

November 2, 2011

**Windmill Ridge Golf Course**  
**Monett, Missouri**

**DATE OF VISIT: October 27<sup>th</sup> and 28<sup>th</sup>, 2011**

**PERSONS PRESENT:**

Mike Knight, Golf Course Manager  
Dave Gillaspay, Golf Course Superintendent  
Michael D. Vogt, CGCS, CGIA

**Overview of Greens Conditions**

Upon arrival at Windmill Ridge Golf Course I made contact with Golf Course Superintendent Gillaspay and General Manager Knight.



*Photo 1 Many areas on greens are slow to recover*

The turf that survived the summer is basically in good condition. The seedling bent grass turf and volunteer annual bluegrass (*Poa annua*) is struggling to establish.

After close examination a prostrate growth habit was noticed, especially on annual bluegrass plants. After a conversation with a private turf grass pathologist, she suggested that the growth habit could be a factor of the plant trying to spread and fill into the voids, coupled with reduced photo-period and cooler temperatures. Other areas showed signs and symptoms of leaf spot. (That disease has been reclassified into several leaf diseases, and pathologists now refer to “Helminthosporium types” when discussing leaf spots in the genera *Bipolaris*, *Drechslera*, and *Exserohilum*). This prostrate growth habit is illustrated in the red circles on Photo 2.

*Overview of Greens Conditions (continued)*



*Photo 2 Prostrate growth habit of annual bluegrass (Poa annua)*

While I was on site October 28<sup>th</sup> a precautionary spray application of Daconil Ultrex<sup>®</sup> (*chlorothalonil*) and Protect DF<sup>™</sup> (combination of product of *Zinc Ion* and *Manganese Bisdithiocarbamate*) was applied. These two chemicals mixed together in a spray will guard turf from a variety of cool season fungal pathogens and allow the turf to grow without inhibition from infection. The Protect DF<sup>™</sup> in the spray formulation will also discourage surface algae from sealing-off the surface which is apparent in some areas on greens.



*Photo 3 Fungicide application, October 28th*

## Turf Nutrition

An application of fertilizer to enhance further growth was applied during my visit. An equivalent of one pound of nitrogen per 1,000 ft<sup>2</sup> was applied (Anderson DG<sup>®</sup>, 18-9-18). This should feed turf and aid in leaf formation to accomplish a more rapid “fill-in” of turf.

Weather is the main dictate to tillering (spreading) of seedling turf. The daily high air temperatures are beginning to fall and soil temperatures will follow shortly. After soil temperatures fall below 50° F, the turf plant will no longer grow substantial leaf. The beginning of November will be the last opportunity to encourage any turf growth until spring of 2012.

## Soil and Water Test Protocol

### Soil Test

Soil tests from now forward should include a Saturated Paste Extract. This test should also include Electric Conductivity (ECe). The saturated paste extract procedure was specifically designed to give very accurate information on the soils Total Soluble Salts (TSS). To estimate TSS, the ECe is multiplied by 640 to give a TSS value in parts per million (ppm) or milligrams/kilogram.

Turfgrass Salinity Tolerance			
Sensitive (<3 dS/M)	Moderate (3-6 dS/M)	Somewhat Sensitive (6-10 dS/M)	Tolerant (>10 dS/M)
<b>Annual Bluegrass</b>	Annual Ryegrass	Creeping Bentgrass(var. Seaside)	Alkaligrass
Colonial Bentgrass	Chewings Fescue	Perennial Ryegrass	Bermudagrass
Kentucky Bluegrass	<b>Creeping Bentgrass</b>	Tall Fescue	Buffalograss
Rough Bluegrass	Hard Fescue	Buffalograss	
Centipedegrass	Bahiagrass	Zoysiagrass	
<i>Relative tolerance to soil salinity, soil salinity is reported in decisiemens per meter and is a measure of electric conductivity (EC<sub>w</sub>). Varieties in red are being grown on greens at Windmill Ridge Golf Course.</i>			

On comparative year-to-year soil tests, I have purposely focused on number 2 green for several reasons:

1. Common soil tests in past history;
2. Most difficulty growing consistently fine turf;
3. Most difficult environmental conditions, shade and air movement;
4. The same soil test protocol was used in each test.

If we can solve the problems at Windmill Ridge’s worst green we are most likely to have a successful program for the remaining greens. For that reason, we should always include number 2 green in all soil analyses.

### Soil Sample Collection

If a soil test is to be a reliable guide for the addition of fertilizers and/or gypsum, the sample tested must represent the soil condition of the green sampled.

### *Soil Sample Collection (continued)*

A soil sampling tube should be used in taking soil samples.

Scrape away any green surface tissue.

Obtain a small portion of soil by making a boring about 7 inches deep.

Because of soil variations, it is necessary that each sample consist of small portions of soil obtained from approximately 10 locations in the green area.

After obtaining these portions of soil, mix them together for a representative sample. Dry samples and place 16 oz. (2 cups) of soil in a soil sample bag or ZipLoc<sup>®</sup> bag.

After the sample has been taken, the soil sample bag should be clearly marked with your name, your address, and the sample number on the outside of the soil bag. Keep a record for yourself of the area represented by each sample.

### **Water Test**

As with the soil test, the area of interest to Windmill Ridge Golf Course is salts that can effect turfgrass growth and summer survivability. The water test should include: pH, Conductivity, Sodium Adsorption Ratio, Calcium, Magnesium, Potassium, Sodium, Iron, Carbonate, Bicarbonate, Chloride, Sulfur, Salt Concentration and Boron.

Currently, the water test (dated 10/27/11) only includes Aluminum, Boron, Calcium, Iron, Potassium, Magnesium and Sodium. From this basic information it remains difficult to make determinations of the suitability of the water and corrective measures needed to maintain fine turf.

