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A Patch of Green

Official Publication of the
Michigan & Border Cities Golf Course Superintendents Association

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"A Patch of Green"

31823 Utica Road, Fraser, Michigan 48026
(313) 293-3540

Published monthly by the Michigan and Border
Cities Golf Course Superintendents
Association

Circulation: 500

E. Blakeman, Blakeman Publications
Editor

R. Briddick, Blakeman Publications
Graphic Arts

ADVERTISING RATES

Double Page Spread.....	\$100.00
Back Outside Page.....	65.00
Full Page.....	55.00
Half Page.....	35.00
Quarter Page.....	25.00
Eighth Page.....	12.50
Sixteenth Page.....	7.50
Classified Ad (per inch).....	5.00

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THE PRESIDENT'S MESSAGE

Personally, I don't know how you have been handling your individual situations this spring, but here's how we do it at Plum.



The Crew arrives at 6:00 a.m. sharp, coffee in hand and brown bags under their arms. We have been taking the first few minutes and setting them aside for a little prayer for warmer weather. Our knees are getting a little raw from the concrete floor, but the fairways wouldn't improve that. They all have their silly hats, jackets and extra trousers on, but by noon they can eliminate the thermal underwear.

Originally, our dry conditions were bothering some of the members, but now that everyone hits it out of sight on our fairways, we've decided to paint it green and go fishin'.

When you've all been on the bottom rung of the ladder all year, where else can you go but up? If things don't improve around your track give me a call and we'll all go ice fishing together.

Next year it will be different because I'm putting a cover over the place. It's going to be plastic - not glass, because I don't want any accidents if we have some stone throwers passing by.

Ward Swanson, President

MEET THE BOARD

Donald A. Ross, President Emeritus.



Don began working in golf at the Country Club of Lansing in 1944. He is a graduate of MSU with a B.S. in Soil Sciences. After spending two years in the army at the Officers Club at Fort Campbell, Kentucky he became Superintendent at the Country Club of Lansing.

Don left the C.C. of Lansing after 13 years to become Superintendent of The Country Club of Detroit, where he remained for two years. He is presently Superintendent at Highland Meadows Golf Club, Sylvania, Ohio. Don has held all offices in the Western Michigan Superintendents Association and all offices in the MBCGCSA. He is a charter member of the Michigan Turf-grass Foundation.

Other activities include church offices of Executive Committee of Michigan District of American Lutheran Church. He is now Recording Finan-

cial Secretary of St. Stephan Lutheran Church of Sylvania, Ohio.

Don resides with his wife Bernie in Sylvania. Our June 10 meeting will be at Highland Meadows.

NEW MEMBERS

The MBCGCSA has added twelve members to its roles since the first of the year. We wish to introduce and welcome them to the MBCGCSA, the new members are:

Mr. James Gabriel II
Mr. Edward Henderson
Mr. Arthur Hills
Mr. Richard Edger
Mr. John Sieggreen Jr.
Mr. Herbert Cole
Mr. William Mlujeak
Mr. Don Beam
Mr. Charles Kingsley Jr.
Mr. Tony Malnar
Mr. Thomas Brooks
Mr. Harold Fiebelkorn

Albert Kaltz, Membership Chairman

ARE YOU PLANNING A NEW IRRIGATION SYSTEM?

By Ted Woehrle

The following notes and comments are the result of actual experience obtained during the installation and design of four golf course irrigation systems.

Point O'Woods C. C.	1967
Beverly C. C.	1961
Oakland Hills C. C.	1969
Oakland Hills C. C.	1971

These notes may prove helpful to you in the future. File them in your IRRIGATION file.

Last September, I was the guest of A. J. Miller at his Holly, Michigan maintenance shop, where I was introduced to some of the most modern and best designed irrigation equipment available to the Superintendent today. The A. J. Miller, Inc. organization is one of the foremost installers and designers in the Midwest. They have had many years of experience in golf course irrigation work including - materials, pumps, controls, water sources and water usage.

While visiting with Austin, we talked about some of the following points. Incidentally, Austin Miller is the newly elected Vice President of the Sprinkler Irrigation Association.

1. The importance of clean water was discussed as perhaps being one of the most important items to consider, especially in Automatic systems. This means clean from solids as well as chemicals. There are a few water purifiers on the market for cleaning chemically dirty water.

