



most if not all golf courses sooner than later. Courses who can get out in front of these planning challenges will be the facilities other courses will look to model themselves after.

One other advantage that drainage has over irrigation is the ability to warm the soil two weeks earlier in the spring (compared to undrained areas) and two weeks longer in the fall, resulting in four weeks of extra root growth per year. Subsurface drainage systems perform this by eliminating useless gravitational groundwater that keeps, the soil cooler in the early spring and late fall periods. Conversely, in the heat of the summer and during a heavy precipitation event a golf drainage system will help cool the subsoil temperature in the same way by reducing

the groundwater and introducing oxygen in to the soil profile to aid in cooling your playing surface.

The importance of proper drainage to the golf course is completely unglamorous and does not give you visual style points like showing your greens committee how you can program your irrigation head from your smart phone. I only urge you to also communicate the importance of drainage to aid in giving your facility the optimum soil moisture level needed to reduce your other agronomic inputs to a sustainable level for the long term.

XGD Systems stands for “eXisting Greens Drainage”. However, it is not limited to greens as we have always



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installed it on tees, fairways and approaches as well.

XGD was developed by TDIGolf nearly twenty years ago in southwestern Ontario. TDIGolf began as a small company installing fairway drainage systems on golf courses and sports fields in the greater Toronto area. It quickly expanded its focus as golf course restorations began to dominate its yearly sales. With our extensive farm and golf drainage background, we received several enquiries on how to revive a pushup green without rebuilding it completely. We knew how to accomplish this, but

leaving the green completely playable after the installation was our challenge. So we “guinea pigged” a few greens in the Toronto area using some rudimentary installation methods compared to today’s flawless installations, and the process was born and quickly became a hit in southwestern Ontario.

When TDIGolf moved in to the US market about fifteen years ago the “TDI greens drainage process” followed it and immediately was exposed to thousands of pushup greens in need of a greens revival. After about 10 years the “TDI process” was becoming busy enough to separate

it from the parent company and formed its own subsidiary company named XGD Systems LLC. At this time we also began to slowly expand from a single crew to our present day six crews in the busy install seasons.

So what is XGD Systems exactly? It is a subsurface piped, gravity flow drainage system installed in to the subsoil utilizing basic agricultural drainage principles. These general principles focus on gravitational groundwater control. Not unlike a farm field drainage system applied to the scale of a golf green where the agricultural crop is high value turfgrass, 2” pipe is installed on a 6’ spacing with a minimum depth of 14” across the entire putting surface. However, unlike farm drainage the trench spoils are removed and trenches are backfilled with an organic sand mixture.

This backfill is utilized mostly so that the trenches can be compacted immediately and the sod replaced, and the green is returned to play after a one day installation period. The system does not rely on the sand backfill to direct surface water to the drainage lateral as one might assume, rather it relies on lateral groundwater movement to the XGD laterals. This occurs once saturation point is reached after a heavy precipitation event and all the soil pore space is filled with useless gravitational groundwater. At this time the groundwater table is flushed and lowered to a manageable level which draws oxygen in to the soil profile previously occupied by

gravitational groundwater.

Generally speaking, I refer to the XGD System on golf greens as a major tool in a superintendent’s arsenal. We believe it is as important as irrigation to help aid in soil moisture control. XGD has been installed on over 2000 greens across North America over the last fifteen years. That is over 10 million square feet of putting surface, and doesn’t include our systematic fairway XGD installations which uses a more economical version of the greens drainage principles. One might say our fairway XGD installs are similar to a marriage of our greens drainage to the basic farm field drainage I have described earlier.

How long will XGD last? Our oldest installations are still performing strong in southwestern Ontario after 20 years time. The secret to longevity of any drainage system is positive grade on all pipes installed. This allows any silts and fines that may accumulate in a pipe to flush out after one of Mother Nature’s deluges, or after an irrigation flushing event. XGD is a major investment for any golf facility, and I have to stress that it is an investment in your highest value playing surfaces for the long term. Again, it is not a panacea for all your greens ailments, as sunlight and air movement are the other major factors, but subsurface drainage will play a great role in preserving the long term agronomic success of your finest playing surfaces for the long run.



