

# AERIFYING FAIRWAYS RYAN GREENSAIRE

*By Jerry Kershasky  
Golf Course Manager  
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Sounds like a new idea, but wait a minute, I can remember a guy by the name of Bob Musbach doing this very thing 10 years ago.

Why use Greensaires when quicker less expensive operating aerifiers are available? I think I should go back a step before I can answer that, and determine just why I aerify in the first place.

**Compaction:** This is sometimes termed the "hidden" stress since its effects are not readily apparent. For example, compaction of a soil in spring may not result in deterioration of the turf until later in the season. How compaction affects soil physical properties is important in understanding soil compaction as a stress.

**Bulk density** refers to the density of a soil. Compaction tends to increase bulk density, particularly if traffic occurs near field capacity moisture. When this happens we destroy the large noncapillary pores [air space] and increase the small capillary [water space] pores. Noncapillary pores are essential for proper water infiltration and percolation as well as good gas exchange. Without gas exchange oxygen levels drop and root growth stops, and even retreats. You know, this description sounds like fairways we water every night during the season and then allow maintenance equipment, golf cars, and alike to roll down them.

**Soil strength** refers to the hardness of soil. A hard compact soil offers little hope for deep root penetration, and without that wear tolerance is nil, diseases tend to be more severe, and the turf cover tends to "Check Out" in summer stress periods.

**Aeration**, as mentioned in bulk density, decreases with compaction. The important factor being, oxygen levels for root respiration decreases, while carbon dioxide and other lethal to growth gasses increase.

**Soil moisture content.** Moisture holding capacity increases due to increased capillary pore spaces. However lack of moisture holding capacity is not a problem on soils prone to compaction, but lack of aeration is.

**Infiltration and percolation.** Without noncapillary pores water infiltration and percolation are reduced. Poor infiltration makes proper irrigation programming difficult. Also, standing water in low areas and excessive run off on slopes contribute to inefficient water utilization.

**Soil temperature.** A wet, compacted soil retains more moisture than if not compacted. In order for a compacted soil to warm up in early spring, the constituents of the soil plus any retained water must be heated. Thus, compacted soils are slower to warm up in the spring. However, compacted soils may become drier in summer due to poor infiltration rates. In this situation such soils tend to heat up

more rapidly compared to noncompacted soils. Sounds to me like just the opposite of what I would like to happen.

Well, now that I have the soil with the strength of a stretch of I-94, I don't think I'm going to get much root penetration into it. So if roots don't go down they will stay up and form another problem, thatch.

Thatch basically is a tightly intermingled layer of living and dead grass stems, leaves, and roots that develop between the zone of green vegetation and the soil surface. Give grass some credit, its smarter than some people I know, instead of trying to beat its roots into soil that resembles a rock, it develops above the problem. But by taking the easy route it will accumulate excessiveness which makes it more susceptible to environmental stress, disease, and insect problems.

Actually the roots and rhizomes themselves can alleviate some compaction by fracturing the soil with their mass penetration. But with a lower percentage bulk density in the thatch than in the soil the roots and rhizomes stay above the soil, with the end result of more soil compaction.

How do we get rid of the thatch, and get the roots back in the soil?

Topdressing mixed into the thatch will help decompose the organic debris, give better moisture retention, and may be due to the abrasive action of soil particles it will grind away the thatch also. Sounds good to me, but I'm not "YET" equipped to topdress fairways, but I can aerate them and leave the cores on top and drag them in to get some topdressing material on, plus have the bonus of relieving the soil compaction below the thatch.

Now that I have convinced myself that aerifying is indeed beneficial, I can now specify the job performance I want out of an aerifier.

The aerifier I want should be able to do the following:

1. Penetrate the deepest into the soil. The deeper the machine goes, the more soil it will bring to the surface to decompose thatch, plus, compaction is reduced deeper in the soil, and water and nutrients can pass easier to greater depths in the soil allowing the roots to go after them.

2. The surface penetration of the turf must be neat, not ragged. Let us not forget the golfer, the employer, they want the surface to be playable, and back into tournament condition in the shortest period of time.