2. Capacity of water. How much water is needed? There should be enough water available to water the entire course in 12 hours. The normal amount of water needed in the Midwest is about one acre inch per week. (27,560 gallons are needed to cover an acre one inch deep) Multiply this times forty acres which is about the average acreage of fairways and this amounts to 1,102,400 gallons needed for the

fairways in one week. We average about four and one half acres for tees and greens, so we need an additional 124,020 gallons. There are about two additional acres of lawns, flower beds and odd areas, so we have another 55,120 gallons per week. Add these three figures and we find out that we need 1,281,540 gallons per week maximum during a dry period.

Now, if we water 12 hours per day for seven days this means that we water 84 hours per week, so we need 15,256 gallons per hour or 260 gallons per minute. It is obvious that 260 gallons per minute is not adequate unless we are going to water each valve every third night. This was the theory in the old days. This might have been the reason why there was less *Poa annua* years ago, when it had to survive or die and it usually died before the third day.

It seems to me that the ideal amount of water would be between 600 and 1000 gallons per minute. This would give you about one third of an inch of precipitation every second night. Some soils will not take one third of an inch in 45 minutes so we would apply it in lighter amounts and more frequently. All clubs must determine the amount best suited for their own use.

3. Center sod cups vs. perimeter sprinklers, hoses and sprinklers vs. hand watering. If sufficient water and pressure is available and you have the proper nozzle sizes the center sod cup and sprinkler become the most efficient method of applying water on greens. Of course the surrounding traps must be well drained, but this holds true for the perimeter sprinklers too. The hoses and sprinklers are good for windy conditions but how often is wind a problem? If watering is done at dusk or after dark wind is seldom a problem. Hand watering is the most ineffective

Continued on next page

method of watering. Collars usually suffer and the banks and approaches rarely last the summer.

4. Automatic vs. manual. Automation is far more efficient in water usage. You can save water because you can put it where you want it for the length of time you want it and as often as you need it by recycling the program.

5. A two row system vs. a single row system. Cost of installation for a two row system often can be justified if you use single speed heads. If you use a two speed head it is doubtful if you can justify the additional cost of a two row system over a single row fairway system. The width of the fairway will enter into the selection also.

6. How many controls (Not Controllers) do you need in an Automatic system?

a. You should have individual control for all heads - timing from 0 - 60 minutes each.

b. Scheduling - separate controls for: tees, greens, alternate fairway valves, approaches and tee ends of fairways.

c. Syringe cycle for dew removal, frost removal and wilt control.

d. Recycle. If soil penetration is too slow you may wish to water the same area two or more times lightly in one night.

e. ON and OFF switch for pumps. These switches should be located in more than one location.

f. RAIN-OMIT SWITCH. A rain gauge can be placed out on the course so when a predetermined amount of rain has fallen the system shuts down by itself. Also an automatic dumping

device so the rain gauge is emptied every day, ready for another rain. You may forget to empty the gauge yourself and the system would not come back on.

7. Pumping plant should be automated to start and stop water demand. If someone has to be present to start and stop the pumps then you don't really have an automatic system.

8. Constant pressure is a must. A properly designed system will have the same pressures or near equal pressures throughout the course. A pressure regulating valve on the outgoing line is essential. These valves also help to control the water hammer.

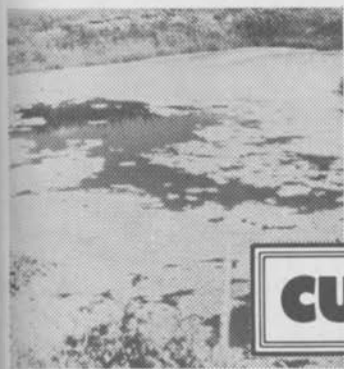
9. Insist on a superior installation. Keeping the pipes clean is a must. All heads should be level. Heads left too high will be hit by mowers and those too low will not throw water properly.

10. Always consider design first. Pick equipment second. The cost is negligible between brands, so pick out the one you want. By all means stick to standard brands, especially the controllers.

11. Insist on a two or three year guarantee on installation (pipe and controls). Spell out what is guaranteed (workmanship) and what is service. The contractor or installer should be responsible for the drainage of the system the first winter.

12. Electric vs. hydraulic. At present, the hydraulic valve is superior to the electric but the entire hydraulic system of tubes may be inferior to the

Continued on next page



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Irrigation System Cont.

electric. If electric is used make certain the system is capable of running the entire system at one time.

