Making Proper Topdressing for Bent Greens

***By* O. J. NOER**

The plant food content of topdressing is less important than are its physical characteristics. It is a simple matter to apply fertilizer to furnish needed plant nutrients, but faulty soil structure caused by the use of an unsatisfactory topdressing mixture cannot be corrected easily or quickly.

The ideal topdressing is a mixture of soil, sand, and organic matter in proportions which produce a medium to coarse sandy loam. The ratio of soil and sand is not a fixed one. It varies at different places because of the diverse character of the soil and sand obtainable in the locality. When the soil is heavy, a large amount of sand must be used, but when a medium to coarse sandy loam of good structure is available, little or no sand is needed. There is less leeway with respect to the content of organic matter. The quantity should be 20 to 30 percent by volume. It should never exceed 30 percent, and ought not be less than 20 percent.

Volume rather than weight is used to express the proportion of ingredients used to make topdressing because that is the practical way to measure them when the final mixture is made. Laborers take so many shovelfuls of soil, sand and humus. Sometimes it is one shovelful of each ingredient; or it may be one shovel of soil, 2 of sand, and one of humus.

The importance of selecting the right kind of sand, and obtaining a suitable organic material is always stressed. The necessity for a careful choice of the soil fraction is either overlooked or ignored. Any kind of soil on the property, or obtainable nearby, is used. It may be anything from a muck to a heavy clay. The soil used exerts a marked effect upon the topdressing which can be beneficial, or it may be detrimental. By selecting the right kind of soil, the amount of sand, or organic matter, required may be greatly reduced. The resulting saving in cost may more than offset the higher price of good soil.

Soil Texture Paramount

Texture of the soil is vastly more important than its color or organic matter content. Other things being equal, the choice would rest with the darker of 2 soils, because it would have a higher content of organic matter. But a light colored loam soil is vastly superior to a dark colored clay or muck. Soils of loamy texture are best because they contain 30 to 50 percent of sand, have some silt, and up to 20 percent of clay. The silt and clay give the topdressing body, and provide a little colloidal clay which is a miracle mineral. It is an exchange complex which alternately absorbs and releases the basic plant nutrient elements, and prevents the loss by leaching of potash, phosphoric acid, and the other basic mineral elements. With some of this miracle mineral in the topdressing mixture, nitrogen is the only element subject to loss by leaching.

A silt loam can be used if a loam or sandy loam is not available. But the amount of sand must be increased to offset the larger amount of silt in the silt loam. A clay or clay loam should never be used because it has too much clay in it. A fine sand is equally bad because it lacks the desirable miracle mineral, or colloidal base exchange complex.

It is not necessary to have a mechanical analysis made of the soil. With a little experience the soil can be judged by rubbing a small amount of moist soil between the thumb and first finger. The ideal sandy loam or loam soil has definite but slight cohesive properties, and has a pronounced gritty feel caused by the medium to coarse particles of sand. When a little moist soil is placed on the thumb, and rubbed quickly with the first finger, the slicked surface should not be shiny or smooth. That is evidence of too much clay. The absence of cohesive properties shows that the soil is a sand, and does not contain the miracle base exchange complex. When the slicked surface is smooth and shiny the soil is a clay loam or clay. Altogether too much sand will be needed to change it to a sandy loam. A silt loam does not have any gritty particles. It has a floury feel, and produces a dull slicked surface crossed by innumerable fine cracks.

Preparing Soil

It is frequently possible to locate an area of suitable soil in an out of the way spot on the course. The area should be plowed, cultivated periodically to kill weeds, and planted to cover crops to add organic matter and improve soil structure. Grass clippings and other organic debris can be scattered over the surface before plowing and incorporated into the soil. Two cover crops

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design had been reached in Scotland and everything we did had to be an imitation of their courses. It has been very gratifying to see the fine research on turf improvement by our Greens Section of the USGA and by the experimental stations and agricultural colleges with whom the greenkeepers have closely and effectively cooperated. You can read the results of all this research as it is constantly published.

Because of our Scottish finality complex, for many years our golf course architecture did not keep pace with our turf research. I think it is high time that we stopped imitating the old traditions in golf course design and build golf courses that will satisfy our own player demand, our pocketbooks, our maintenance machinery and our own peculiar American climatic and topographical conditions. Unhampered by tradition, we can develop golf courses of the highest architectural standards and which will be far better suited to Americans and modern American maintenance machinery.