3. The holes must be close together. The further apart the holes the less compaction I'm relieving and the less soil I'm bringing to the surface to topdress. You, might say that you could accomplish the same thing with a large fairway aerifier by going over the same area several times, but that practice causes more ragged holes on the surface, the very thing we wanted to avoid in our #2 requirement. Then you might say, why don't you just aerify three or four

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# FAIRWAYS WITH MOWERS: TWO OPINIONS

By Monroe S. Miller

Golf Course Manager  
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One of the recommendations Stan Zontek made during his last USGA Green Section Visit to my golf course in July of 1984 was to aerify my fairways with Ryan Greensaires. When he made that suggestion during our conversation my jaw hit my chest and my remark was something like, "You cannot be serious!" I knew some Golf Course Managers were involved in this program, but I assumed it was merely a brief trend that would pass quickly. Stan doubted that and was firm in his conviction that our Club should seriously consider it. He spoke from the experience of many visits on golf courses that had realized excellent results.

There was (and is) no doubt we needed to do more aerifying than we had been, in spite of the use of lightweight mowers. In fact, these machines were leading to a "puffiness" that we'd never experienced with gang mowers, and it was giving me a fair amount of concern. They seemed more matted and I suspected some increase in the amount of thatch. Soil compaction relief wasn't a major consideration in deciding to go ahead with this program. The twice a year aerification with the Ryan Renovaire wasn't doing the job in firming up the fairway turf and controlling thatch.

If there was a reasonable method and appropriate implements available, I would have opted for topdressing alone, since the principal concern wasn't soil compaction. But neither exists, at least at a sensible cost. The thought of preparing hundreds and hundreds of cubic yards of topdressing wasn't a pleasant one, either. The need to biologically decompose some of the accumulated mat caused me to pause and at least give some consideration to what I envisioned as a slow, laborious and time-consuming job.



At times the Renovaire does a fairly good job of aerifying, although the number of cores and volume of soil are small.

A couple of other factors influenced me to decide to plan on the Greensaire procedure. The Renovaire we've been using for years is unpredictable in its results. Some aerifications were excellent and others were not. Results seemed dependent on a

soil moisture content that I couldn't define, predict or expect. We've gotten excellent penetration with a double set of 3/4" tines and poor results with a single set of the same tines, pulling only a 3" core. The best that could be said of the machine is that it is fast. Another consideration was the leveling effect of the volume of soil brought up by the Greensaires. Our golf course was built over sixty years ago and the grading on the fairways is less than desirable. As Roger Thomas pointed out in an article he wrote for a past issue of the GRASSROOTS, the lower heights of cut on golf course fairways are exposing some of these poorer grading jobs — unevenness that was disguised in the 3/4" to 7/8" range of the recent past. Finally, I gave serious consideration to Stan's recommendation simply because he never once gave me bad advice, and few people travel more widely and are more on top of turf management problems and practices than he is.

Once my decision was made, I proposed it to the Green Committee. They concurred. One of the Board members in particular applauded because of the improvement he'd noticed over time as a result of our aerification of the approaches or decks in front of putting greens with the Greensaires and 5/8" tines.

We started this past spring. Our intention was to do about half of the fairways with Greensaires and the remainder with either the Renovaire or the Terra 200. We purchased one new machine and one used machine to give us a total of four to work with on this project.



Four Greensaires bring up a tremendous amount of soil in a relatively short period of time.

We started aerifying our first fairway on April 15. I guess the main reaction any of us on the staff had was that it went so quickly. It was a fairway of about an acre and a half and we had it cored in about 2 hours, using the four machines. I should add that 2 of the machines were the newer Greensaire II models, and they are noticeably faster than the 2 older models. We consistently cored more than 3/4 acres per hour, which included fueling time.

One of Zontek's recommendations was to combine the coring with verticutting. The previously mentioned unevenness of our fairways precluded the use of our Aeroblade (too wide), so we used a Mataway. With the thatching reel running in reverse, it does a beautiful job of verticutting and of

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different times per year with a large fairway aerifier going over the area only once each time. Well, for one thing that makes three or four times I have to inconvenience the golfers. But even more important than that, you miss doing the complete job the first time, and the total benefit of the practice is delayed beyond prime time. Its like a doctor saying to his heart patient, you have four bad arteries going into your heart, and I'm going to fix one this month and than do the other three, one each month for the next three months. And if your lucky, you won't die before I get to those other three. I like doing the complete job all at once, it saves more grass plant lives per square foot the first time around.

