moisture by evaporation) for soils to dry out. The roots of turfgrasses under these conditions declined rapidly in wet, soupy, oxygen depleted soils. Roots need oxygen to function just like us. Essentially, roots were suffocating. Roots, of course, are the plant component that absorbs water and nutrients necessary for normal functioning. It is agronomically difficult and certainly challenging to maintain turfgrass under a limited to no roots scenario. For our cool-season turfgrasses, these environmental conditions were simply a recipe for disaster. All of our agronomic tools and skills make it difficult to provide tournament playing conditions consistently (e.g. green speeds of 10.5 or greater, etc.) when Mother Nature sends this kind of wrath on our cool-season turfgrasses. Even though it is hard to imagine, 2011 set weather records in almost every category as July was the hottest month on record and weather statistics appeared to exceed those of 2010.

Simply, cool-season grasses (bentgrasses, annual bluegrass - Poa annua, ryegrasses, and Kentucky bluegrasses) prefer air temperatures in the range of 60-75 degrees F and soil temperatures in the range of 50-65 degrees F for optimum growth and plant health. While it is not uncommon for the latter temperatures in Ohio and the Midwest to exceed these ranges each summer, extremes in heat and humidity are not typically sustained for long periods of time and typically intermittent breaks in these extreme

conditions occur during the summer. These intermittent weather breaks and usually cooler, less humid nights gives the cool-season grasses a chance to rest, recover and recuperate. At soil temperatures above 75 degrees F, the roots of cool-season grasses begin to slow in active growth and become less physiologically active resulting in the onset of the hidden turfgrass stress called "**root dysfunction**". At soil temperatures (80-90 degrees F) recorded in mid June to early August in Ohio and other parts of the Midwest, roots actually began to become dysfunctional, decline, and die back causing additional overall turfgrass stress. All turfgrass managers dream of deep, white physiological active roots in the summer as they realize this can result in the difference between grass and no grass.

High air temperatures physiologically resulted in a significant decline in photosynthesis (the food production process of the plant) of cool-season grasses causing a decline in over all plant vigor and health. High **nighttime** air temperatures physiologically resulted in an increase in nighttime plant respiration which increased photosynthate/food depletion relative to cooler nights further stressing the vigor and health of the turf. The high (stifling) humidity and high temperatures, both day and night, resulted in a compounding effect on turfgrass stress. Normally, cooler, less humid nights allow turfgrass plants to recover from daytime stresses. This summer turfgrass plants did not get this environmental nighttime rest. Consequently, the weakened turfgrass was more susceptible to heat stress, diseases and other pests. These extreme environmental stresses are additive or cumulative in weakening the turfgrass plant. The reason that turf managers request some stress relief with maintenance practices under extended extreme stress conditions (2011), like increasing mowing height, mowing less frequently and/or rolling less frequently, skipping daily mowing or rolling, or venting, hand syringing, etc. are an attempt to reduce maintenance imposed stress. Yes, maintenance practices, particularly close mowing, imposes additional stress on the turf., Yes, green speeds and overall playability may be compromised some, but an old agronomist much wiser than most said "**a little slower grass is better than no grass**". Physiological plant and root decline makes it extremely difficult to manage turf without being on the edge of a nightmare.

PLANT PATHOLOGY (DISEASE) PERSPECTIVE

Multiple factors are usually associated with turf decline and in most cases factors are additive or cumulative. However, a single environmental or management factor could be the key deciding factor in turf decline and serious problems. Key factors associated with turfgrass decline are listed below. In viewing these factors, please note that golf courses differ in some of the abiotic and biotic factors mentioned and this is true even within an individual golf course like sand versus push-up greens, percent annual bluegrass from green to green, shade, air movement, etc.

- Excessive rain fall in the spring (like 2011) resulting in a compromised, shorter than normal root systems entering the summer.
- Record high temperatures (day and night) in July and early August.

