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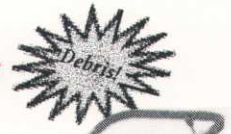

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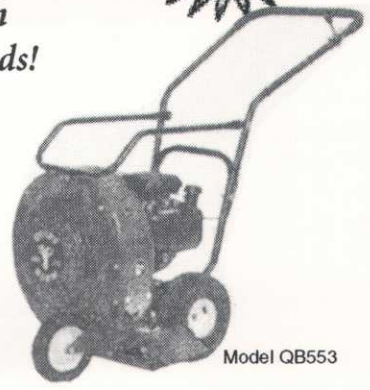
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From Your President's Desk

The Final Frontier

It was a rather cool day, but host superintendent Steve Hamelau had the course in excellent condition for the Research Scramble. The event raised a significant amount of money for the research fund. Thanks to all who participated. Along those same lines, the research donations forms were sent out recently. Encourage your club to participate, or participate yourself. It is a great cause since it furthers turfgrass research here in Minnesota.

I have been having meetings recently with the Department of Agriculture regarding the use of phosphorous on turfgrass in the metro area, and I am now convinced that there is nothing people won't say or do to further a cause they believe in. This is not necessarily a bad thing if these same people are willing to accept facts, but they aren't. In early September there was a meeting of individuals that were considered stakeholders in the phosphorous debate. It was immediately apparent who was on what side. There was science and there was emotion. The science side was represented by industry and U of M educators. The emotion side was represented by lakeshore property owners and environmentalists. Needless to say, neither side won. It was a seven-hour group therapy meeting with no tangible results but to stake out your ground. I hate these kinds of meetings. I went to this meeting ready to have a discussion about changes to the legislation to allow us to do our jobs as well as have a real impact on the phosphorous pollution in our lakes and streams. What I came out with was an understanding of the political process of doing anything to get a foot in the door even though it will have little or no real impact on a problem. Discussions are continuing, but I fear that the real battle will again be fought at the legislative level through testimony in front of the various committees. I will keep you posted.

On page 35 of this issue of *Hole Notes* you will find an article written by Mike Brower, our voting delegate, on the chapter delegates meeting. Mike offered to write this article to help keep everyone up-to-date on what is happening at the national level. It is a view from the stands and not the front office, so please give it your consideration. Thanks, Mike, for this informative article on the national.

With the end of the season comes time for educational conferences. The GCSAA conference and show packets have been mailed out and should be in your hands. Remember to register early since classes fill quickly. Our State conference in conjunction with the MTGF is quickly approaching and looks to be a great educational program. The Department of Agriculture will again hold its recertification workshop, still required for all classes of license. Along with the MGCSA annual meeting will be a binding vote on the PDI program. Please be sure to attend or vote by proxy, either way be sure to have your voice heard.

--Respectfully,
Paul Eckholm, CGCS

Western Superintendents' Bull Session

9:00 a.m. ~ November 6th ~ Alexandria Golf Club

All are Welcome!

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Agronomically Sound and Player Friendly Aerification.....In My Humble Opinion

By JACK MacKENZIE, CGCS
Superintendent, North Oaks Golf Club

Perhaps the greatest equipment made available to the superintendent over the last five decades is the core cultivation tool we know today as the green aerifier. Its use has been a miracle cure for old and tired greens as well as new. The 50-year-old push up greens at North Oaks Golf Club are no exception, and have improved significantly since the concept of removing cores and topdressing with sand was introduced in 1985 and continued until 1997. However, the last two years of the millenium brought a change in my aerification program and my attitude toward core cultivation.

In fact now I feel that core cultivation during peak playing time is a disservice to the players and in turn to the turf professional. Not only does it shorten the already too short season in the northern states, but also, in my opinion, it is agronomically questionable to disrupt the turf plant during the late spring or early fall. With the best of intentions I did more damage to my poa/bentgrass greens, and my reputation, than I like to admit. However, I have learned my lesson and will probably never cultivate my greens during the peak-playing season again.

The golf season at North Oaks Golf Club begins the first week of April and usually lasts until early November. As it is everywhere, the bulk of my membership play runs with the growth cycle and heat index. The nicer the weather, the nicer the turf and the more the play. And the better the conditions, the happier the players, and the greater the respect there is for me, the superintendent. With a moderate operating budget of $530,000 dollars, and very persnickety members, my 19 greens are expected to be close to perfect - all of the time. So why as a turf professional did I insist on tearing them up when they were at their most playable, usually between Mother's Day and Labor Day? Could it be staff availability and scheduling?