There is one point of greenkeeper-golf architect relationship that I would like to bring out. If the greenkeeper can be on a new course with the golf architect from the day that construction of that course starts, a much better result will be obtained. The greenkeeper will then have an excellent working knowledge of the course that he is to look after. It is bound to result in more satisfactory maintenance.

At present I am designing many clubs in various parts of our country. One of the things that has impressed me, is that all of my clients, whether they are municipal, private, or daily fee, and whether they are rich or poor, have all expressed a desire to have their layout designed so that it will be fun for all classes of players. They do not want courses that will be hard work for most of the membership to play. Not one of these clients has expressed a desire for the old time, tough, sporty tournament course. They want a beautiful, pleasant course, suitable for everyone, that can be easily and economically maintained. And judging from the foresighted concern about year after year maintenance costs, the greenkeepers on these new courses will have a happier existence.

If at any time any member of the Greenkeeper Superintendents Association can offer the golf architect ideas or suggestions that will contribute to the advancement of golf course construction or management, please send them to the American Society of Golf Architects.

Care of Bent Greens

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can be grown each year. Winter cereal rye is excellent for fall and early spring, and a mixture of soy beans and sudan grass is a good summer crop. The winter rye is seeded in the fall and allowed to grow until late April or early May when it is plowed under. The area is disced once a week, or when sprouting weed seedlings appear, from then until time to plant the summer crop. Soy beans and sudan grass are planted when the ground becomes warm in May. A small seed variety of soy beans is generally used and seeded at 1½ bushels per acre. The rate for the sudan grass is 12-14 pounds per acre. This combination makes an ideal warm weather cover crop. The soy beans provide organic matter, and add a little nitrogen because it is a legume. The sudan makes a heavy growth and has a very extensive root system which helps granulate the soil. The soil should be tested for reaction, and lime should be applied and disced into the soil if it is acid. A 3-12-12 or 0-14-14 fertilizer should be applied about a week before seeding at 400 lbs. per acre. The fertilizer will help pro-

duce a better cover crop and the phosphoric acid and potash will benefit the turf when greens are topdressed. The use of cover crops, and cultivation, improves soil structure and rids the soil of weed seeds within a single season.

Some clubs without good soil on the property import soil and spread it in an out of the way spot. It is improved by cultivation and green manure cropping. Sometimes the sand is spread over the surface and mixed with the soil by plowing and discing, or by the use of an Ariens, or Roto tiller.

Many clubs in eastern Pennsylvania purchase screened spent mushroom soil from mushroom growers in the Kennett square area and use it in place of local soil. Sand and additional humus are mixed with it.

Avoid Fine Sand

Fine sands and those of uniform size particles are not suitable for topdressing mixtures. They should be avoided because they pack and have a cementing action. There is very little difference between a very fine sand and a coarse silt. Both are apt to make the soil tighter and more compact than before.

The sand used should have a variety of different sized particles, with the majority varying from medium to coarse. The larger particles help provide passageways which are needed to facilitate the downward movement of surplus water. The medium and smaller size granules aid granulation and by improving soil structure provide a better ventilated soil.

The Green Section of the USGA made an examination of sands and prepared specifications for a desirable one. They cooperated with the National Sand Gravel Assn. and found a specification of the American Society for Testing Materials (ASTM) which is acceptable, and is one any sand and gravel dealer understands. It is the specification for a concrete sand and hence is one the dealer can comply with when he furnishes sand. The specification is as follows:

100% passing a ⅜ sieve	0.371 in.
95-100% passing a No. 4 sieve	0.185 in.
45-80% passing a No. 50 sieve	0.0118 in.
2-10% passing a No. 100 sieve	0.0058 in.

All ranges of particle size in the above specification have been examined by the staff of the Green Section and have been found satisfactory. The finest grade is not too small, and the coarsest has only a small percentage of aggregate larger than 0.185 inches diameter. The Green Section findings were reported in October-November 1946 issue of Timely Turf Topics.

