



EFFECTS OF IRON ON ROOTING

By Jeffery Bahr

James Beard defines sod as, "plugs, blocks, squares or strips of turfgrass plus the adhering soil that is used for vegetative planting." Rooting into the underlying soil is the primary requisite for sod establishment.

Iron is active in plants through chlorophyll synthesis and is a constituent of certain enzymes in the respiration system (James B. Beard c. 1973; *Turfgrass: Science and Culture*). Thus, turfgrass color is influenced by the level of iron available to the plant. It has been noticed, however, that iron applications do not substantially increase shoot development, hence, there is more available energy for root development.

It was on the premise that foliar iron applications hasten rooting of organically grown sod in mineral soil that this experiment was based.

Dr. Wayne Kusow and I conducted the study with Kentucky bluegrass established in peat soil during the spring semester of 1988. Sod was grown and cared for in the greenhouse for nine weeks. A week before the sod was cut, two different treatments of nitrogen were applied. The treatments consisted of 1) one pound of nitrogen per thousand square feet, and 2) one half



Jeff Bahr in the Soil Science Department greenhouses where he conducted his research project.

pound of nitrogen per thousand square feet. One sod strip was not treated with extra nitrogen and served as a control.

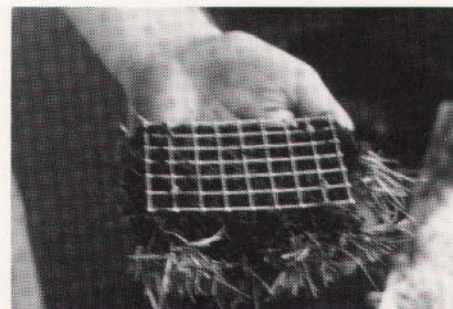
The sod was cut at a depth of one half inch below the soil surface. Each sod strip was cut into 10 three and one

half by four and one half inch pieces. The sod pieces were placed on individual three and one half by four and one half inch wire mesh screens. Four hooks were attached to the screen and extended through the soil and root systems of the sod pieces. The sod, with the wire mesh screens, was transplanted into mineral soil. The proper iron treatments were then applied. The iron treatment consisted of 0.25 ounces of iron per thousand square feet. Nitrogen, iron, and starter fertilizer applications are shown in Table 1 for each treatment.

Observations on root strength were taken the first and second weeks after transplanting. A second application of iron was applied to treatment 10 two weeks after transplanting. Three weeks after transplanting the sod root strength was tested by attaching the four hooks, coming up through the sod, to a rope which was suspended by a boom and pulley system and attached to a pail on the other end. Sand was poured at a constant rate into the pail until the sod piece was torn from the soil. The pail with the sand was weighed and recorded for each replicate.

Sod grown on organic soil was used because the degree of root acclimation is greater than that of mineral soil. One week after transplant of the sod pieces, the pieces with the one half pound per thousand square feet application of nitrogen rooted most consistently. The iron had little or no effect after one week.

By the second week all the sod pieces had established roots into the mineral soil. After the third week the iron application did have a major impact in root strength for the treatments with no extra nitrogen (treatments 1 and 4). Starter fertilizer increased the rooting rate for the treatments with no extra nitrogen (treatments 1, 4, and 7). The treatments with half pound nitrogen rooted the best of all treatments,



Wire mesh screens were placed beneath sod prior to treatments.

TABLE 1

Treatment	Nitrogen (lb./M)	Iron (0.25 oz./M)	Starter fertilizer	Root tensile strength (lb.)
1	0	-	-	9.62
2	0.5	-	-	13.06
3	1.0	-	-	9.30
4	0	+	-	11.48
5	0.5	+	-	12.05
6	1.0	+	-	10.31
7	0	+	+	12.71
8	0.5	+	+	12.40
9	1.0	+	+	11.67
10	0.5	++	+	11.41

(+ one treatment applied - no treatment applied)