Bio:

Mark Luckhardt

Vice President of Sales

XGD Systems LLC

772-528-5459

www.greensdrainage.com

blog.greensdrainage.com

Twitter: @xgdsystems

Twenty five years of experience in golf restoration industry. Mark helped develop and perfect TDIGolf's XGD Systems process twenty years ago. A significant part of his career has been with TDIGolf as a Senior Project Manager. As Vice President of Sales, Mark is responsible for sales and business development.



“SPECIAL COLLECTION”

To all MGCSA Members,

I know times are tough and budgets are tight and it seems like there is one golf event after another. Each one asking for this and that and each time we all are asked to dig into our pockets, into our budgets to help. Yes the Wee One Foundation is one of those golf outing I am talking about. We are asking for you to dig into your wallet or your budget and find some dough to help one of our own members.

From time to time at church on Sunday there is a “Special Collection” for an unforeseen natural disaster or special need...the tsunami in the far east a couple of years ago the day after Christmas, the earthquake in Haiti, the floods in Fargo. Well we should consider this a “Special Collection” for all of our friends in this business whom we wish didn’t need the contents of this special collection.

The Wee One Foundation was started eight years ago when a group of Wisconsin and Illinois superintendents had a “Special Collection” for one of their [(our) – we are all in the green industry] own, Wayne Otto, C.G.C.S. Wayne was a superintendent in the Milwaukee area for many years and sometime in the spring of 2004 Wayne was diagnosed with pancreatic cancer. We all

know that that form of cancer is NOT good but Wayne’s friends and colleagues from AROUND the INDUSTRY stepped up to the plate with that “Special Collection” and created a golf outing to raise money for his treatment. The Wee One Foundation was born. Wayne lost his battle with cancer in October of 2004, but his smile lives on and HIS Foundation is here to stay and to help others that are in need.

Today eight years later there are Wee One Foundation golf outings in many states including Minnesota. The Wee One Foundation has helped many families in OUR industry throughout the country that have been in financial need. The Wee One Foundation has already given two Minnesota families \$30,000.

Ours is a very special industry in that we are always lending an extra hand for our fellow turf managers. Well this is one hand out I hope I never need to ask for...but my heart swells to know that my peers are there for me if I do.

Please join me at North Oaks Golf Club on October 8th for this year’s Wee One Fund Raiser. Lets make that “collection” basket overflow with the goodness of ourselves, our good fortune and our professional camaraderie.

Kind Regards,

John Meyer



*The Wee One Foundation, lets hope you never need it.
The Wee One Tournament, Ocotober 8th,
at North Oaks Golf Club. Lets fill the
field and fill the basket!*

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SCHEDULE OF EVENTS

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 12:00 pm..... GOLF
 5:00 pm..... Heavy Appetizers & AWARDS

Dress Code for Golf & Post Meal: Must wear collared shirts, slacks or Bermuda length shorts. No denim.

Golf & Dinner: \$70 Heavy Appetizers Only: \$35
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Factors Affecting Fungicide Performance

Jim Kerns, PhD. University of Wisconsin, Madison

As summer approaches so to does the battle between diseases and golf course superintendents. Although in a perfect world it would be nice to manage fungal diseases without using a pesticide, yet we do not currently have that option. Fungicides are necessary in order to maintain the quality playing surfaces golfers demand, but it never hurts to understand the factors that affect fungicide performance. With an understanding of these factors, I believe that golf course superintendents could maximize their fungicide programs and possibly even extend residuals of some of their applications.

