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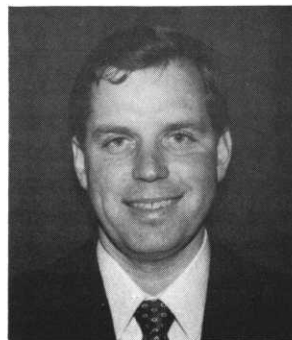
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## FROM THE PRESIDENT'S DESK

SCOTT HOFFMANN, CGCS

As winter draws near and we begin looking for that first lasting snow that will blanket and protect our golf courses through the long winter, thoughts of last summer's heat and drought already seem to be a distant memory.

While I would be the first to agree that winter comes too soon and lasts too long in Minnesota, it does have its advantages. The slower pace is not only welcome, but much needed, and the seasonal change offers us time for reflection of last season and planning for the season to come.

As Minnesotans in general, and golf courses in particular, reflect on the summer of '88, our water resources, and usage of, will undoubtedly be foremost in our minds. Our state legislature is expected to take a new look at old laws and we may expect to see some major changes in permitting and appropriation.

It will be a vital period for golf courses and we will want to play a significant role in the development of new water policies. Your board has begun to take action and will be pursuing several plans of action. Two of these concern funding Golf Course Water Use Surveys and Golf course Economic Impact Studies. It is important we work together on these issues and hope when called upon you will respond to these surveys.

Rick Frederickson and Rolling Green Country Club had the greens rolling, as well as a few superintendents rolling, with some of us over indulging a bit on that unbelievable dessert buffet. Thanks to Rick and his staff for a great October meeting and for the golf balls donated by Rick and his pro, Jim Terry.

This will be my last article as president so would like to take this time to thank the membership for providing me the opportunity to serve and for an exceptional, hard-working board to serve with. It has been a pleasure.

I will not be seeing you at our November meeting at Billy's Lighthouse as it conflicts with Madden's annual management meeting but look forward to seeing you all at the Sheraton in December.

# SOIL FOR TURF FACILITIES

by DR. GENE C. NUTTER, AGRONOMIST

In the operation of modern turf-grass facilities, more problems are caused by improper physical condition of soil than probably any other single factor. While other symptoms may be more readily recognized and treated (such as disease, compaction, poor aeration, weeds or fertility problems), the real and underlying cause is usually poor soil physical conditions. It is time that we recognize this basic fact so that we can begin to cure the real problem and stop the never-ending, expensive job of just treating the symptoms.

True, most superintendents and managers of turf facilities inherit their soil problems. How sad it is, however, to see the great number of new facilities (including expensive and complicated golf course greens) that still ignore the importance of proper soil conditions, including surface and internal drainage, soil preparation, and use of amendments and soil conditioning. Certainly there is enough information available to guide the planners and contractors of these jobs in this age of technology.

Why, then, does our industry continue to make these inexcusable and expensive mistakes? As long as we continue to follow this course of extravagant ignorance, we will be burying our heads further in the sand instead of advancing our individual courses, our profession and our industry image.

What are the basic aspects of soil management that seem to be so often overlooked or ignored? First, let us consider the origin of soil.

## Soil Origin

In its natural condition, soil is a complex mixture of mineral fragments, decayed plant residues and microscopic organisms. Each of these classes of ingredients have their influence on the nature of the soil. As a natural body, soil developed through a constantly changing pattern which was greatly dependent upon environmental conditions such as temperature, rainfall, plant life and location.

For the majority of cases, the native soil is most influenced by the mineral fraction (called parent material). These soils are called mineral soils. Parent material may have developed from underlying rock formation, or been transported by ice (glacial soils) or water. Thus, soils which developed from rocks through the age-long process of weathering will have properties akin to those kinds of rock. Examples are the heavier, more complex mineral soils such as clays. Usually these soils are more difficult to manage physically (poor internal drainage and

aeration) but are richer in fertility potential (will hold more nutrients).

On the other hand, soils which were laid down from water deposits - such as sands, would reflect a lighter, simpler structure. These soils (such as our various Florida sands) are easier to manage physically (better drainage and aeration) but have much lower fertility capacity.

