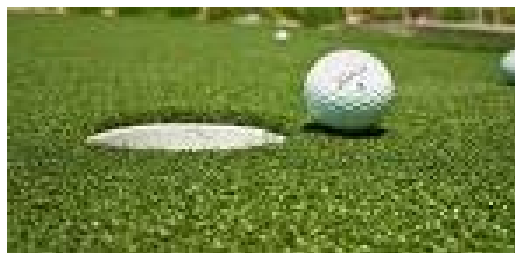


Gillian Garbutt  
Greens Liaison Chairman  
Sandhill Golf Club



14 June 2010

Hi again, doesn't time fly when we are having fun. As we see the course is looking great and we have had a lot of lovely comments, from members and visiting guests. Nature, with our help works wonders and the memories of scared greens are in the distant past. I must say that Steve and his team are working flat out to keep on top of all the cutting, that the rain and sunshine combination is producing an abundance of growth. Also that our bunkers are draining very well better than some I have been playing and also watching on television, which means that getting rid of the few that held water was a good call.

There have been only three **questions** that are on going.

1. The fence on the ladies tee on the 8<sup>th</sup> – After having word with Steve and Val this is being priced up and we should have an answer for next month, but obviously, the timing of erection of the said fence will have to be when the work load of cutting the grass depletes .
2. Marker posts for 150 yds these are also being priced up and again I will have more about them for next month.
3. A drop zone on the 3<sup>rd</sup> . Has been discussed in great length and has been decided to go ahead. Therefore, when a golfer shot ends up with the ball in the pond on the 3<sup>rd</sup> tee, the player may either drop a ball using the normal water hazard rule OR in the dropping zone under penalty of one stroke.

**May**

Besides Steve and his team being up to their necks in cutting they have also been doing the following.

Greens – Slit and scarified. They have been given an iron/seaweed mix. Also they have had a granular feed.

Fairways – They have been sprayed for weeds, also had a granular feed and iron/seaweed mix

Tees – They have had a granular feed and sprayed with iron/seaweed.

Bunkers - They have been edged and the topping up with sand is ongoing.

Rough – This is being systematically being cut and has been sprayed for weeds (yeah)

**June**

Greens – Weather depending these will be slit, scarified and top dressed, with addition of fertiliser.

Fairways – Continuously cut.

Tees – Divided and cut.

**OK now comes the technical bit.**

You might wonder why on earth am I talking about Mycorrhiza this is because every time Steve applies granular fertiliser this contains Mycorrhiza and the idea is that we top up regularly to help the natural ones that exist in our grass. As you will read further down it is a war going on between all the diverse micro organisms that exist in our soils throughout the world. Some are good (that's what we are adding) are some are bad.

## Mycorrhiza And Turfgrass

**Making a commitment** - How often do you think about the impact of your golf course maintenance practices on turf and environmental quality? Annually? Weekly? Daily? If you responded weekly or daily you are probably a person who is interested in organic, environmentally friendly products that will improve turf and soil quality. Mycorrhizal fungi are not new, trendy, genetically engineered organisms. These specialized fungi have been fundamental to the survival and growth of plants for over 400 million years. When you view turf grass at a golf course it is like viewing an ice burg. Between 50 to 80 percent of the energy absorbed by the grasses is allocated below-ground. This energy can be put to work by the manager utilizing specific beneficial soil organisms.

New scientific advancements in the cost effective growing of certain Mycorrhizal species beneficial to turf grass are rapidly bringing Mycorrhizal products to the golf management marketplace. Mycorrhiza can help lower costs over the long run. Healthy living soil and turf will retain nutrients, build soil structure, reduce stress and suppress disease, thus reducing the frequency and level of certain maintenance activities. Choosing to incorporate Mycorrhizal fungi into construction and aerification programs will not only benefit the environment but improves turf cover, rooting, fertilizer utilization, disease and drought resistance. Protecting the environment has never made more sense. Myco-what? This may be a question of the past.

### **Biological tool improves establishment, growth, disease and drought resistance of golf turf grasses**

Ten years ago the mention of Mycorrhizal fungi to a golf managers might have met with a blank stare. Today's managers are much more knowledgeable regarding the benefits of Mycorrhiza. Research studies have shown us all how these specialized fungi can improve fertilizer utilization, rooting depth, the speed of establishment, disease and drought resistance of turf. The golf industry and golf managers take their responsibility for managing the game and the environment seriously. New tools, such as the use of beneficial Mycorrhizal fungi, allow golf managers to improve the condition of both turf and soil

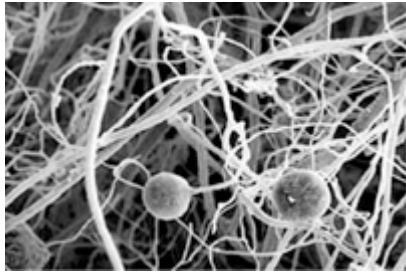


Golf course management is a balance between the speed of play, golfer's desire to see perfectly manicured turf grass and the ecological concerns of frequent chemical and water use. Golf

courses do not operate in a vacuum but are part of a watershed. The selection of fertilizers, pesticides and water are important not only to the "look" of the course but to the surrounding environment as well. Golf course managers have a new tool in their belt that utilizes nature's own way for growing plants and conserving resources. Golf course managers can use a group of beneficial soil organisms, the Mycorrhizal fungi, to improve the health and vigour of their turf grass.