During heavy play periods, it was imperative to get aerification done in as little time possible. Thus more equipment and more bodies were necessary. A full summer crew had to be on hand to pull the job off. Planning was important to coordinate such a massive task. Everything had to be ready to go, go, and go. Oops, a thunderstorm! Whoa! The kids start school in mid-August. Oh oh, an unscheduled event has been booked. Maybe we could do nine at a time. Sound familiar? I used to super-stress myself out just trying to do something that really had my members angry with me. What could I have been thinking? Furthermore, was it an agronomically sound program?

I had always thought that by punching my greens in May and August I was encouraging faster recovery due to warm soil temperatures and the ability for me to force my grass to recover with increased rates of nitrogen. Also the holes and pore space between the sand particles I had created would be optimum for root development. I thought my job would become easier and the turf would grow healthier. In hindsight I see that I was a bit off base with my assumptions.

My thought process was flawed in several ways. I had forgotten these facts: adventitious root growth occurs from the nodes of the plant and once cut or broken, have to be reinitiated from the nodal region, i.e. my aerification practices were disrupting my roots and forcing excessive new root growth at the cost of plant recovery. Also shoot growth occurs at the expense of root growth; thus my "pushing" recovery was weakening my already taxed root system. And finally, root initiation doesn't happen for bentgrass when soil temperatures are over 75 degrees, typical summer temperatures in this region. Was I really helping the development of my root systems, or setting myself up for a summer of stress susceptible plants, syringing and living on the edge? Was I limiting my turf's ability to develop a pre-dormancy carbohydrate reserve for the following spring's resumption in growth, an energy bank I depend upon to encourage recovery from a nasty winter? Was I doing my greens any favors?

The practice of core cultivating twice each year, with plug removal and incorporation of Uniman sand, did produce the desired result of a modified root zone and turf decline symptoms did indeed decrease. When healthy and in top condition I was proud of my green's playability, even if I did have to baby them in the "hot" times and spring start up. Much to my consternation however, I had developed multiple layers down to one inch below the turf canopy. And even more detrimental was the "shear zone" at the first sand/soil layer interface, roughly two inches below the surface.

Layering has been touted by many in the industry as the root of all evils. Over the years of punching and removing soil from the greens, followed by a heavy layer of sand worked into the cavities, and monthly moderate topdressing, I had developed many "micro-layers" of alternating sand and organic material. Everyday as I cut cups I would reflect upon the detrimental effects the micro-layers would

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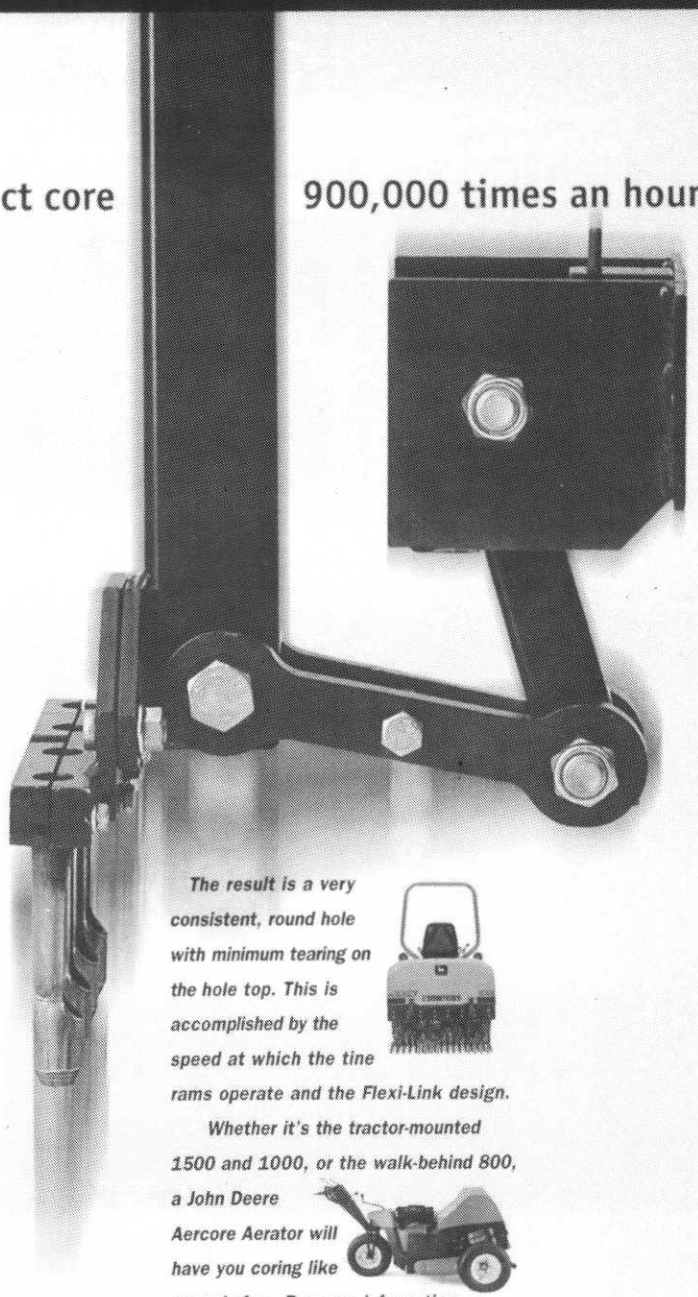