- Long periods of high humidity (day and night) which lower evapotranspiration rates - (slows drying) and creates an optimum environment for many diseases including the most devastating like Pythium, brown patch, and summer patch.
- Heavy rain events in the summer- sites may have experienced single or multiple heavy rain events (like northeast Ohio) resulting in wet, waterlogged, saturated soils causing root decline and dysfunction, especially coupled with high temperatures and humidity.
- **Greens with a high percentage of Poa annua (annual bluegrass) which is are our weakest cool-season grass species with low heat tolerance, high susceptibility to diseases and root decline and dysfunction. Some call it the "Poa no-roots annua" and along comes the old phrase "Poa going out" (via stress not disease). Poa annua is much more difficult to maintain under extreme stresses like 2011.**
- Courses that were conditioned for special events and club championships in July and August maintaining high green speeds, etc. (cumulative maintenance stress).
- High use of greens and facilities soon after heavy rain events.
- **Push-up greens (soil-based) and old greens with poor internal drainage.** These greens are difficult to manage at adequate soil moisture without overwatering. Of course as stated in the agronomic section above, untimely heavy rains just completely takes soil moisture control away from the superintendent. In the extreme heat, soils turn quickly into thick soup as they bake during the hot and humid days and nights. It is very difficult under this scenario to dry the turf system out.
- Greens with any kind of surface or internal drainage problems like low areas, water movement onto greens from surrounds, and/or no internal drainage system.
- As discussed earlier, excessive soil temperatures causes major root decline and root dysfunction.
- **Locations with poor or minimal air movement. These locations simply do not allow for adequate cooling and drying of the turf resulting in increased heat stress and diseases.** Some superintendents have been using fans to off set this problem and modify the microenvironment. The other alternative is to clear out trees and brush to improve air circulation. Obviously, the latter is a club/course decision but a wise one.
- Greens designs that create wear patterns and/or that lead to excessive soil compaction.

These latter problems and limiting factors vary from golf course to golf course and even within an individual golf course. It is difficult therefore to make comparisons between or among golf courses in a geographical area because of these potential differences and differences in maintenance budgets, play, etc.

TURFGRASS DISEASE OVERVIEW (SUMMER 2011)

Since most pathogens that cause turfgrass diseases are ubiquitous (always present) in Ohio, the two determining factors for disease development on golf courses are (1) the genetic susceptibility of the turfgrass to disease pathogens and (2) the environmental (weather) conditions that are ideal for disease activity, development and spread. When excessive heat, humidity and wet conditions occur, diseases and disorders are exceptionally "SEVERE". These diseases include Rhizoctonia brown patch, Pythium blight, root rots, various leaf spots, anthracnose (foliar and basal) summer patch, necrotic ring spot, nematodes, fairy rings, and previously mentioned abiotic disorders like wet wilt, black layer, and algae. They occur alone or in complexes and the 2011 summer environmental conditions were **EXTREME AND SEVERE** and a haven for them all. Our plant pathology team said Pythium blight was more prevalent than they have seen in a long time. This disease under high temperatures and humidity kills turf overnight. Typical fungicide programs were taxed to the limit and some programs based on conditions, stress, and disease pressure simply failed. They are fungicide programs and under the worst of conditions like described above they have their limitations.

However, Joe Rimelspach, our leading OSU extension plant pathologist and also our chief diagnostician in the OSU Turfgrass Diagnostic Clinic says reread the "Agronomic Section" because many of the samples coming into the clinic from golf courses did not have infectious turfgrass disease problems. His conclusion from samples and discussions with superintendents was that effective disease management programs to prevent or manage diseases were in place. **The most common cause of turf decline and death was the direct result of excessive heat and humidity (day and night) and excessive soil moisture.** Mother Nature simply rules the golf course under conditions like the summer of 2011.

POA ANNUA DECLINE, COLLAPSE AND DEATH

Poa annua is considered to be a weak grass based on marginal heat tolerance and susceptibility to many diseases. New technology especially in the area of fungicides has helped us deal with Poa annua better under moderate stress and disease pressure. However, the summer of 2011 produced consistent **EXTREME** stress and disease pressure. The old saying "Poa annua going out" was stated over and over in 2011 and confirmed by the OSU Diagnostic Clinic. Yes, there are different biotypes of Poa annua and some may be slightly more heat and disease tolerant than others but under less than ideal conditions management is a challenge. On golf course across the Midwest where Poa annua was a major component of the turf on greens and fairways major problems were encountered and generally Poa annua just ran out of gas. Decline, collapse, and death of Poa annua was not unusual with the **EXTREME** weather, excessive rainfall causing wet, waterlogged soils and in areas with poor air movement. Again, just an accumulation of stress factors causing a recipe for major disaster.