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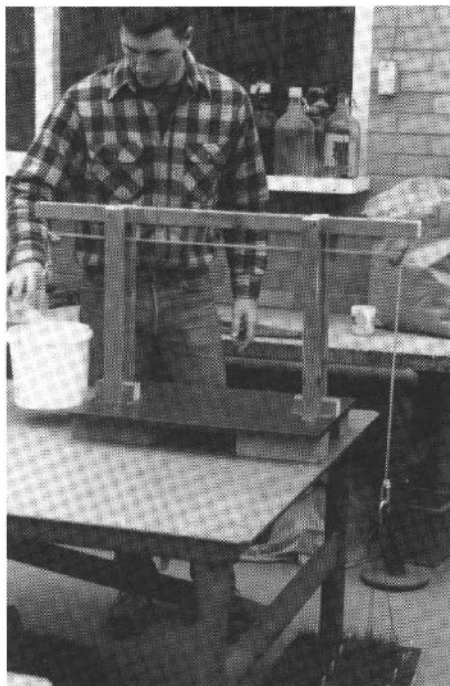
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but, the iron applications did not seem to have a major effect on the rooting. The one pound application of nitrogen seemed to induce more shoot growth; hence, there was no substantial difference between iron applications in these treatments. The sod pieces treated with a second application of iron were noticeably darker but had a lower



Is that a Jacobsen mower?



Jeff devised a unique method for measuring root strength.

rooting response than comparable treatments.

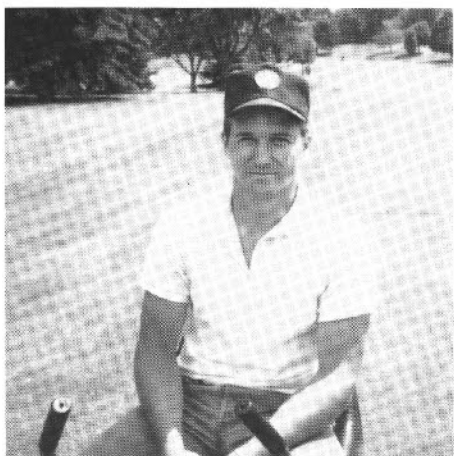
Iron application is useful in inducing strong roots for sod that is nitrogen deficient. Too much nitrogen, regardless of how much iron is applied, can be detrimental to strong root growth.

USGA Director speaks...

Continued from page 19.

Overall team best ball winners were Jeff Bottenzek and Dick Evenson. Second place went to Bryan Schmidt and Wayne Otto. Third place winners were Jerry Ebel and Bruce Worzella. Losing the tie breaker and finishing fourth were Pat Mertz and Chad Ball. Fifth place went to Jim Wunrow and Dave Murgatroyd.

This meeting was the second of three featuring USGA Green Section staff. Needless to say, it is always an honor to have the Green Section National Director take time from his busy schedule to be a part of someone else's. For the Wisconsin GCSA, it truly was a memorable meeting.



NOR-AM Scholarship winner Jeff Bahr.

BAHR TO RECEIVE NOR-AM SCHOLARSHIP

Jeff Bahr, a senior in Dr. Wayne Kussow's Turf and Grounds Management Program at the University of Wisconsin-Madison, has been chosen as the 1988-1989 recipient of the NOR-AM TURF SCHOLARSHIP. The announcement was made by John Turner, NOR-AM's representative for Wisconsin. The award will be formally presented to Jeff at the 1989 WTA Winter Turfgrass Conference and Annual Meeting next January.

John Turner has been absolutely dedicated to turfgrass education and deserves an applause for working to include Wisconsin in the generous NOR-AM program. Many fine young people have benefited from this financial aid.

Jeff Bahr is the son of WGCSA member and La Crosse Country Club Golf Course Superintendent Joe Bahr. Jeff was selected by a UW-Madison faculty committee.