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In My Humble Opinion--

(Continued from Page 5)

soon have upon my livelihood. Through observation however, I could see that they always consolidated into the soil and never appeared below one inch in depth. Rooting was never impacted and I have since learned that my concerns were based upon my personal misguided perceptions. My only real challenge existed farther in the profile where there was a distinct difference between the native soil and the sand topdressing program.

1985 saw my course into the "next" generation of greens; the sand modified push up. Unfortunately, the routine aerification program developed a noticeable hard pan three inches under the surface. Also distinctive was the creation of a transition layer from soil to sand. Even though rooting occurred through the layer via the aerification holes, the bulk of root growth was very shallow, and root sloughing always occurred at this layer during the mid summer or times of turf stress. This "shear zone" was a foreshadowing tool for me. When my cup-cutting plug broke at the soil/sand interface, I could count on challenges to follow. Syringing and wet greens, disease pressure and fungicide applications, membership encroachment, long days and even longer nights.

Over time, through aerification and topdressing, I was able to puncture and drive the shear zone deeper into the soil, but not deep enough for satisfactory rooting in my mind. Thus I turned to the new technology of water injection. Toro had begun marketing the Hydroject for relief of compaction throughout the golf season.

For one season I gave the hydroject a fair shake. Several times I went onto my greens with the intent of improving the soil structure through aerification. What I found was the opposite. Putting water into an already moist soil seemed to make it wetter, thus predisposed to compaction and reduced gas exchange. Native soil was brought to the surface and fine particles migrated into my sandy profile. Lastly I was concerned with the thought of blasting my plants and their roots with a jet of water that could blow a hole in my foot. Wasn't plant tissue as prone to injury as my skin? The unit was soon parked in the pole barn only to be brought out for spot applications on my fairways. At about the same time period, deep tining became the trend.

Early in the spring of 1996 I experimented with a Vertidrain upon two of my worst greens for root growth. The holes were left open and soon much to my delight roots filled the voids. The new root growth was maintained until annual attrition took most of them in August. At this point I began pursuing the purchase of a deep tine unit. Also I reevaluated my aerification practices. Perhaps this new tool could be used to encourage rooting through my shear zone. After all, considering the amount of sand I had applied to my greens during the previous decade, didn't I have enough porous material in my profile?

In early July of 1998 North Oaks Golf Club purchased a Vertidrain Deep tine Aerifier. I was thrilled and scheduled a "needle" tine application for the second week of the month. My distributor had assured me that the members would notice no disruption. He was right. The players didn't, but I sure did.

It rapidly became obvious that the deep tines had accelerated the summer slough of my roots at the sand/soil interface. The day after aerification I noticed root shear on my cupping plugs. Also there was no impact, that is any root loss, in the areas of my greens where my inexperienced operator had missed. Now I had to be on guard for the rest of the golf season, i.e. syringing, and more plant protectants. I was however very impressed with the improved rooting when soil temperatures dropped in late August and could hardly wait to punch my greens again. By now however, I had formulated my own plan of attack.