Then there are organic soils, derived from decayed plant residues. These are the muck soils of the rich Everglades region, and the peat deposits scattered around the state.

## Native vs. Artificial Soils

If we were farmers, we would be growing crops on one of the types of native soils mentioned above. We would gather information about the nature of our particular soil from state and federal soil scientists who had surveyed, studied, classified and mapped the major soil formations in every county in Florida (and likewise most other states). This information would provide guidelines as to the physical condition and fertility status of our particular soil, and this information would guide our crop production practices.

However, turf managers are not farmers - and, with few exceptions, (sod producers, perhaps), they are not growing turf on natural or native soils. Instead, they are managing turf facilities which were built by a mass mixing of soil, through excavation, fill, grading and leveling processes. For example, housing projects, apartment complexes, golf courses, athletic fields and highway sites have gone through mass movements of "dirt". When finally completed there usually is not resemblance between the resultant "dirt pile" and the original native soil profile that occurred on that same site.

What does this mean to us practically? It means simply that you have to throw the "book out the window" and start over. None of the previously compiled information of soil scientists applies. It could be that the original soil was improved (richer soil hauled in), but usually it works the other way. Often, damaging foreign material is mixed in (debris, chemical deposits, etc.). Another serious problem is that the mixing process was not uniform and therefore there is much greater variability in the final soil material. This is why we find "spotty" conditions in our turf from area to area. The grass is reflecting the "spotty" soil conditions underlying. In short, all of these factors mean that turf soils are more difficult to manage!

Where do we go from here? Good turf managers have learned the vital importance of proper soil conditions to the success of grass production and maintenance. Therefore the problem is simple. By carefully studying and evaluating the soils you inherit, you can then go

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about an intelligent soil management program. For intensively managed turf areas (such as putting greens, tees, athletic fields, etc.) you may need to improve that inherited "dirt pile" by the use of soil amendments. We know generally, for example, that heavy, mucky soils can be improved by the addition of coarse sands; or that infertile, ball bearing sands may become more productive by the addition of heavier soil fractions like clay or organic matter such as peat.

### Soil Amended to Improve Physical Condition

But just a minute! What really are we doing when we add the above soil amendments (and many others - natural processed or manufactured)? First and most importantly, we are changing the physical condition of the soil.

The management of turf facilities imposes unique and damaging requirements on the turf. Heavy traffic, continuous wear, regular movement of maintenance equipment, high rates of irrigation - all these factors work to destroy soil structure. Thus, turf soils must be constructed (remember - no more natural soil, so we must construct a usable soil base from that inherited "dirt pile") to take the punishment and still grow good turf.

Here is where the soil amendments come in - to change the inherited soil to a more desirable physical condition.

Briefly, to produce good turf under our demanding conditions, soils must have proper pore space. There must be pores to move water through the soil and pores to move air so the grass can "breathe". Approximately half of the soil is made up of solids (the mineral matter plus a small amount of organic matter). The other half is pore space.

Pore space is of two kinds - large (macro) pores and small (micro) pores. Air moves into the soil (and harmful gases move out) through the large pores, except after a heavy rain or irrigation. Then they may be filled with water temporarily, which soon drains out. This is the ventilation system which aerates the soil. The large pores should comprise about half of the total pore space.

Small pores (also called capillary pores) move water through the soil. These pores conduct water to the grass roots (not the opposite - roots don't "grow to water" - water must be there first), from the water table, like a kerosene "hurricane" lamp moves kerosene up through the wick. The finer the pores, the farther the water will move, and the slower.

### Proper Balance of Large and Small Pores

The most important aspect of soil porosity is the proper balance between the large and small types of pores. An excessive proportion of large pores will result in a well

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aerated but dry soil (like most of our sandy soils). Water will move through (percolate) too rapidly and very little will be retained to grow turf. An excessive proportion of fine pores, on the other hand, will exclude air and may be water-logged (like heavy clay soils).

Thus, once we have determined our given soil situation, and knowing the physical requirements of our turf facility (percolation rates, drainage, etc.), we can then amend the soil to meet our requirements. A great variety of soil materials are available to do this including calcined clay, vermiculite, peat, colloidal phosphate, sand, etc.