4. If I want to oversee, the machine must bring the most soil to the surface for good soil seed contact, and provide the most holes per square foot for sheltered niches for maturing grass seedlings.

To my knowledge, the machine today that can accomplish the aforementioned practices is the Ryan Greensaire. Which, this past season was my choice at Westmoor for core cultivation of fairways.

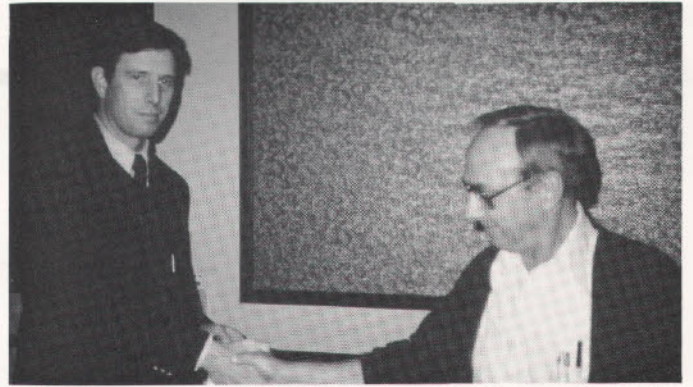
We aerified our 27 acres of fairways this past Spring with two Ryan Greensaires. We started April 29, and it took us 11 working days to complete the task. We began each day at 6:00 am and ran the aerifiers continuously until 4:30 pm. Once a fairway was aerified we broke up the cores with a harrow by going slowly up and down the fairway, and then in a circle pattern. We watered lightly that night to wash the soil down into the turf, and the next afternoon we mowed with a triplex mower with no buckets, again trying to separate the soil from the tufts of grass. Immediately after the mowing we swept the fairway with Parker lightweight sweepers pulled by Cushmans, and adjusted so they only picked up the tufts and not the soil.

The maintenance of the aerifiers was the responsibility of our Service Technician, Mr. Robert Kenngott. Bob had the aerifiers lubricated every hour while they were in operation, and at the end of each day he changed the engine oil, cleaned the precleaner on the air filter, checked the cam case oil, changed the tines, checked chain tensions, checked the machine's timing, and checked all nuts, bolts, and set screws for tightness. And every third day he changed the air cleaner.

After the fairway coring was one, Bob estimated the rebuilding of the machines to be between \$2,000 and \$2,500 each. With the major replacements being; pushrods, bushings, bearings, seals, chains, drive clutch, and master clutch.

The 1985 season at Westmoor until September, saw dry warm temperatures with little humidity, and low dew points. In other words, ideal drying out conditions. I definitely feel that the early season coring task helped us maintain ideal fairway playing conditions throughout that droughty period, besides helping to keep thatch under control.

The close proximity and depth of the holes, along with the vast amount of soil brought to the surface, and the minimum playing surface damage, have sold me on the use of Ryan Greensaires as the best tool to perform a one time annual fairway core cultivation, that delivers maximum agronomic benefits.



Neil Richter presents WGCSA President Bill Roberts a \$500 S&R donation from Hanley Implement.

## HANLEY IMPLEMENT ADDS TO WGCSA SCHOLARSHIP AND RESEARCH FUND

Neil Richter, General Manager of Hanley Implement in Sun Prairie, presented newly elected WGCSA President Bill Roberts a check for \$500 to be added to the Association's S&R Fund. It was the third consecutive year that Hanley's, Wisconsin's Ransomes distributor, has given that amount. It is presented with the understanding that the membership determines where it will be best used. Thanks to Neil, Dean Lund and Ray Woznik for their generous support of the most worthy of causes!