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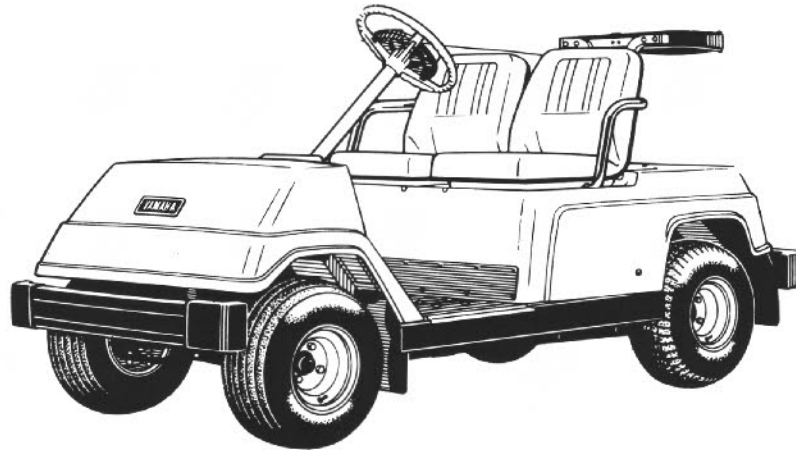
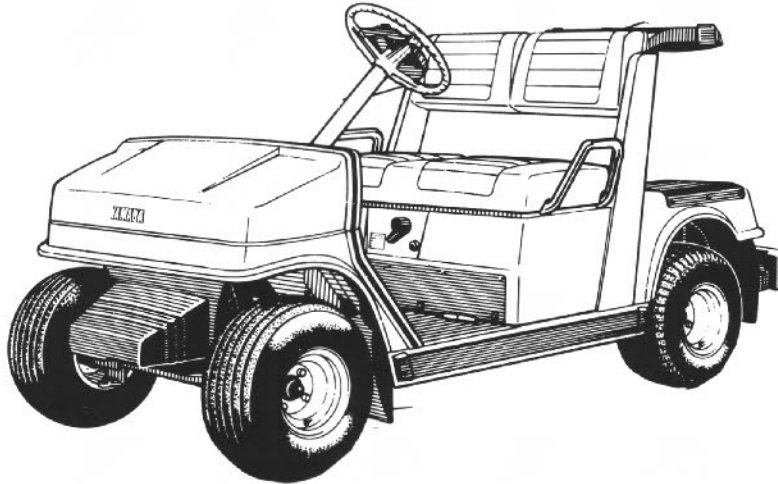
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PANDEMONIUM

By Dennis Thorp

Unfortunately, the above title refers not only to this article, but to the kind of year most of us have been having, at least to this point in time. Speaking for myself, when things settle down from utter chaos to mere pandemonium, I will be extremely grateful. Having started a new job in March, I find myself not only trying to make the normal kinds of adjustments, but also trying to do ten years of equipment maintenance in a few short months. Two mechanics have been working full time since mid-April, but every time I think I see the light at the end of the tunnel, it turns out to be an oncoming train. We had a nasty bout with leafspot in mid-May and I played telephone tag with a couple of you, trying to find a shoulder to cry on. But school is finally out and I now have a full crew, so things should start to settle down, now.

In my last column, I wrote about "TURFBYTE" and the "TURFGRASS INFORMATION FILE" and promised you more information on those services. Unfortunately my computer has been gathering a lot of dust the past two months, as I tended to more pressing requirements, and I have not had the opportunity to tie-in. But I did take a few minutes one day last week to call Duane Patton, "voice-to-voice" and talked to him about his service. I also received a 13 page newsletter from the TURFBYTE people that completely explains how to use the service. A copy has been forwarded to your faithful editor. The main use for TURFBYTE right now, according to Duane, is to encourage dialog between Superintendents. It is a good way to "talk" to Bill Roberts in Michigan, Oscar Miles at Butler National in Illinois or Jim Moore of the USGA Green Section in Waco, Texas. Sorry about the name dropping, guys, but I couldn't help myself. According to Duane, the spreadsheet templates and other files that you will be able to download are not available yet, but will be soon. Maybe I'll send him a few blank disks. The big news from Lawrence, KS is that TURFBYTE

is now available around the clock. Call 913-842-0618 from 7:00 a.m.-4:00 p.m. and 913-842-0592 after 4:00. They are trying to get GCSAA to officially back the program and maybe get it on "Compuserve". Then most of you would have a local access number of an "800" number that you could use to call TURFBYTE. For now, we will have to pay the AT&T long distance charges from our location to Duane's computer. An example given is the \$8.50 per hour off-peak rate from Louisville to Lawrence. Their main problem at the present time is in trying to get more people to try the system. For the majority of you that do not have computers or modems, this does pose a slight problem. However, make a few phone calls to your local computer store, explain that you are thinking about buying a system and ask for a demonstration. Offer to pay for the telephone call. You might get hooked on telecommunications. Be creative, guys and gals. Have a little fun with this.

