DECEMBER, 1962
VOL. 16, NO. 6

The Bull Sheet

Official Bulletin
Midwest Association of Golf Course Superintendents

ED BURKE
Superintendent
Elmhurst Country Club

Merry Christmas
And
A Happy New Year

Monday, December 3rd
Dinner and Annual Business Meeting
Elmhurst Country Club

THE BULL SHEET, official publication of THE MIDWEST ASSOCIATION OF GOLF COURSE SUPERINTENDENTS.

TED WOEHRLE, *Editor,*
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PRESIDENT'S MESSAGE

This President's Message is one of my last duties as President of the Midwest Association of Golf Course Superintendents. Each month for the past twelve months I have attempted to write a message that has a definite subject and a specific objective. To have written in an abstract manner would have been a waste of my time and your time.

Similarly, any attempt to direct or to carry on the activities of this Association without a specific purpose would be uninteresting and unrewarding. Our purpose is the quest for knowledge—knowledge pertaining not only to agronomic subjects but to areas of administrative achievement and personal improvement. We practice our purpose in a formal manner and in an informal manner. The former is provided by presenting well planned educational programs; the latter by associating and conversing with fellow superintendents. None of this will be of value if one element is missing—*participation;* by taking part in the discussions during our meeting; by being active in an educational program; or, and this is elementary and often overlooked, by attending all of the functions of the Midwest Association. To repeat an old proverb, "you get out of it only as much as you put into it."

Our December meeting is the Midwest Association Annual Meeting and election of Officers. During this meeting you will have the opportunity to participate in a manner that is characteristic of a free society and a democratic organization. Become familiar with the abilities of the candidates and exercise your privilege to vote for the candidate of your choice.

Donald Gerber
President

REMEMBER!

THIRD ILLINOIS TURFGRASS CONFERENCE

DECEMBER 6 & 7, 1962

AUDITORIUM, LAW BUILDING
URBANA, ILLINOIS

BE AN ACTIVE MEMBER

Borrowed from "OUR COLLABORATOR"

the Northeastern Golf Course Superintendents Association. Jack Gomley, Editor, and Lawrence Mattei President.

Be an active member,
The kind that would be missed;
Don't be just contented
That your name is on the list.
Do attend the meetings
And mingle with the crowd;
Do take an active part
And make the Chapter proud.
Take time out to visit
A member who is sick;
Don't leave the work for just a few
And think they are a clique.
There is quite a program scheduled
That means success, if done;
And it can be accomplished
With the help of everyone.
So attend the meetings regularly
And help with hand and heart;
Be an active member
And take an active part.
Think this over, Member
Are we right or are we wrong?
Be an active member

DON'T JUST BELONG!

BUILDING NEW SOILS FOR TURFGRASS AREAS

By H. B. MUSSER

Professor Emeritus, Pennsylvania State University and Turf Consultant, Royer Foundry and Machine Company

In the construction of lawns and other turfgrass areas it is common practice to scalp off and stockpile the topsoil, then replace it after the subgrade has been completed. Where topsoil has not been saved, specifications for turf establishment often require that new topsoil be purchased and applied over the surface in layers of varying thickness.

This is a desirable practice if good quality soil is available at a reasonable price. On the other hand, there are many instances where the topsoil used is so poor that the over-all cost is not justified. It may be wiser to build new soil by modifying the existing material on the area. This would be less expensive and provide a better soil medium for turf production.

Unfortunately, the idea is still all too prevalent that topsoil is a panacea . . . that using a five or six inch layer of it is sufficient to insure good turf establishment. This is seldom justified, from either a chemical or physical standpoint. Because of erosion, leaching or poor previous management, topsoil often may contain less total nutrients than the subsoil below it! In addition, physical condition of the purchased topsoil may be so poor that it will not support good turf growth without extensive modification.

Even when good topsoil is available, its cost should be carefully compared with the cost of modifying existing soil to put it in good condition for turf production. In many urban locations good quality topsoil is scarce and expensive. It may be much more economical to improve the existing soil by the use of fertilizer and physical conditioning materials. In many cases the cost of the required materials, plus application and mixing, will

be materially lower than to purchase and apply the topsoil. The margin of saving may even be wider, since topsoil must also be fertilized and often needs modification.

Why Modify Soils?