If we are fortunate enough to take over the turf facility prior to planting, we have a golden opportunity to shape our future soil condition. If we inherit an established facility, the job is more difficult, expensive and time consuming. It can be done gradually, however, by periodically working proper amendments into the soil as topdressings following soil aeration.

The proper proportion of amendments can be determined by a soil testing procedure known as "mechanical analysis". Many soil testing laboratories and industrial firms can provide these tests, and will help you compound or construct a soil to meet your needs based on such factors as percolation rates, etc.

Once you have amended your soil to a proper physical

condition, then the previously mentioned secondary symptoms such as compaction, weeds, restricted roots, etc., will be minimized. Then turf maintenance will be a more enjoyable and successful business.

Credit: *THE FLORIDA GREEN*, Spring 1988



## EDITOR'S CORNER

BRAD KLEIN, CGCS

The golf season is soon to be replaced by the snowblower season and with that we'll experience some joy and some regrets.

Regrets that our families had to enjoy the hot weather without us. Regrets that turf was lost and replaced by weeds. Regrets that some memberships didn't fully comprehend the problems we experienced and regrets that we didn't accomplish all our goals set for the past season.

It may be hard to find any joy but hopefully you've be-

# THEY HOLD DOWN MORE THAN ONE JOB.

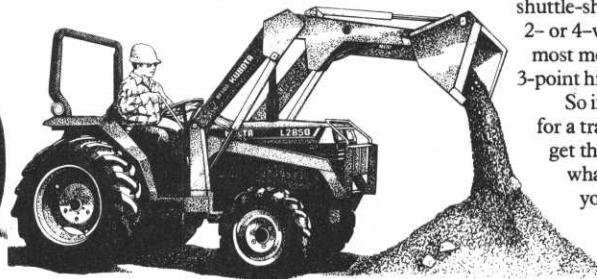
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come reacquainted with your family. You're prepared to kill the weeds and grow new improved turf varieties next season. The membership realized it wasn't greener on the other side of the fence and now want that new irrigation system you've been dreaming about. I'm sure some joy will come from the friendship that will be made with our DNR officials in the future. This past season is almost history and that fact alone is a joy.

The association had a very successful year in regard to our turf research funding and promises to be a benefit to all. The success of not just the research projects but every aspect of the association is dependent upon participation by its membership whether it's serving on the board or committees or just attending the monthly meetings.

One of our bylaw changes for this year's election is to allow career assistants classified BII with five years in that classification to be changed to Class B. This will allow them the privilege of voting and increase participation even more.

The annual conference is soon approaching, November 30 through December 2 at the Sheraton Inn Northwest, with a great slate of speakers on hand. Once again we'll have a casino night so dust off the cards and dice and get prepared for a great time.

The wind blew but that didn't detract from the nice time we had at Rolling Green Country Club. Rick Fredericksen had his leaf blowers out in force and the course was superb. The clubhouse crew presented about the best lunch ever and I think high scores could only be blamed on too full of stomachs.



*"You didn't lose it in the sun . . . you lost it in the pond."*

## PESTICIDES AND PROTECTIVE CLOTHING

by **MARJORIE A. SOHN**, Associate Professor  
University of Illinois at Urbana-Champaign

Exposing your skin to some pesticides presents a health hazard and clothing provides a vital protective barrier against exposure.

Pesticide applicators can purchase chemical-resistant apparel, but recent surveys indicate the majority of pesticide users wear traditional work clothing when mixing, handling, and applying pesticides. They prefer ordinary work clothing because it is more comfortable, less expensive and easily available. They also doubt the need for protective clothing.

A non-punctured-type Tyvek is one of the disposable chemical-resistant garments on the market. It is made from spunbonded olefin, a non-woven fabric that provides an effective barrier to many types of chemicals. Although you usually must dispose of non-woven garments after one use, Tyvek garments withstand up to four launderings. However, if your clothing is contaminated with a concentrated chemical, dispose of it rather than trying to clean it because of safety considerations.

### Fabric Studies

Testing is under way on Gore-Tex fabric to determine its ability to provide protection from pesticides. Gore-Tex is a microporous membrane that is laminated between a shell fabric and a fabric lining. As a result, Gore-Tex allows perspiration to pass through the fabric, but it keeps liquid from entering the outside of the garment and contacting the skin.