Unfortunately play scheduling postponed my program until after October 15th. At first the delay caused me some concern. Would the holes heal before freeze-up? What would happen if there was an open winter? How was I going to get sand into the profile? Then I was struck by a concept that would cultivate my greens and perhaps improve some areas prone to winter injury

Several of the greens at North Oaks puddle up with water and often freeze solid for a long period of time caus-

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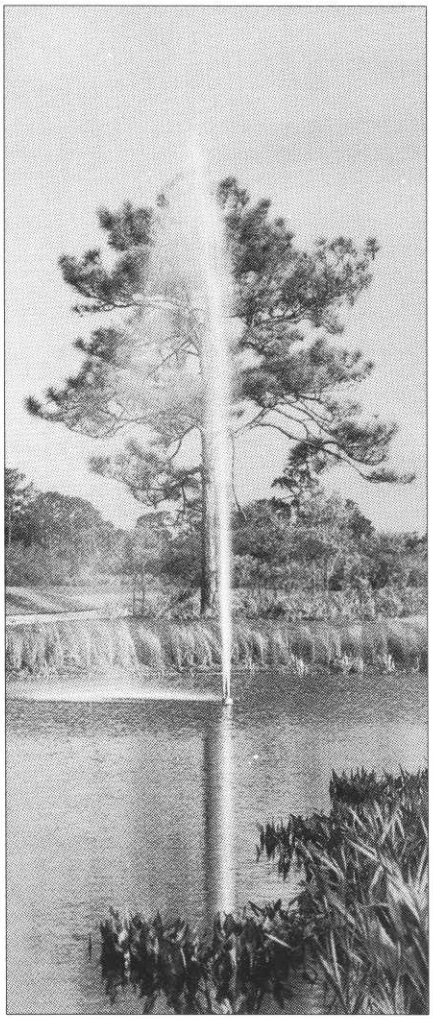

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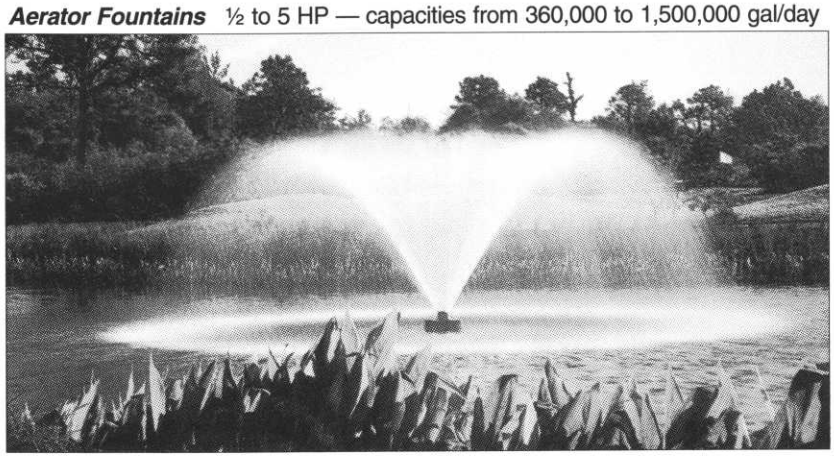

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In My Humble Opinion--

(Continued from Page 7)

ing great mortality to the annual bluegrass. If my staff deep tine aerified late enough in the season, just before freeze-up and didn't backfill the holes with sand, wouldn't the channels facilitate the removal of free surface water from the greens? The sub-surface soil would be warm enough for water absorption much longer than the surface. And when the water did freeze, expansion would cause additional fracturing of the soil. My Green Committee endorsed the idea and we aerified the last week of October.

I've changed my aerification to a much more agronomically sound and player friendly program. It is the best of all worlds.

In fact the late fall of 1998 was so mild the greens received the special treatment twice more in November. Spring of 1999 arrived in March and I was impressed with the condition of the greens. Very little ice damage was observed, rooting initiation started with a bang when the soil temperatures rose, the few members impacted by the previous falls aerification were pleased with the rapid recovery and I was so amazed with the condition of my greens I was forced to reevaluate my program again.

Root growth in early May was so deep and fibrous that I couldn't justify punching my greens in the spring. Thus I decided to repeat my late fall experiment. That is right, no in-season green aerification. No angry members. No struggling with staff schedules. From May first through October 19th the greens were in exceptional condition. Roots were penetrating the shear zones and the plant health was greatly improved over previous years. I had found the right aerification timetable to promote the healthy growth of my greens. Now I only had to attack the micro layer problem created by infrequent medium light applications of sand.