I'm going to plagiarize a few paragraphs on file transfer from Dale Gadd right now as it is as clear an explanation that I ever read. "File Transfers Made Easy" or "I understand PPM per Acre Foot. Surely, I can Learn Protocols!" I didn't even know that Acre Feet could have PPM and surely there is a chemical to prevent it.

One of the bonuses of telecommunicating is the ability to transfer entire programs or files from one computer to the other. Thus, a bulletin board system (BBS) such as Turfbyte can become the central point for superintendents to share information and programs.

Copyright laws prevent the sharing of commercial software. But, there are many excellent public domain or "shareware" programs that many of you may find valuable to the operation of your computer and the way in which your computer is used in your profession.

For example, Lotus 1-2-3 is a commercial program and cannot be distrib-

uted by a BBS. However, templates, essentially a spreadsheet setup, can be distributed. This means that if you have developed a 1-2-3 spreadsheet for a particular purpose like tracking chemical usage and inventory, with computation formulas and cell labels all set up, you can legally share that template with other owners of the Lotus 1-2-3 program.

You could post that spreadsheet template on Turfbyte and another superintendent who has not yet developed a spreadsheet for chemical usage and inventory could "download" your template and use his 1-2-3 program to operate it — and, voila, he has an instant chemical inventory system. All he has to do is plug in his information and does not have to develop the spreadsheet from the beginning.

In this way all of us can share our best work to help others in their jobs. And, instead of all of us reinventing the wheel, we can take advantage of each other's ideas, add our own and the combination will be more powerful than each by itself. Synergy works with ideas as well as chemicals.

Thanks, Dale. I'm sure he is using 1-2-3 as an example and not an endorsement. One of my next purchases may be one of the new spreadsheet challengers, either from Borland or Microsoft. They have improved functions, faster operations, more features and greater ease of use. Plus, they are much cheaper.

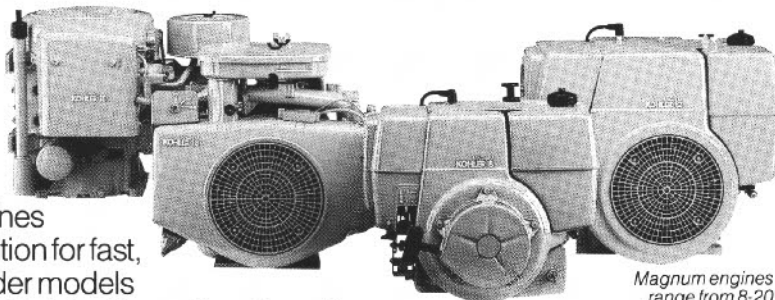
Lotus 1-2-3 is the target for programmers and even whole companies because it was the first electronic spreadsheet designed to take maximum advantage of DOS and the IBM 8088 hardware standard. VISICALC was the first popular electronic spreadsheet. It appeared ten years ago and set the microcomputer world on fire. Yet today, relatively few people even recognize the name. Lotus 1-2-3 has become what Kleenex is to tissues, Xerox is to copy machines and crayons are to waxy color markers — in most users' minds it is synonymous with personal



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computer spreadsheet. For them, no other brand exists.

Lotus 1-2-3 does more than automate complex spreadsheet calculations. It also converts numerical data into charts and graphs and contains database functions. These and other capabilities — notably the inclusion of “macros,” a kind of programming language that allows 1-2-3 users to customize the program for all kinds of specialized applications — were so helpful that they compelled many people and companies to go out and buy a personal computer, just so they could run this program.

But Lotus has faced challenges from the very beginning, mainly from so-called “clones,” inexpensive programs that mirror 1-2-3 capabilities. Clones have the virtue of being cheap — costing from \$50 to \$150 in contrast to the \$500 price tag for each copy of Lotus 1-2-3. And they’re usually not copy-protected. (Many otherwise enthusiastic users consider Lotus’ insistence on copy protection annoying and decidedly unfriendly.) Copy protection systems can cause unexpected problems with a hard disk. The market for clones is limited because business users are often wary of off-brands.