13. Non overloading characteristics in pumps is a must.

14. A manual over-ride for electric failures. One good point about hydraulic systems. Manual shutoff for tees and greens. Maybe even for individual shutoff for each head. Manifold system for tees and greens a must.

15. Manual drains for winter drainage a must whether blown out or not.

16. Location of field controllers. You should be able to see the area controlled from the site of the controller. There are limits of course.

17. What about central controllers? Regardless of whether or not you have a central programmer one should still visit the field before selecting his program for the night.

18. Quick coupling valves at all greens and tees, for emergency watering. An occasional quick coupler in the fairway for watering new trees or newly laid sod. Quick couplers at every station are not necessary. If they are needed to syringe fairways then the system is poorly designed or perhaps a bad selection of equipment was made.

19. Lightning protection for system. This is a must. Lightning can destroy an entire system with one bolt if appropriate protection isn't included.

20. Pump operation light. A signal light should be placed on the outside of your pump house and turned on when

your pump is in operation. A visual signal to tell you from a distance that everything is okay.

CONCLUSION: We all need water to supplement nature. If you are planning a new system consult an irrigation engineer. Tell him what you want and what your limits are. Pick a system to fill the requirements of the design. Present it to the Club and let them decide what they want and what they can afford.

POINTS TO REMEMBER:

1. Automatic start and stop of pumps determined by water demand. This is a good feature for manual as well as automatic systems.
2. Individual controls for all heads if automatic.
3. Equipment is equal in cost so select the one you want.
4. Adequate supply of water is necessary.
5. Manual over-ride on automatic systems for greens and tees.
6. Manual drains on main lines.
7. Insist on superior installation.
8. Supply clean water if possible.
9. Make certain that the system gives you what you want.

If you are presently using an old system make certain that you are using it properly. Check the nozzle sizes. Too many heads in use on one line may destroy the precipitation pattern. Improper nozzle size may not breakup water and an erratic pattern may result.

A good water management program can make or break you. One of the hardest decisions for a golf course Superintendent to make is when to water - what to water and how much to water.

After your decision is made to install a new irrigation system it would be wise to obtain a small booklet entitled, "Minimum Installation Specifications for Turf Irrigation Systems." This helpful checklist can be obtained from the Sprinkler Irrigation Association, 1318 Second St., Santa Monica, California.

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Poa Annua Programs

POA ANNUA WILL BE CONTROLLED!!!

By Tom Cronin, Rhodia Inc., Chipman Division

Going into the 70's one has several choices being offered for the control of Poa Annua. Basically we can break these down into four programs.

Scorched Earth Method

Complete burning off, or stripping sod and thatch. This has proven successful on some courses but it is a drastic program.

Advantages. Can accomplish change over from poa to bluegrass or bentgrass in one year. Can then go on a prevention program to keep poa out.

Disadvantages. Takes course out of play for long period of time. This, like all programs, requires good cultural practices, such as good drainage, de-thatching. Aeration and correcting soil acidity.

Pre-Emergence

(Balan - Dacthal - Betasan - Pre-San)

This method while still very new, is completely dependent on the quirks of nature. Timing is very important, but weather conditions are the key factor. If you apply these chemicals at just the right time and nature knocks out the poa, then you can prevent it from coming back by killing the new emerging seedlings, as they germinate. The big drawback of this program is that poa usually dies all at once instead of gradually - leaving unsightly bare areas. The desirable grasses do not recover because of the chemical destroying the desirable seeds.

Advantages. Economical - Use any fertilizer - No residue.

Disadvantages. Affect desirable seeds, Can't reseed for 2 to 6 months. Soil can't be disturbed after application. Possible danger to bentgrasses. Will not control poa that does not die out. *Must be repeatedly applied at critical times and rates.*

Growth Retardant (Po-San)

Inhibits poa seed head production and retards foliar growth. Encourages upright growth and reduce matting. Inhibits 80-100% seed formation. Places poa under chemical stress.

Advantages. No soil residues - Use any fertilizer - Re-seed immediately.

Disadvantages. Mixing two chemicals - agitate while applying - Timing must apply *before* seed heads develop. Do not use on greens. Use only in well established turf.

Put under high stress-heat-drought-disease may stress weakened turf more. Temporary chlorosis will occur. Knocks out seed but not mature plants so you may never rid area of poa completely. Results are variable.