The primary factors that affect fungicide performance are what Rick Latin refers to as deposition factors, depletion factors, disease pressure and fungicide resistance. Dr. Latin discusses these factors extensively in his book *A Practical Guide to Turfgrass Fungicides*, which in my humble opinion is by far the best Turfgrass text I have ever read! Deposition factors refer to deployment of the fungicide, which includes application rate, application volume, application timing and application interval. Depletion factors refer to the removal of a fungicide either through degradation processes, mowing or rainfall. Disease pressure refers simply to the disease triangle- there are some circumstances when the pressure is so intense that more frequent and higher rates of products are required to maintain suppression. Finally fungicide resistance is essentially the natural selection of tolerant individuals through the repeated use of a fungicide, especially ones with single site modes of action. The remainder of the article will examine these factors in a bit more detail.



Deposition Factors:

Fungicides are typically applied using water as the carrier and one of the most controversial topics is how much water should I use. Most researchers apply fungicides in 2-gallons/1000 ft², yet most golf course superintendents try to limit that water volume for efficiency during the application. Do you run the risk of losing performance when the water volume is cut from 2 gallons to 1.5, 1 or even lower? Coverage is not ideal when spraying fungicides from a sprayer traveling at 6 mph so why reduce water volume too much (Figure 1A). Most of the current research has focused on evaluating different water volumes for the control of dollar spot. Research conducted at Kansas State University demonstrated that water volumes could be reduced without sacrificing dollar spot suppression when using chlorothalonil (Figure 1B). These applications were conducted biweekly, which probably demonstrates that frequency of applications are important when lowering water volume.

The question I pose is what happens if we use a DMI or another product and expect more than 14 days of control? Does the residual control change with increasing water volume? I ask these questions because we routinely get exceptional control in our dollar spot trials with limited breakthrough, yet I rarely hear of the same control from golf course superintendents. Yes I know we do not have traffic and golfers at the OJ Noer and most certainly an argument could be made about how this influences disease pressure. However, keep in mind that we as plant pathologists are morbid and we do everything possible to induce disease development, so it's unlikely that the pressure observed at any particular golf course is higher than the pressure at the OJ Noer. We plan to deploy our own water volume experiment this summer looking at residual control of dollar spot, in other words can we extend intervals just by increasing water volume? If you are interested come to the Wisconsin Turfgrass Association Summer Field Day on July 31st for the results.

Depletion Factors:

Once a fungicide is deployed into the environment there are many factors that remove it from the plants we applied them to. One of the biggest factors is mowing. Constant mowing is an excellent way to remove or dilute fungicides from the targeted area. Notice the word dilute because in some cases we are removing protected tissue and as the new growth emerges it may or may not be protected. Another factor that we have worked on extensively is the degradation of fungicides in response to temperature. Paul Koch has focused his PhD research on how fungicides persist in the environment and has found that fungicides degrade rapidly when temperatures increase from 50 to 68 to 86°F (Figure 2). It is interesting that by 14 days we cannot detect iprodione on turf when temperatures are at 86°F. Based on this particular research, we think that microbes are the main entities degrading iprodione in the environment. Therefore as temperatures increase so will the degradation of iprodione. This is why Paul and I say increase rates and intervals during the summer months and when disease pressure is highest.

Another question I commonly receive is how long does it take for a fungicide to be absorbed. To answer this question, Pete Dernoeden's group did a very nice study that applied water 30 minutes after fungicide application. They used four different fungicides, Emerald, Chipco 26GT, Daconil Ultrex and Banner MAXX in this experiment and used dollar spot to evaluate the efficacy after rainfall. Emerald and Chipco 26GT were not affected after rainfall, but Daconil Ultrex and Banner MAXX were. This tells us that Daconil and Banner's performance can be affected if a rainstorm occurs within 30 minutes after application. However, typically fungicides dry quickly and once they do, it is difficult to dislodge them. Therefore it is imperative to water-in fungicides immediately after application when targeting take-all patch and fairy ring.

Disease Pressure and Fungicide Resistance:

Like the past two summers, sometimes the summers are perfect for diseases.