Recently several companies introduced not clones but Lotus 1-2-3 alternatives, programs that “push the inside of the envelope,” to borrow Tom Wolfe’s famous phrase. These products are attracting serious attention from product reviewers and end users. In addition, most have the capability of “reading” Lotus 1-2-3 spreadsheets, so it is not necessary to reenter all the data one may have accumulated over time.

I read an article that TGIF was ready to go on-line and interested people should call to get the specifics. When I did, a sweet voiced lady named Tricia informed me that August 1 was now their target date and the fee schedule would go into effect then. I had her run a search on a topic that interested me anyway, while it is still free. And, since my next deadline is August 1, I should have the tie-in details for those who are interested by then. Besides, I want to talk to Tricia again.

Now I’m going to ask for some help from the readers of *The Grass Roots*. In order to take the subjects of my articles in the direction most needed by the readers, I need some feedback. Since it is physically impossible for me to work one-on-one with all of you, I’ll

try to answer the most asked questions here, although I’m sure I will be working individually with as many as I can this fall and winter. Write to me at Rt. 2, Box 559E, West Salem, WI 54699.

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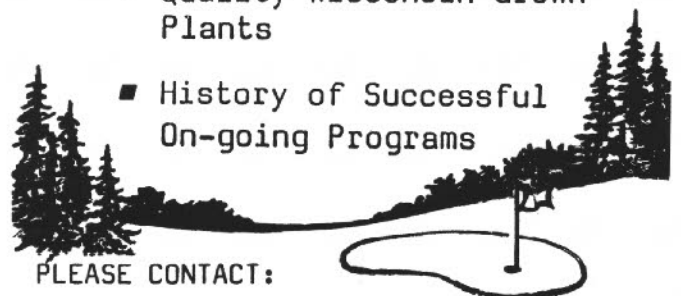
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STAN ZONTEK "COMES HOME" FOR A VISIT!

By Mark Kienert

ONLY two days after a heavy wet blanket of snow covered much of Northern and Central Wisconsin, the last of the WGCSA headed South to the warmer climates of Janesville to play Supt. Bruce Schwiegers "third nine" on a very windy, sunswept day.

Those rumored not wanting to attend this meeting because, "it's only a nine hole track" missed out on some of the most unique greens in the state. Built using the construction techniques found in an earlier day, that featured terrain changes that an alpine skier would fondly call moguls. Bruce had the course in fine shape for our group, as always, and promised to have us back sometime after the turn of the century or just after the "other Blackhawk" hosts a meeting.

Scramble event winners on this windy day were: First place was the team consisting of A. Jeff Bottenzek (continuing the winning easy of a recently departed turncoat, "What was his name Roberts"), Dick "The automatic Pilot" Evenson. (Did you ever notice the glasses he wears? I can't prove it, but I swear all the data needed to one putt greens is projected up onto those lenses just like the flight data used by some hot F-16 flight jockey.) Listen for the sound of computer chatter the next time you're near Evenson, or was that the sound of "Heavy Metal" in his pockets as he collects another bet? I need TEN Shots a side, Dick! The local knowledge was provided by Brad Wagner, a not so likely fourteen handicapper, and Mr. Jon Gallus. Second place winners were Wayne Otto, Myron Seavers, Bob Belfield and local Pro Ken Johnson. Third place winner were the Portage Pro Ray Shane, Bob Stock, Joe Deschler and recently retired Bob Welch.

Our friend for life, Mr. Stan Zontek of the United States Golf Association's Green Section, gave his usual, excellent overview of problems found around the country and in our backyards. For those who were there, it will be very difficult to forget the memory of Stan, serving as auctioneer, raising monies for the O.J. Noer Center in Houston.