Soil Control Program (Chip-Cal)

Start with one fairway, green or the whole course. Follow the 6 point program that has worked on over 3,000 courses. The only program that takes out poa without depending on nature.

Advantages. Works slowly so there is no lost playing time. Can reseed and build up desirable turf. Once control is reached, cost of program drops to very economical level. Also controls crabgrass, chickweed and soil insects.

Disadvantages. Restricted fertilizer program.

The Plant

With any program you choose there are certain ground rules that must be followed. We in the northern area of the United States know that Poa Annua is very unpredictable. In some areas it dies out every year. In other areas it lives for two or more years, so it acts like a perennial weed. Which ever program you choose will only get results if you follow the correct principles.

Continued on next page

JOINT MEETING AND SOD FIELD DAY

American Sod Producers Association Meeting and Michigan State University Sod Production Field Day to be held Jointly.

"June 29, 1971, is the date for this unique Sod Production Research Field Day" according to Dr. James Beard, coordinator of the sod production research and educational program at MSU. The event will be held from 1:00 to 5:00 p.m. at the MSU Muck Experi-

mental Farm located 7 miles northeast of East Lansing. The Sod Research Field Day tour will consist of 14 individual stops where sod growers can view the results of 18 major investigations being conducted on most cultural phases of sod production. Topics covered on the tour include:

Stop 1: Nitrogen Fertilization of Bluegrass/Red Fescue Sod Mixtures.

Stop 2: *Fusarium* Blight Control in Kentucky Bluegrass Sod with Systemic Fungicides.

Stop 3: Organic Soil Subsidence and Soil Removal in Sod Production.

Stop 4: Fertilizing for Sod Strength and Rerooting.

Stop 5: Factors Influencing Sod Heating. Stop 6: Potential Uses for Pelletized Clippings.

Stop 7: Annual Bluegrass Control Studies with Endothall.

Stop 8: Weed Control Studies in New Kentucky Bluegrass Seedings.

Stop 9: A Survey of Nematode Problems in Sod Production.

Stop 10: Seeding Rate and Dates Studies for Sod Production.

Stop 11: Comparative Sod Strength and Transplant Rooting Capabilities of 30 Bluegrass Varieties.

Stop 12: Bluegrass Blends and Bluegrass/Red Fescue Mixtures for Sod Production.

Stop 13: Effects of Cutting Heights and Frequency on Sod Strength and Transplant Rooting Capabilities.

Stop 14: Sod Quality as Affected by Varying Percentages of Canada Bluegrass in the Seed Source.

The data discussed for many of the studies will include actual measurements of sod strength and the transplant rooting capability which were developed at MSU.

Individuals wishing additional information concerning housing, etc. can write Robert Shearman or James Bogart, Department of Crop and Soil Sciences, Michigan State University, East Lansing, Michigan 48823.

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Poa Annuua Cont.

The Action - It's Up To You

1. Explain program to all interested parties, greens chairman, committee and membership. Tell them what to expect and how long it will take.
2. Correct any soil deficiency, lime if acid, etc.
3. Aerate, de-thatch or spike the ground.
4. Drain low area - on fairways, trench or vertical slit.
5. Overseed often - as the poa goes out you want to fill in with Bluegrass or Bentgrass.

Now's the time to do something - Poa may go at anytime and cause undue hardships on some really fine people.

MICROPORE RELEASE FERTILIZER PACKETS

Improved plant survival, increased shoot growth, and lower replacement costs are among the important advantages of recently introduced micropore release fertilizer packets developed by Professor O. J. Attoe, Soils Department, University of Wisconsin. In test results from Michigan State University, use of these packets approximately doubled shoot growth as compared with unfertilized plants. This increased growth was achieved with rates of plant survival significantly superior to those of other slow release fertilizer methods.

The fertilizer packet is a heat sealed polyethylene-paper laminated envelope containing specified quantities of water soluble (16-8-16) fertilizer. The sides of the packet are pierced with a predetermined number of "pin holes" of precisely measured diameter. Upon planting, the packet is placed unopened next to the roots of the plant. Vapor in the soil enters the micropore openings and slowly dissolves the fertilizer which escapes through the fame holes in liquid form and is taken up by the plant roots. The combined effect of slow release and the relatively minimal amounts of fertilizer delivered to the plant at any one time assures that fertilizer burn of root tendrils will not occur.