A North Central Region research project focused on the influence of the following characteristics in creating a protective barrier:

- Fiber content,
- Fabric construction,
- Functional finishes, and
- Laundering methods.

### Choosing Clothing

Absorbency and wicking are important considerations in determining chemical resistance. Tests conducted on cotton, polyester/cotton blends, polyester, nylon, acrylic and spunbonded olefin fabrics yielded these results:

- Pure cotton fabric exhibits the highest rate of absorbency, which means it absorbs a large amount of pesticide solution. However, less pesticide solution travels to under-clothing or skin.

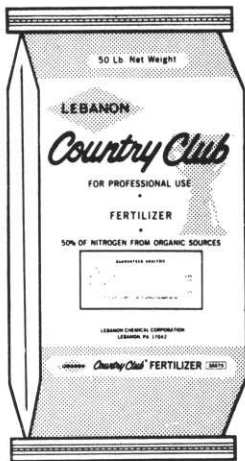
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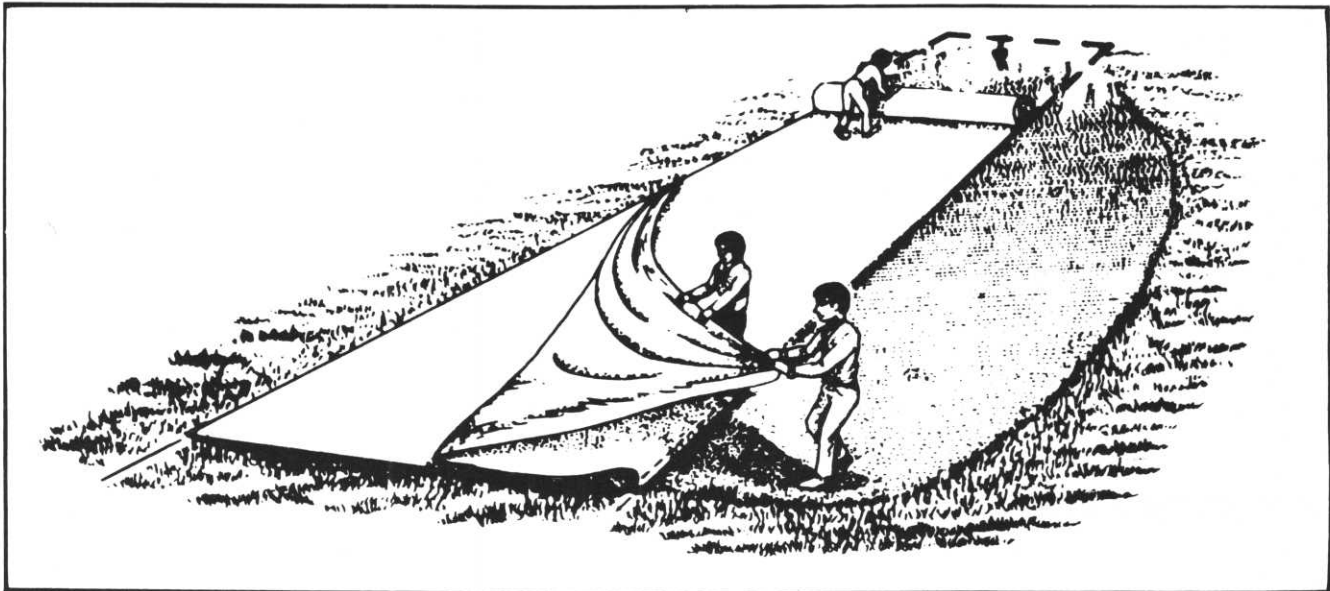
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- Lightweight fabric (broadcloth) demonstrated lower absorbency than poplin or twill in tests, but it also exhibited very rapid wicking. Broadcloth's tight weave appears to transport pesticide solution more rapidly and in greater quantities to under-clothing or skin.

- Synthetic fiber - acrylic, nylon and polyester - had low absorbency, but they had the highest wicking levels. Compared to other fabrics, the pesticide solution flowed rapidly from the garment to underclothing or skin.