Zontek spent six years serving as the USGA Agronomist for Wisconsin (and



Former Great Lakes Region Agronomist Stan Zontek.

the rest of the Great Lakes Region). The thrust of his remarks focused on the differences between golf turf management in Wisconsin and in the mid-Atlantic region transition zone he now serves. In the final analysis, stress related problems impact most significantly in both areas. Ours are frequently winter related problems—desiccation, crown hydration, low temperature kill and snow mold. In the mid-Atlantic states, the most serious troubles come

in the summer months—they normally experience between 30 and 35 days with a high temperature over 100° F. Spring dead spot is a problem in that region, and even though their winters are mild, they can lose bermudagrass in the winter. The South suffers from pythium, dollar spot, brown patch, anthracnose, summer patch and soil born pythium. They also have to deal with serious insect problems and have difficulty controlling crabgrass and goosegrass.

Stan flew into Milwaukee over the preceding weekend and spent that time with his close friends Wayne Otto and Dan Quast.

Thanks, Stan. Many thanks to Bruce and his staff for drawing foursomes and arranging prizes. It's a great golf course, one of the secrets of golf that can be found "Only in Wisconsin".

Thanks to Mike Semler and his Education Committee for inviting Stan for a visit home. And special appreciation to Stan for taking time from his busy schedule to travel to the Midwest. It was all our pleasure!

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LETTERS

A PERSONAL VIEWPOINT

May 9, 1988

Mr. Monroe Miller
Editor and Publisher
The Grass Roots
c/o Blackhawk Country Club
3606 Blackhawk Drive
Madison, WI 53705

Dear Monroe,

After reading your editorial "Shamelessly Unprofessional" I can understand smoke coming out of your ears, your face turning red and your heart rate quickening. We would have felt the same way, had such a letter been directed to the Club or General Manager. I for one, denounce CM Magazine and Mr. Baetz for the letter which was mailed out. Monroe, I can assure you without a doubt, that neither the Board of Directors of CMAA or its membership would ever condone or approve such a letter to the GCSAA and/or Exhibitors.

Being Chairman of the Research and Publication Committee for CMAA which deals with CM Magazine, I can tell you that we (CMAA) have no direct input for the magazine, since, according to our current contract with them, they have complete control over advertising and editorial content.

As you indicated in your article, you really believed that there was a renewed sense of cooperation among the GSCAA, PGA and CMAA. We share your feelings. To continue the growth and the future building of the private club industry as well as those in the public sector, we, the members of CMAA, along with the members of the GSCAA and PGA need to work together as a TEAM, a team of professional men and women whose sole purpose is to provide for the needs and pleasure of its members, with beautifully groomed golf courses, social activities, fine dining and the continued enjoyment for the great game of golf.

With this in mind, I sincerely hope that this relationship between us will continue to grow and strengthen now and in the years to come, and that no individual and/or publishing company can rip us apart.

Sincerely,

Bernd U. Sturm, CCM, Chairman
Research and Publication Committee, CMAA

APOLOGIES ACCEPTED

June 7, 1988

Mr. John Sequi, CGCS
Waynesboro Country Club
11000 Country Club Road
Waynesboro, PA 17268

Dear John:

Several weeks ago, David Boetz, Sales Manager for *Club Management* magazine, sent a communication to the exhibitors of the 1988 GCSAA Houston Conference that was misinterpreted by some GCSAA members. Mr. Baetz was attempting to encourage those vendors and purveyors to advertise their products and services in *Club Management*. It was his intention to widen the vendors' service and product awareness to a greater audience. Subscription to the magazine includes all CMAA members, as well as the boards of many private clubs.

Club Management is published by the Commerce Publishing Company, headquartered in St. Louis, Missouri. CMAA works closely with the Commerce Publishing Company by providing articles, pictures, and suggestions to represent a viable magazine, however the CMAA does not control their policies or their personnel.

The CMAA officers and board members have high regard and respect for the Golf Course Superintendents Association of America and its members. Your tremendous contribution to the game of golf, providing clubs with excellent golf courses, and the expertise your Golf Course Superintendents members bring to the management staff is the catalyst that enables clubs to enjoy great success.

We are truly sorry GCSAA members were offended by Mr. Baetz's communication, and on behalf of CMAA, I reiterate to you our pledge of friendship and cooperation to work with the officers, staff and members of GCSAA to provide the members of our respective clubs the very best management team possible.

Sincerely yours,

G. Mead Grady, CCM
President

Editor's Note: Is this an apology? If it is, we accept.