Forsetry Professor, D. P. White, Michigan State University, states: "The nonburning properties of perforated plastic sacks of soluble fertilizer in direct contact with tree roots commends them as a useful technique for providing a slow and safe release of added nutrients for tree growth . . . Of all the techniques tested, perforated plastic sacks of soluble fertilizer seem to offer the safest approach to providing additional soil nutrients for newly planted trees."

In practice, the activity of the packets is largely controlled by the seasons. With the arrival of colder

weather, the reduction of vapor pressure in the packet temporarily halt release of plant nutrients. Thus, fertilizer is not delivered to the plant roots during the dormant period. When the soil thaws in spring, however, vapor pressure is resumed, and the packet again releases the fertilizer to the roots in line with the plant's growth needs. Because of these unique features, the perforated packets operate through a timing mechanism which is triggered by vapor pressure in warm soil and halted when the soil is cold.

Plant and soil tests under the environmental conditions encountered in Wisconsin indicate that the life of the two-ounce packet is slightly longer than five years. Where the growing season is longer - that is, in warmer climates - it is estimated that the projected life of the packet may be somewhat less, in some cases perhaps as little as three years.

The packets are recommended for roses, potted plants, deciduous bushes, evergreens, shade and fruit trees. They may be used in new plantings or inserted into the soil at the root system of established plants. It is recommended that three to five packets (depending on size of the tree) be buried in the soil around the drip line.

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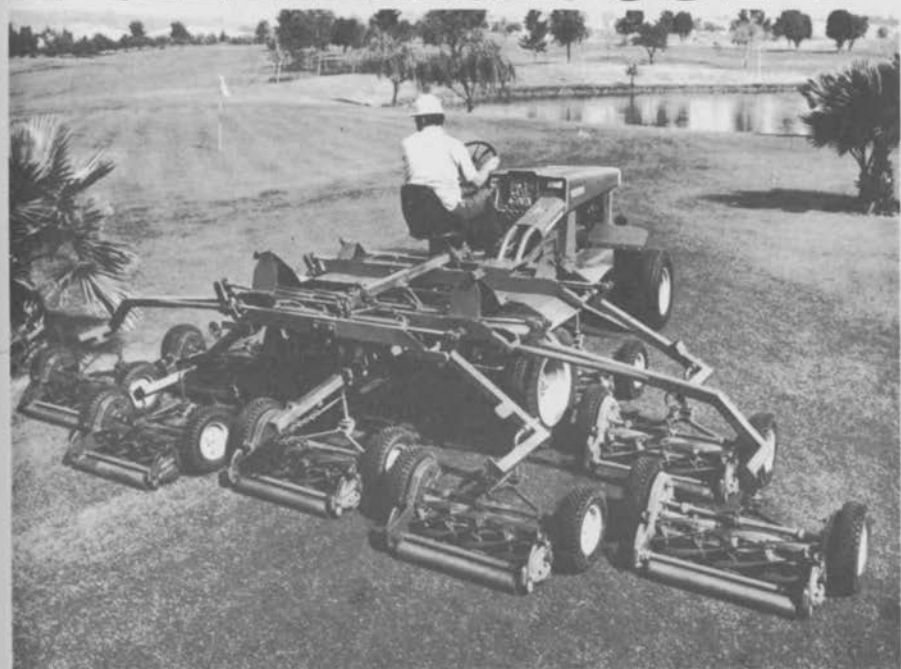
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Clarence Wolfrom presented the following presentation at the 1953 Turf Conference at Purdue University. Mr. Wolfrom was Superintendent of Maple Lane Golf Club at the time.

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4. What you don't say often helps more than what you do say.
5. Always use the cooling off period.
6. Get all the facts before saying anything.
7. Study each man individually.
8. Be interested in his and his family's health.
9. Always be a good listener.
10. A good word for a job well done.
11. In solving a problem always ask, "What does he think is the best way."
12. Keep him interested. Tell him why this has to be done and why you do it this way.
13. If he has a better way, try it out. Do not be too set on your ways.
14. Have periodic golf matches with neighboring course men.
15. Dinner in the club once a year paid for by the Superintendent if necessary.

Release Fertilizer Cont.

Experience among landscapers has indicated that the cost of the packets and the labor involved in using them in new plantings is insignificant and far less than the expense of replacing plants that otherwise might be injured or killed by root burn. Customers are likewise pleased to learn that they need not add fertilizer to the soil for three to five years.