Concurrent with the changes in the aerification agenda the sand topdressing program was modified at North Oaks Golf Club. Two staff members and two walking fertilizer spreaders replaced the ancient meter-matic. Sand applications became lighter and more frequent, but layers continued to develop. In the summer of 1999 I promoted and was allowed to purchase a new 15/30 top dresser specifically for the ultra light application of sand on a weekly basis. For this reason during the last 14 months my surface soil has changed significantly.

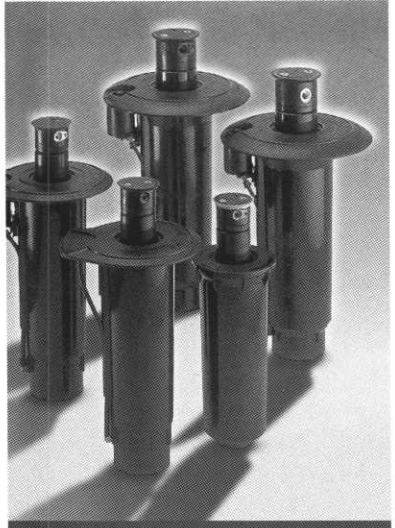
My fretful layers have disappeared, consolidated into the sandy organic mixture I was now developing. When wet, the material appears thatchy, but when dry, it looks very porous and crumbles rapidly into a wonderful mix of sand and organic material. In fact, it is such a great medium for the growth of roots, I plan on quarter-tine punching my greens one week before power aerifying them late in October. My intention is to remove some of the organic build-up in the top one inch of the green surface. No sand will be applied to fill the cavities. I'm done filling holes!

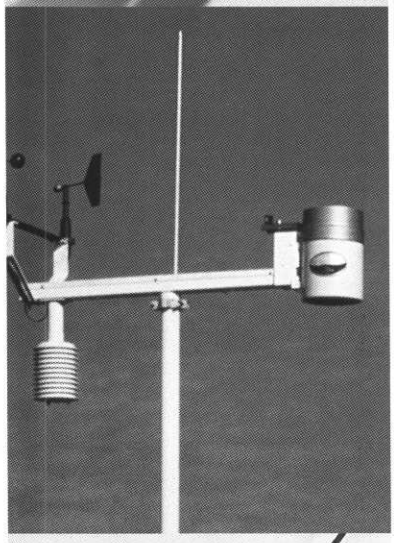
And I'm done tearing up my greens when play is most active and staff most stretched. Traditional aerification has its place in the turf industry and I'm thankful for the development of the technology. You don't have to convince me that it is exceptional for the amendment of soil-based greens, the encouragement of deeper roots and the disruption of thatch layers. The goal is to improve the environment for turf growth. However, when native soil greens are no longer native it is time to evaluate and perhaps change your aerification agenda.

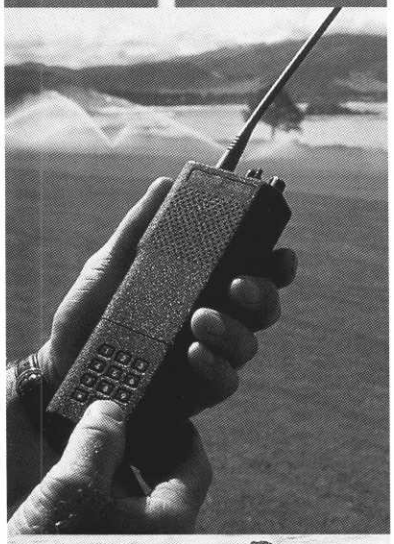
I did, and my members are very happy because of it. I've changed my aerification to a much more agronomically sound and player friendly program. It is the best of all worlds.

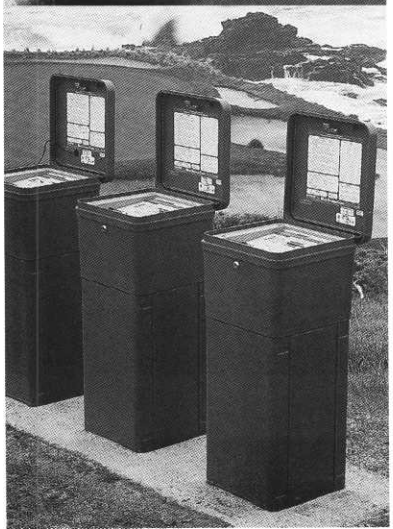
* * * *

(Editor's Note: This article by Jack Mackenzie, CGCS, was first published in the October issue of Turfnet Monthly. Jack is superintendent at North Oaks Golf Club and is a long-time member of the MGCSA.)









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