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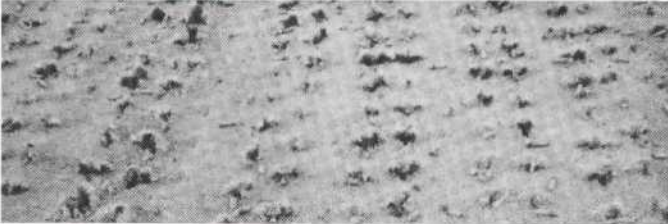
separating the soil from the thatch of the core. Also, it worked well in thinning out the grass plants to give an opportunity for some juvenile growth. But it is just too slow and took much longer than the actual aerification. We did not use Mataways this fall and instead broke the cores up using a 12' Fuerst rolling harrow. It does a good job if the cores are not allowed to dry too much and it is exponentially faster. The verticutting, although beneficial, was sacrificed.

As planned, we did about half the fairways this spring with the Greensaires and the remainder with either the Renovaire or the Terra 200. This fall we reversed the process so that all of the fairway turf was cored with a Greensaire in 1985.

We did not notice as much wear on the machines as we had expected. Part of it may be that four of them were used, but we also used those same machines to aerify greens and tees in 1985, so they did have a lot of individual hours. We changed engine oil about every ten hours and greased the machines after approximately five hours of operation. The engine oil level was checked with each fuel fill.



The finished product of the Renovaire can be quite good, or . . .



It can be terrible, as shown here. We stopped with this fairway.

An operational report of lessons learned would include the following key points:

1. Results are much better in the spring than in the fall. Rooting of the turf is better, the turf is tighter and the coring is much cleaner.

2. During the 1985 season, myself and staff were able to clearly identify those fairways which were aerified with the smaller machines. Better uniformity, less visible stress in areas normally weak due to uneven water distribution from our manual center row irrigation system, and substantially less need for handwatering. Remember, this is a comparison of fairways in the same reason — healthier turf with less water.

3. We didn't see the need for as extensive machine lubrication as has been reported elsewhere by others.

4. The procedure offers a great opportunity for corrective applications of phosphorus, potassium, sulfur, gypsum, etc.

5. It's an excellent preparation for the overseeding of bentgrass into *Poa annua*.

6. Cross-sectional cuts of the turf reveals excellent incorporation of soil into the thatch, my prin-

cipal goal in the first place.

7. I offer this as only a curious observation — we used substantially less nitrogen fertilizer in 1985 than in any other previous season. A lot of theories could be advanced to explain this, but I'll resist doing that and instead see if it continues to the upcoming seasons.

A couple of other observations are worthy of comment. We asked Bill Milward for a demonstration of the Terra 200 this spring and took a careful look at it and the job it did. Obviously, it falls somewhere between the Renovaire and the Greensaire in terms of soil brought to the surface, speed and surface disruption. I think it has a place on our golf course and hope to purchase one for use in 1986 for fall aerification.

Although soil compaction relief was not the reason I initiated this program, it most certainly is a tangible and important result of it. Anyone who knows or even pretends to know anything about golf course turf knows the value of aerification in correcting and improving problems of soil compaction and surface crusting. Use of the Greensaires does more than any other implements to improve the oxygen-carbon dioxide relationship in the soil. It increases the rate at which oxygen will move into the soil and carbon dioxide from root respiration will move out of the soil. Poorly drained and compacted soils restrict this exchange and there is a reduced ability of plants to take up water and nutrients important for healthy turf. The result is weak and thin turf that is more disease susceptible and, for *Poa annua*, more wilt prone. Evidence of the value of aerification can be dramatic as we have all seen in the form of dense root growth in aerifier holes and more vigorous top growth above them. The top growth is especially evident in the spring when the green tufts stand out from the surrounding turf. The value of aerification has been proven experimentally in the laboratory and in the field. Differences in turf quality have been quantified and correlated with aeration. And most important of all, it has been noted in the field of play.

Measuring the cost/benefit ratio of aerification has made the decision to continue using Greensaires on our fairways next year an easy one. We will continue the program with the knowledge that the result is better turf for the players. Noting that I've never seen a turf that has been over-aerified, I'm convinced that the substantial number of holes and the volume of soil removed make these machines and this process an important management improvement at our Club.



The Terra 200 is between the Renovaire and Greensaire in quality and quantity of cores.