A U.S. patent for the micropore fertilizer release has been assigned by the inventor to the Wisconsin Alumni Research Foundation. A license to manufacture and distribute the product has been granted to S & D Products, Prairie du Chien, Wisconsin. It is now being supplied commercially under the trade names Eeesy Grow and Root Contact Paket.

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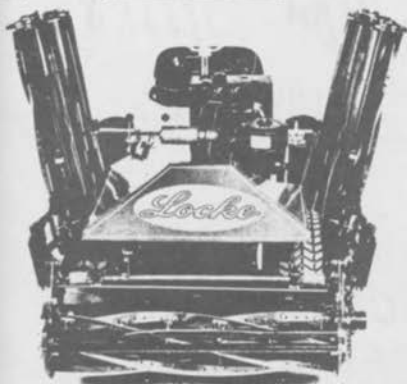
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PROBLEMS

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USGA FIELD REPORT

By Lee Record, Midwest Field Agronomist, USGA

Concern over turf conditions this spring in the greater Detroit area by course superintendents have been greatly appreciated by their club members. This was my observation during the week of May 10th while visiting member clubs of the United States Golf Association.

During a normal spring, with adequate rainfall, one always experiences the rich green that is associated with turf. This year it has been different, not only in Detroit, but the entire mid-continent region. Rainfall is several inches below normal regardless where one goes. Cool days and colder nights has been the rule rather than the exception.

What effect has this climatic condition had on golf courses? It has helped more than one can realize. Root zones on greens, tees and in fairways are exceptionally deep. Can you remember the last time roots were six, eight or more inches in depth going into the summer? With a wet spring, this seldom happens. This year it has become a reality.

Dessication has not been severe, nor has snow mold. Yes, wind swept mounds and collars have not come along as quickly as one would like, but then, nature has not played her part. Soil and air temperature have not been adequate during the past several weeks to encourage these weak areas to heal.

Thorough aeration during the month of June may make the difference in holding turf during the summer. The soil is beginning to firm quite quickly this year. With aeration at this time, water management practices will make the difference, by not adding to compacted conditions, but by strengthening and encouraging a deeper rooted plant to exist much longer into the summer.

How has the club member reacted to

this off color, slow growth condition which now exists? He has taken it in great stride. Frequently this week I have heard, "The course is just great, best roll I've had in a long time." "The earliest we've ever had carts on the golf course." "So, what's a little color, I'm not concerned, the greens are great . . ." "The best spring we've ever had." With comments like this, the battle is half won. Don't let the remaining half slip through your hands.

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FAIRWAY RENOVATION

By Howard Neilson in Collaboration With Clem Wolfrom

Renovation of the first fairway of the South Course was completed last August. This fairway was selected as a test site for seeding with the new Fylking Bluegrass as it conformed to all the parameters of the diseased fairway condition which we are trying to correct (i.e.) - it had excessive thatch, it was heavily infested with *Poa Annua*, and finally it was typical in typography to most of the other fairways where drainage conditions are minimal.

In converting this one fairway our green staff has acquired a wealth of experience which has proven to be invaluable to us in establishing accurate cost information and providing more efficient procedural techniques when and if we proceed with converting nine additional holes this year. In the belief that those of our more technically oriented members may be interested in the details of this fairway renovation, I respectively describe the procedures employed.

Our first task was to strip the old turf and underlying thatch from the

fairway. This operation was started last August 17. For sod removal we utilized a Ryan Sod Harvester (Model H-24-1). Green Superintendent Clem Wolfrom designed a conveyor which was attached to the rear section of the harvester. This conveyor transported the sod after cutting directly into a truck following behind the harvester, and thus eliminated all handling.

Actual sod removal from the 2.2 acres took about 2½ days, or 22 man hours. It was in the sod removal phase of this project that we garnered the most valuable experience. Numerous machine breakdowns, traceable primarily to the equipment not being designed for this specific type of operation, caused some bothersome delays. On-the-spot equipment changes combined with modifications in our techniques mow make us confident that the time employed for fairway stripping can be reduced by half.

Following the sod stripping, the the fairway was raked with a York Rake to pick up all small pieces of turf remaining. This was then followed by sweeping the entire fairway with a Jacobsen Sweeper (Model 720E) to pick up all remaining debris, grass plants, etc.

On August 20th, we superficially graded the fairway to improve surface drainage and fill in small potholes, again using a York Rake.