It should be noted that if areas were damaged this year and allowed to reestablish to Poa annua (especially the annual biotypes), these areas will be very prone to problems

in the future. Unfortunately, the more annual biotypes are heavy seed producers so an abundant seed bank will be produced next spring. These are the biotypes most common in problem sites as they are fierce invaders in damaged and unrenovated turf.

WHAT NOW????????? BE CAUTIOUS!!!!!!!!!!!!!!!

IRRIGATION AND HIGH ET

For the remainder of August, first be cautious with the existing turf as roots systems are still very shallow making them quite susceptible to dry wilt and drought injury. Mid August has provided somewhat more moderate temperatures but it is still 87 degrees F in Columbus today (August 24) with low humidity and a nice breeze. This weather tends to be very deceiving because evapotranspiration rates are high (.2-.3 “) resulting in the potential for dry wilt and turf loss. This dry wilt potential is even higher because of short root systems that have not regenerated yet. So, even though the extreme heat and humidity have hopefully gone for this year be cautious with irrigation for now – believe it or not- dry wilt and isolated dry spots are now a potential culprit. Monitor ET rates every day! Irrigate to keep a shallow rooted turf plant alive if dry weather and high ET rates prevail.

LACK OF A FERTILIZATION RESPONSE

Regarding fertilization, some reports are coming in indicating that superintendents are having a problem getting good fertility responses. Turf is exhibiting slow growth and general yellowing/chlorosis. First, remember that root system are shallow and are not taking up reserve soil nutrients like in a normal year when at this time roots are somewhat deeper and more prolific. The cool nights, milder days and decreased soil temperatures will help that situation in the next few weeks. So, be patient! But in the interim, continue your foliar feeding programs with a FULL complement of nitrogen and other macro and micronutrients. Calculate out your actual pounds of nitrogen that you are applying as a foliar spray per 1,000 square feet.. If the nitrogen rate is 0.1 pounds N per 1,000 square feet or less, consider temporarily upping the N rate more towards 0.2 pounds of N per 1,000 square feet. My experience has been that many labels are recommending less than 0.1 pounds of N per 1,000 square feet (e.g. 0.05 lbs N/M). Also, consider temporarily increasing the fertilization frequency to a week instead of every two weeks. However, if everything is fine then stay the course.

RENOVATION

Yes, it is time to start considering renovating damaged areas. Use the best agronomic practices available. Try to keep traffic off renovated areas until reasonably established. Standard coring/aerification can be conducted if greens and other areas will not tear up. There is still a little potential for some warm, drying, high ET rate days left in August and

early September and pulling up poorly rooted turf may not be the most desirable for a few weeks.

LONG RANGE PLAN

Finally, develop a long range plan for what I call “PHYSIOLOGICAL, TURF HEALTH AND DISEASE MANAGEMENT FALLOUT”. This involves trying to make a science out of long-range weather forecasting to better define when extreme weather conditions will prevail for extended periods of time in your area and at your golf course. For example, our weather forecaster in Columbus (predicting weather and weather patterns) for Central Ohio indicated early in July that our extreme weather was here for a while based on the jet stream and other criteria. **SO, HOPEFULLY THE SUPERINTENDENT AND CLUB/COURSE OFFICIALS CAN WORK TOGETHER TO DEFINE A “PHYSIOLOGICAL, TURF HEALTH AND DISEASE MANAGEMENT FALLOUT PLAN” THAT DICTATES UNDER PREDICTIONS OF EXTENDED ENVIRONMENTAL STRESS AND DISEASE CONDITIONS WHAT SHOULD BE DONE RELATIVE TO COURSE MAINTENANCE, PLAY, CART TRAFFIC, AND OTHER FACTORS THAT WILL REDUCE THE PROBABILITY OF YOUR TURF AND GOLF COURSE BEING PUSHED TO THE BRINK OF POOR CONDITIONS AND PLAYABILITY IN THE FUTURE.**