### **What Mycorrhiza are**

Most grass species in their undisturbed natural environments form a beneficial association with Mycorrhizal fungi. The resulting structure is called a Mycorrhiza, or literally "fungus-root". Although several types of Mycorrhizal fungi form Mycorrhiza with plants, the largest group, -endomycorrhiza or also called arbuscular Mycorrhiza form with most grass species. Mycorrhizal fungi are present in soil as spores, as hyphae in soil (filaments) or as colonized roots. Hyphae of Mycorrhiza penetrate into and between the outer cells of the root. Inside the root the fungus forms special coiled hyphae (arbuscules) that provide increased surface area for exchanges of food to the fungus and nutrients for the grass.



The abundance of hyphae attached to colonized turf grass roots greatly expand the level of nutrients

minimizes off site and groundwater movement of fertilizer that is not utilized. The network also binds soil particles together

The Mycorrhizal fungi once established on the turf root system radiate out from the roots to form a dense network of filaments .These filaments form an extensive system of hyphae that grow into the surrounding soil and provide a variety of benefits for the grass plant. This network of filaments obtains 15 major macro and micro nutrients and water and transport these materials back to the turf root system. Mycorrhizea are especially important for uptake of nutrients that do not readily move through the soil such as phosphorous and many of the micro-nutrients. The elaborate network of hyphae beneath the soil surface greatly increases the potential of the root system to absorb nutrients and water.

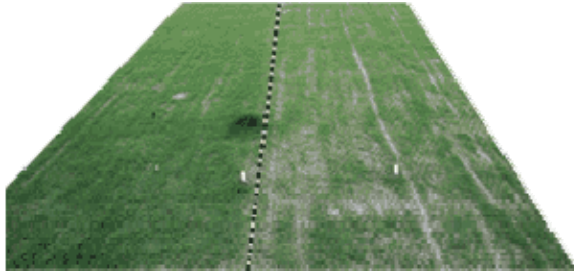
Conserving and incorporating fertility and water directly into the target turf grass is a goal of golf management professionals and

**Where Mycorrhizea are** - Soils in natural settings are full of beneficial soil organisms including Mycorrhizal fungi. Research indicates, however, many common practices can degrade the Mycorrhizea-forming potential of soil. Construction practices, tillage, removal of topsoil, site preparation, heavy use of pesticides and chemical fertilizer, compaction, and leaving soils bare are some of the activities that can reduce or eliminate these beneficial soil fungi. In many man-made landscapes we have reduced or eliminated healthy diverse populations of Mycorrhizal fungi.

Putting greens constructed according to Golf association standards lack Mycorrhizal fungi at the time of sowing and Mycorrhizal populations are slow to increase in the green .All important turf grass species can form a specialized symbiotic (mutually beneficial) relationship with Mycorrhizal fungi. Unfortunately, modern golf construction practices often reduce or eliminate these beneficial organisms). New Mycorrhizal products designed for the golf industry are now returning these ancient allies of grass back to golf course soils.

**Water, water everywhere?** - Attention has focused on water conservation as water becomes a more expensive and environmentally sensitive component of golf course management. Research studies have shown that Mycorrhizea can enhance the ability of grasses to avoid water stress. Recent studies from the Journal of Turfgrass Science indicate that creeping bentgrass inoculated with the Mycorrhizal fungus *Glomus intraradices* tolerated drought conditions significantly longer than non-Mycorrhizal turf. Mycorrhizal inoculated turf also recovered more quickly from wilting than non-Mycorrhizal turf. Mycorrhizal turf maintained significantly higher (avg. 29% more) chlorophyll concentrations than non Mycorrhizal turf during drought events. Other research studies indicate that greater chlorophyll content and enhanced photosynthate production can lead to increased drought resistance. Mycorrhizal inoculations can be a useful tool to managers because sand/peat putting greens dry out quickly and creeping bentgrass is intolerant of drought and difficult to maintain under summer conditions.

**Faster grow-in** - Research indicates that Mycorrhizal inoculation at the time of sowing can increase the rate of establishment by Turfgrass species. The early establishment of Turfgrass in sand/peat medium has received the attention of managers where early playability can have a significant economic payback. In recent trials in Oregon and California, Mycorrhizal inoculants at the time of sowing doubled the percent grass cover in the early establishment period



**Figure 8**  
Creeping Bentgrass cover with Mycorrhizal inoculation



**Figure 9**  
Bermuda grass cover with Mycorrhizea inoculation using *Glomus intraradices* spores (right) and non inoculated

**Resistance to disease and nematodes** - Root pathogenic fungi and parasitic nematodes can be acute problems for golf course managers. Research indicates that the Mycorrhizal relationship can improve grasses resistance to the negative effects of these organisms (Mycorrhizal fungi improve the plants resistance to soil born diseases in several ways for a wide range of host species .

Some specific Mycorrhizal fungi like *Glomus mosseae*) and *Glomus intraradices* are particularly effective in preventing *Fusarium*, *pythium*, and *phytophthora* infections. Root infections by pathogenic nematodes are generally less severe on Mycorrhizal plants than on non Mycorrhizal plants, but the responses may vary, and the mechanisms involved are being studied .

**When do I use Mycorrhizea?** - Sand/peat medium incorporated during construction of golf greens is generally devoid of Mycorrhizal inoculum and is a prime candidate for achieving the benefits of the Mycorrhizal relationship. Mycorrhizal inoculum can be incorporated during construction and aerification. Mycorrhizal propagules are then incorporated into the rooting zone where they will be effectively utilized.

Natural areas generally contain an array of Mycorrhizal fungal species. Following any disturbance. Not all Mycorrhizal fungi have the same capacities and tolerances. Because of the wide variety of soil, climatic, and biotic conditions characterizing golf environments, it is improbable that a single Mycorrhizal fungus could benefit all turf grasses and adapt to all conditions.