### **Water Sample Collection**

The key to the success of a water sampling program is proper handling and preservation of samples.

Use only clean plastic containers for holding water samples, no glass. Do not use pesticide, surfactant, or fertilizer containers. The container and cap should be rinsed at least 3 times prior to sampling, with the water to be sampled.

Samples from the irrigation system should be collected from running water, from a hose or quick coupler.

Fill to the top of the bottle to limit air exposure and squeeze air out of bottle before putting on lid. Seal sample bottle tightly. Ship sample to lab within 24 hours using UPS delivery no later than 2 days from collection. If sample is to be held at golf course longer than 24 hours, keep refrigerated.

## Water Quality

The water test, dated 10/27/2011, indicates a calculated SAR (Sodium Adsorption Ratio) of 8.93. The water test supplied to you is recorded in milligrams per liter (mg/L). To convert Na, Ca and Mg from mg/L to meq/L, we will need to divide the concentration by 22.9, 20 and 12.15 respectively. After the conversion, the SAR calculation is achieved by the following:

$$SAR = \frac{[Na^+]}{\sqrt{\frac{1}{2}([Ca^{2+}] + [Mg^{2+}])}}$$

For most irrigation water, SAR is sufficient to determine if salt is problematic for proper turf establishment and growth. Although not perfect, with addition of gypsum even at an SAR of 8.93 accumulation of salt, especially on modified sand root-zone greens, it should not be a problem. A more detailed program of gypsum applications, light venting and leaching will be outlined in the spring of 2012

after additional soil tests and water tests are evaluated.

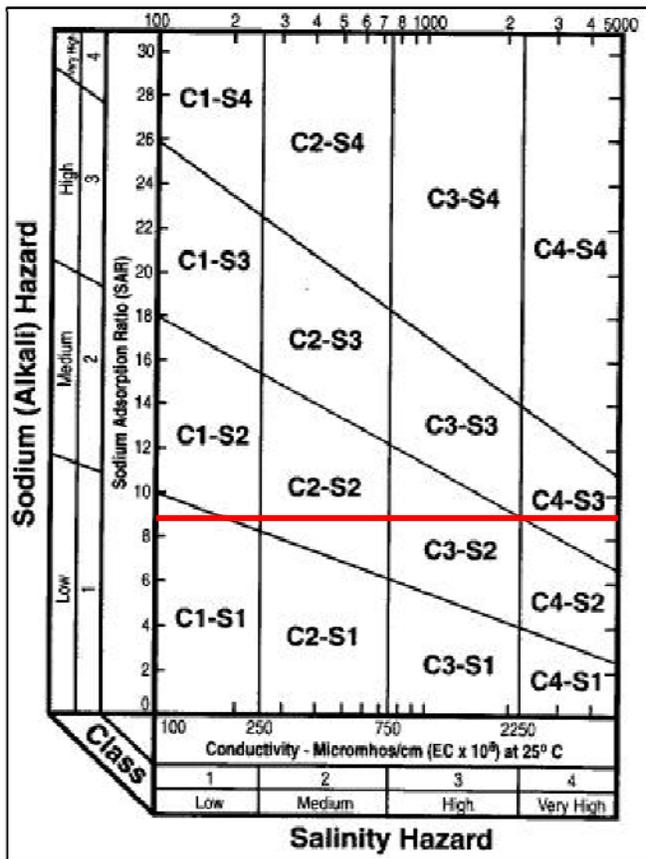


Figure 1 Red line indicates Windmill Ridge irrigation water SAR (sodium adsorption ratio)

An additional test on water will further enhance our understanding on how to mitigate the salt fraction. A simple test indicating conductivity will bring to light the classification of water and reveal how to calculate leaching requirements and exactly how much gypsum to apply.

The red line at 8.93 SAR on the sodium hazard chart, (Figure 1) only addresses the X axis. When we can establish the electric conductivity of the water samples we will gain a more precise measure of how to treat the salt conditions in the irrigation water.

I have analyzed past soil reports from data supplied to me from Superintendent Gillaspay. Superintendent Gillaspay was given a copy of this report with an explanation of trends that may be effecting turf growth on the greens at Windmill Ridge Golf Course. I will forward copies of this report to General Manager Knight and City Manager Pyle.

## Conclusion and Recommendations

Turf on greens remains thin in many areas. Turf growth is largely attributed to a combination of temperature and hours of daylight. Until temperatures and hours of daylight increase in the spring of 2012, minimum turf growth can be expected.

At my last visit, an application of fertilizer was applied to enhance leaf growth to the maximum physiological ability of the plant. Water applications were discussed and the recommendation to keep the root-zone moist but not overly wet was confirmed.

Mowing heights should remain at .140 of an inch throughout the fall, winter and early spring, to encourage plant tillering. The clean-up cut should be mowed only if necessary, mechanical damage from mowers was obvious from the clean-up cut on my last visit.

Sand topdressing should only be performed in areas to smooth the putting surface.

I will be keeping in contact with Superintendent Gillaspay by phone during the next four months and monitoring progress or problems as they occur.

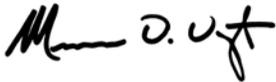
If weather dictates, additional fertilizer will be applied in the month of November.

A final fungicidal spray should occur on or about the third full week of November. I will consult with Superintendent Gillaspay on products used and rates of application.

My next scheduled visit is March of 2012. During this visit we will outline strategies and programs for the year of 2012 after a complete examination of conditions.

Any questions or comments, please feel free to contact me at your convenience.

Respectfully submitted,



Michael D. Vogt, CGCS, CGIA