The fairway was then thoroughly spiked in two directions, using a Three-Gang Maple Lane Spiker. This procedure assures a fairly uniform deposition of both fertilizer and seed throughout the fairway system. It also minimizes the possibility of seed and/

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or fertilizer migrating to low spots in the fairway in the event of a severe rainfall immediately following the application of seed and fertilizer. Finally, it prevents soil erosion due to this excessive loosening of the soil.

A relatively heavy phosphate fertilizer (10-40-5) was then applied to catalyze seed germination. The fairway was then spiked once more to assure more uniform distribution of this fertilizer.

On August 21st the fairway was seeded with 100% Fylking Bluegrass seed at the rate of 100 lbs. per acre. After seeding, we spiked the fairway again and, for the final operation, the fairway was rolled.

Eight days after seeding our first seedlings of the new Fylking Bluegrass appeared with apparently uniform germination in each spike hole, confirming the wisdom of saturated spiking of the fairway.

On September 17th, four weeks following seeding, the fairway was mowed for the first time, the mowers

being set to a grass height of 1½ inches. On September 22nd we applied the first heavy nitrogen fertilizer (Milorganite) at a rate of 600 lbs. per acre.

The fairway was mowed for the second time on October 7th and the mowers were lowered to a grass height of one inch.

It is worth noting that, in the opinion of Clem Wolfrom, the fairway was playable on October 7th, just 47 days, or short of 7 weeks, following initiation of the project. We did not authorize play at this time, as concurrent with this fairway renovation we had also rebuilt the first green and obviously did not want traffic on the new green until spring.

Successive nitrogen fertilizer applications were made on October 8th and October 16th, and on these occasions the fertilizer was applied at the rate of 100 lbs. per acre.

This spring the new fairway will be open for play at the same time the rest

Continued on next page

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Fairway Cont.

of the course is open, unless, in our opinion, we feel that the new green needs a little more maturing.

On our first mowing of this new fairway this spring, our mower will be lowered to a grass height of 5/8 of an inch, which is the optimum height for this new grass, both from the standpoint of play and growth.

An interesting sidelight worth mentioning in connection with this project is the fact that last October 26th we made our first application of Chipcal to the new fairway at the rate of 8 lbs. per 1,000 square foot. With our current turf having a predominant amount of Poa Annua present, we would expect a 10% to 20% germination of Poa Annua invading this new fairway at the outset. Chipcal is a chemical which will be applied to this fairway in low dosages over a three to five year period to assist in the eradication and minimize the re-invasion of the Poa Annua. In other words, we propose to gradually

build up the toxicity of the fairway soil to inhibit Poa Annua growth.

Application of the Chipcal must be a gradual process over a period of three to five years, as too heavy a dosage over too short a period could harm the tender new grass which we are trying to develop.

Originally, we had not intended to commence our Chipcal treatment until early this spring. However, the very successful Fylking germination and growth last fall, assisted no doubt by an almost perfect growing season, allowed us to proceed with this program considerably ahead of schedule.

Our experience of last fall has also given us comprehensive and accurate cost figures for an undertaking of this magnitude. I am happy to report that when and if we proceed with fairway renovation on the remaining 35 holes of our two courses that our actual cost will be considerably lower than originally estimated. We have no doubt that the savings that this new grass will make possible in water, chemicals, and maintenance should reasonably allow us to amortize this cost for the entire project over a five to seven year period.

Elimination of costly chemicals is important in itself, however notwithstanding this cost factor, in the past six months the intense public scrutiny of chemicals harmful or injurious to our environment has begun to center on herbicides, arsenicals, and mercury bearing compounds, some of which are used in golf course maintenance. Some of these chemicals are used for Poa Annua control and others for prevention of various grass diseases. It may well be that within the next few years either legislation and/or public concern for ecology will dictate that all golf courses discontinue the use of some of these products. Therefore, conversion of our fairways to Fylking Bluegrass, which is the most disease-resistant golf course grass that has been developed to date and which has a minimal dependency upon chemicals for healthy growth, certainly seems appropriate as soon as possible.

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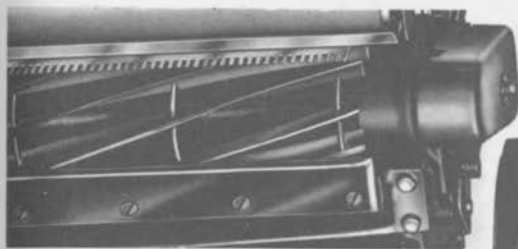
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