The first essential in building a turfgrass soil is to adjust its physical composition to meet the requirements for successful establishment and maintenance of the turf. Soils vary widely in size and arrangement of the particles that compose them, and in their content of organic matter. These physical characteristics have a direct effect on the passage of water and air, on the quantity of available water and plant nutrients they can retain—and on their ability to function adequately under heavy use.

Soils containing high percentage of large particles, from coarse sand to fine gravel, are open and droughty. Though they are highly resistant to compaction, they are also excessively porous and will hold only limited amounts of moisture and plant food. The principal reason for modifying soil material of this type is to increase its water and nutrient holding capacity. Addition of organic matter, preferably a form that resists decomposition, is the best way to do this. Since such soils normally are low in fertility, the modification program also must include liberal additions of fertilizer, and sometimes lime, to complete the job.

Fine textured soils, with a high percentage of silt and clay, usually require more extensive modification than sands. They compact severely on areas of heavy use. The fine particles pack together so tightly that the passage or air and water is so reduced that they remain saturated for long periods. The water they contain loses its oxygen and becomes stagnant. Since the pore spaces are filled with water there is no opportunity for any circulation. Roots will not function and, if the condition becomes chronic, will die off completely.

Texture and structure improving materials must be added to such soils in liberal quantities to condition them for turfgrass. Intermixing medium to coarse grade of sand, or materials having similar texture, will improve their porosity and speed up air and water movement. Some form of organic matter also should be added. In its raw state the organic matter functions as a spongy cushion that will hold apart the fine particles of silt and clay. As it decomposes it acts as a cementing material that aggregates the fine particles into clusters. This further increases the percentage of large air spaces in the soil without materially affecting its ability to retain moisture and nutrients. This also permits using larger amounts of lime and fertilizer in preparing such a soil for turf than would ordinarily be justified for sandy soils.

Underlying Material Must Be Well Drained

Creation of a top quality surface layer of soil is, by itself, no assurance that good turf can be grown on it. Soils in the best possible physical condition will not function properly if the underlying material is poorly drained. Dense and compact subsoil will not absorb water freely, and acts as a dam that backs up the water into the surface layer. This will cause chronic saturation and lack of air movement just as effectively as when the surface soil itself is in poor physical condition. The best remedy for tight and impervious subsoil is to place a layer of highly porous material between it and the surface, with adequate drainage to remove the water that accumulates. Stone chips or pit run gravel, one to two inches in diameter, are excellent for this purpose.

Soil Modifiers

Sand is the material most commonly used in modifying fine texture soils for turfgrass production. Others such as limestone and blast furnace slag screenings, when properly sized, also are satisfactory. It has been shown that the medium to coarse grades (0.02 in. to 0.04 in.), in which particle size is reasonably uniform, are more

satisfactory than an ungraded product with wide variations from coarse to fine particles. Quantities needed will depend on the type and intensity of use of the area and the characteer of the soil to be modified.

If the existing soil on golf greens, grass tennis courts, bowling greens, or playgrounds, has a high silt-clay content, it will require additions of 60 to 70 percent sand to provide optimum physical condition. These percentages should be reduced to a maximum of 40 or 50 percent for athletic fields, turfed race tracks, and similar locations where more firmness and stronger root anchorage is needed. Sand additions to any turfgrass soil that needs texture modification should never be below this 40 to 50 percent range. For otherwise, the soil's fine particle content still will be high enough to fill the voids between the coarse sand grains so completly that there will be no material improvement in porosity and resistance to compaction.

If conditions are reversed, and the existing soil is strongly sandy in character, it may be desirable, in extreme cases, to add some fine textured material to it. However, it should be understood that silt and clay are good cementing materials and, even in limited quantities, have a pronounced effect on structure. In no case should they represent more than ten percent of the total mixture. Their use is justified only where more firmness is required than the sandy soil itself will apply.

Organic materials used for soil building are of two general classes: (1) those subject to rapid decomposition by soil organisms, and (2) products which break down slowly. Materials such as rotted manure, raw sewage sludge, and spent mushroom soil, are typical of the first group. Rotted sawdust, reed-sedge and moss peats belong to the second.