Organic Matter Sources

Manure and commercial humus or peat are the principal sources of organic matter. Cocoa hulls, rotted sawdust and other materials may be used in regions where they are obtainable. Manure is overrated as a source of organic matter. Barnyard manure contains 60 to 80 percent of water so the actual quantity of organic matter in a ton is only 400 to 800 lbs. It is readily decomposable and does not persist in the soil. At least half the original amount disappears in a single season, so a ton, or 2,000 lbs., of manure does not furnish more than a couple hundred lbs. organic matter. Manure has other disadvantages. Unless it has been composted for several years it is apt to introduce weeds and clover into the greens. Most manures contain much clover seed and may have many weed seeds in addition. When enough manure is used in the topdressing to furnish all the organic matter needed to make a good topdressing it supplies altogether too much nitrogen. This makes the grass too soft if greens are top dressed regularly.

Dairy Loam Bad

In Oklahoma and Texas a 50-50 mixture of fine sand and dairy loam is commonly used to topdress greens. The dairy loam is manure from nearby feeding lots. This kind of topdressing is bad for bent grass

greens and is not good for the rye grass used in bermuda greens for winter play. It is not the right kind of topdressing for bermuda greens even though bermuda grass may seem to thrive and make a good growth. The dairy loam undergoes rapid decay during hot weather, and the resulting nitrogen produces a succulent bent grass turf which cannot withstand the hot weather. The use of dairy loam in the topdressing applied in the fall before seeding rye grass aggravates "damping-off" of the young seedling grass. Nitrogen should not be used until after the young rye grass becomes well established. The fine sand-dairy loam mixture does not produce a soil of desirable structure. The dairy loam undergoes rapid decay and after it disappears the fine sand packs. Surfaces become hard, and root systems shallow because of the absence of air in the soil. A topdressing made up of soil, coarse sand and a resistant type of humus is needed for bent and rye grass. It is also better for bermuda greens. The bermuda greens will be more resilient, and the turf will have a deeper and more extensive root system.

The present tendency is to depend upon a good quality of cultivated peat as the source of organic matter in the topdressing and rely upon fertilizer to supply plant food when needed. This method gives the greenkeeper better control of growth. There are times when topdressing is desirable but plant food is not seeded and might be detrimental. Under such conditions a soil-sand-peat humus mixture is preferable to one containing large amounts of manure.

All peats are not alike. Their properties differ depending upon the conditions under which they are produced. The lacustrine peats are formed first and are at the bottom of the swamp or bog. They are produced in shallow water from floating aquatic plants such as lilies. The reed and sedge peats are formed next, and then come the woody peats produced from tamarack and other woody plants that grow on marshlands. Moss peat comes from dome-like deposits in northern regions where the weather is cool and humidity favorable. Moss or sphagnum peat is derived from the sphagnum plant which is a bog type of moss. These plants are not dependent solely upon the soil or rainfall for moisture. They can absorb and utilize the moisture in a humid atmosphere.

The lacustrine peats are plastic and dry to a hard rock-like mass. Once they become thoroughly dry they do not re-absorb water and are what the chemist calls an irreversible colloid. The lacustrine peats have a bad effect on the structure of a soil and should not be used. The woody peats are undesirable also. The sedge, and reed peats are the best ones to use. Sphagnum peat can be used but it does not stay put in the mixture and tends to float out and form riffles when the green is watered. Some greenkeepers prefer this kind of peat and put it through a hammer-mill before mixing with the soil. Then it does not separate.

There are three good reasons for not using over 20 to 30 percent of peat by volume. Peats have a high water holding capacity, ranging from several hundred to a thousand times their weight of water. When the proportion of peat in the soil becomes too high the green may become and stay water-logged because of the tremendous water holding capacity of the peat. Then scald and algae appear and cause trouble. A dry peat resists wetting. It tends to shed water. When a green of high peat content becomes dry it is very difficult to restore moisture by sprinkling. Deep forking followed by several drenchings with water are necessary before the green will take water in a normal manner. Greens that have too much peat have soft springy surfaces and are objectionable from the standpoint of play.

The subject of topdressing will be completed in the next installment. How to determine the amounts of soil, sand and humus to use, methods of mixing, the killing of weed seeds, as well as rate and frequency of topdressing will be discussed.