- Spunbonded olefin fabric showed the lowest rate of absorbency and wicking of the fabrics tested. It provides an excellent barrier against pesticide penetration and it offers extra protection when you wear it over work clothes.

- Clothing with a consumer-applied fluorocarbon soil-repellent finish gives the the same protection as spunbonded olefin, but is more comfortable to wear.

Credit: *THE BULL SHEET*



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Congratulations to the following new members:

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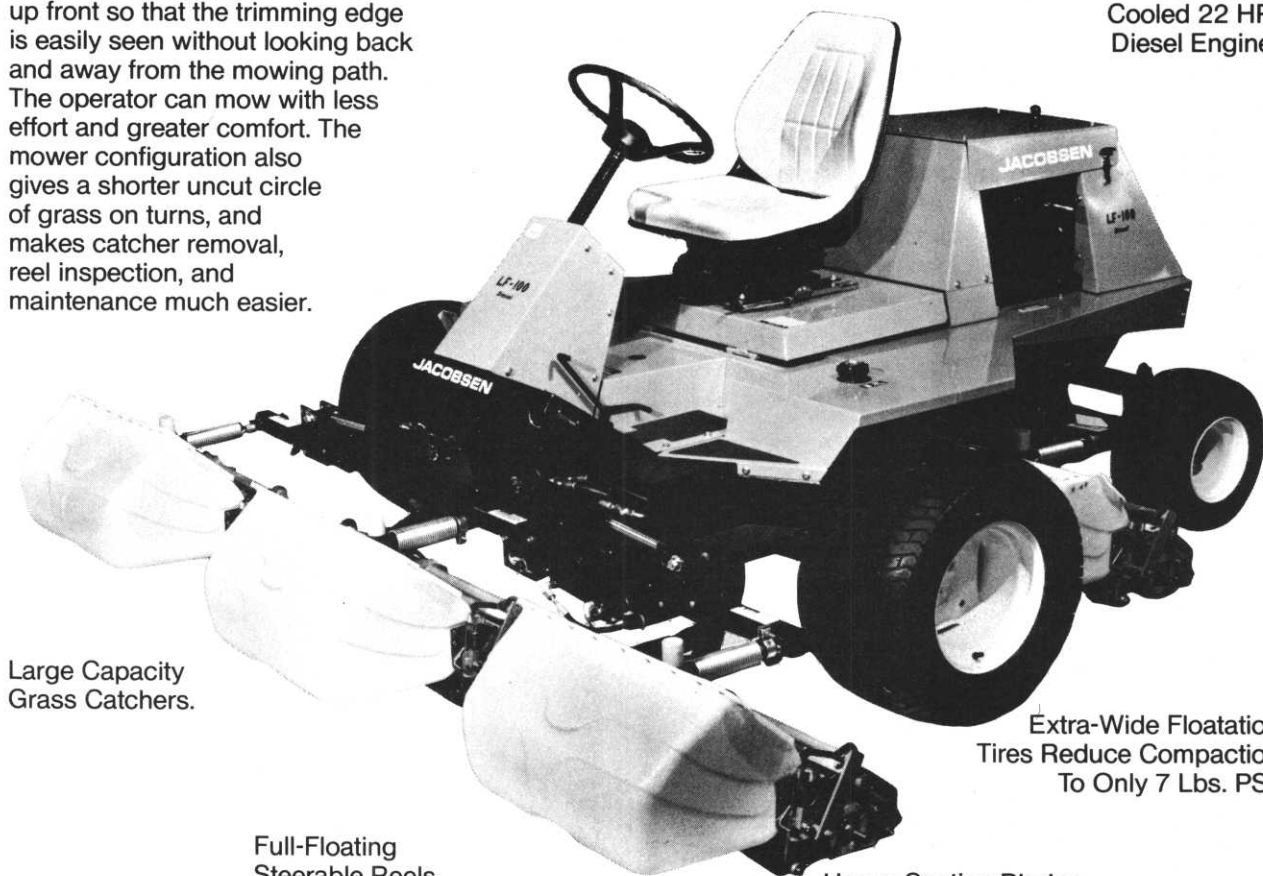
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