The rapid rate of decomposition of the first group admittedly supplies appreciable quantities of available nutrients during the first year or two following their application. However, this rapid rate of decay also reduces their period of effectiveness in maintaining good physical condition. Critical tests of materials representative of both classes, made at the Pennsylvania Agricultural Experiment Station, showed that approximately 75 percent of the organic matter supplied by peat moss was still present after a ten-year period. Most of the effectivness of readily decomposed materials was lost after two or three years. Tests of this type, together with practical experiences over a wide range of conditions, have demonstrated the greater value of the slowly decomposing organics for permanent soil improvement.

The Use of Soil Modifiers

The quantity of organic material required will depend upon the degree of modification needed. Soils subject to heavy compaction should contain from ten to fifteen percent, by volume. This would require additions of two to three cubic yards per 1,000 square feet of area to modify a soil layer six inches deep; or, from one to one and one-half yards for every ten cubic yards of finished mixture. These quantities can be reduced proportionately when areas are less heavily used. Poor, droughty sands will require additions of 20 to 25 percent of organic material to materially improve their moisture and nutrient holding capacity.

The quality of organic material also is important. Its effectiveness depends largely on the quantity of actual organic matter it contains. Readily decomposable products, as manures and raw sewage sludge, have an average moisture content of 75 to 80 percent, or more. A ton of this type of material supplies only about 400 pounds of actual organic matter. Spent mushroom soil supplies even less. It consists mostly of the mineral soil used in casing the bed and usually contains less than 200 pounds of dry organic matter per ton of material. Peats vary widely in organic content, moisture absorptive capacity, and in the actual amount of water present in the marketed material. Specifications for them should require that the organic matter content be at least 90 percent of the total dry matter; that they have a moisture absorptive capacity of at least 500 percent, and that the actual moisture content on delivery be not over 60 percent.

The addition of adequate amounts of fertilizer and adjustment of the pH reaction are essential in the soil building program. The better turfgrasses need liberal quantities of available nutrients and grow best at soil reaction near the acid-alkali neutral point. Fertilizer and reaction correction needs can best be determined by test. Many fertilizer companies, a number of private laboratories, and most state agricultural experiment stations offer soil testing service, either without charge or at a very modest cost. All of these agencies will

supply recommendations for the kinds and quantities of materials that should be used, based on results of the tests. If these are followed, much of the uncertainty and guesswork so common in soil preparation can be eliminated.

Mixing — Methods and Equipment

All materials must be thoroughly mixed with the soil to the full depth of the modified layer. This applies to the fertilizer and lime, as well as to the structure improving materials. On large areas common practice is to spread the soil additions uniformly over the surface and work them in with an appropriate type of tillage equipment. Disk harrows, tillers, and similar machines can be used. The lighter materials, such as peat, should always be applied first, and the heavier materials spread on top of them. In the mixing operation the heavy materials will help to carry the lighter ones down into the soil, assuring a more thorough mix.

The success of *on-site* mixing depends upon the uniformity of the finished product. A poor job will result in solid pockets of sand or organic material which will interfere with water and air movement. The

pockets will cause extreme droughtiness in some areas, and allow others to become wet and soggy. The soil should be examined frequently during the mixing operation and tillage continued until uniformity is assured.

Off-site mixing is another method of soil building. It is recommended where smaller areas are involved because of the more thorough mixing job that can be done. Here all the ingredients, including the soil portion of the mixture, are assembled at a convenient location and mixed with some type of mechanical equipment before being spread on the area. This permits removal of objectionable stones and trash, and is a safeguard against soil compaction by the heavy equipment—which so frequently causes trouble where the on-site method is used. Off-site mixing also permits more even distribution of the prepared material to a uniform depth. (This is an important factor on golf course greens and other contoured areas.)

Modern soil conditioning and handling equipment has reduced the time and labor of off-site mixing to a minimum. Shredding machinery that will handle large volumes—up to 12 cu. ft. in 15 seconds—is now available. Equipment like the Royer Shredder, for example, will condition the various materials at these speeds, and at the same time provide a preliminary mix that is quite uniform. Power screens are available for additional mixing and processing, if a finer texture product is needed than the shredding equipment will provide. Tractors equipped with loaders, and with endless belt or bucket elevators, practically eliminate bottlenecks of hand work and make it possible to prepare and apply large volumes of material in a relatively short time. Machinery of this kind has greatly increased the popularity of off-site mixing. Now off-site mixing is not only common practice in preparing soil for golf greens and similar restricted areas, but it is also being adopted for athletic fields, playgrounds, and other large projects where extensive soil modification is needed.
