Sure Prescription for A Good Stand of Grass from Seed

By O. J. NOER

With Merion blue grass seed priced at $3.00 to $5.00 or more per lb., and seed of the newly developed Polycross strain of bent grass for greens at $7.50 per lb., the cost of seed on an acre basis exceeds the value of the land upon which most golf courses are built. To use Merion blue grass costs from $120 to $200 per acre for seed at the modest seeding rate of 40 lbs. per acre, or $300 to $500 at a rate of 80 to 100 lbs. When Polycross bent is used at the suggested rate of 1 lb. per 1,000 sq. ft., the cost on an acre basis is $325, and at double this rate, or 2 lbs. per 1,000 sq. ft., the cost becomes $650 per acre.

Obviously it behooves anybody using either of these grasses to make conditions for germination and subsequent seedling growth as near ideal as possible. It is important on small test areas, but even more so on large scale seedings. Good seedbed preparation, the use of lime on acid soil and ample fertilizer before seeding are extremely important. Uniform distribution of seed and placement at the best depth for growth affect the uniformity of stand. An adequate supply of moisture for germination and seedling growth is essential.

Frost and wind are deadly and devastating enemies of shallow rooted, tender seedling grass. During a mid-winter or early spring thaw, in an open winter, nightly frosts heave the grass plants out of the soil and expose them to the drying action of sun and wind. Heaving desiccation are far more deadly than the actual cold. Serious loss seldom occurs if there is a dense sward of deeply rooted grass before the onset of winter. Early seeding in the fall, immediately after the break in hot weather, is important along with the use of ample phosphate and nitrogen to speed growth and shorten the time required to develop a deeply rooted grass. The fertilizer is good insurance. Its cost is small as compared with the cost of seed and seedbed preparation.

Seedbed Preparation

Seedbed preparation may make the difference between success and failure. To throw grass seed into a loose, dry soil is a waste of good seed. The necessity for an ample and continuous supply of soil moisture for seed to sprout and grow is obvious. The final seedbed must be firm without clods of any size. It must have a thin cover of loose, mellow soil so the seed can make contact with and become a part of the soil. Seed cannot absorb water unless it is in direct contact with moist soil particles.

In early times seedbed preparation on fairways was more thorough than now. Unfortunately, some of the equipment used then has not been adapted for use with modern tractors. Fairways were plowed, disced several times and floated to level the surfaces. With the exception of steep slopes, subject to bad wash, they were worked during the entire summer with a tool which improved tilth and smoothed the surface. Two double rows of circular knives (one pair in front and the other in the rear) destroyed any and all clods and the wooden frame and cross piece in the middle eliminated slight ponded depressions. The continuous cultivation sprouted and killed most of the weed seeds and made a smooth, firm, ideal seedbed.

Those who do not adopt these practices should disc and harrow enough times to produce a firm, mellow seedbed and should use a Meeker disc after seeding. This machine has two corrugated rollers which press the seed into the soil and leave a slightly roughened surface which is desirable, provided the machine is operated crosswise on slopes which are subject to wash.

On putting greens the final seedbed should be prepared with even greater care. A smooth, well contoured surface of clod-free mellow soil is the first step in the quick development of a satisfactory playing surface. Before seeding, and not afterwards, is the time to eliminate low ponded pockets or high spots. A heavy topdressing for the purpose of leveling after the grass becomes established checks growth and may smother the grass. After the topsoil is in place and the surface is shaped in accordance with the architects' design, the green should be rolled. Besides firming the seedbed, rolling enables one to spot quickly the high spots or low pockets.

The next step is for workmen to push soil from high spots into adjacent depressions with the backs of wooden rakes, or with a homemade soil pusher. It may become necessary to remove part of the soil from high spots and sometimes more topsoil is needed to level low spots. It is well to roll again with a light weight roller before the final inspection to check smoothness of the surface. A little extra care at this stage pays off handsomely later when play starts. After surfaces are exactly right, the top ¼ in. of soil should be stirred with sharp rakes to prepare the seedbed. Light rolling after scattering the seed is advisable to insure good contact of the seed with the soil.

Soil Conditioners Not Justified

Where chemical soil conditioners have been used the initial stand of grass from seed has been poorer on some of the treated than on untreated plots. Because of the marked granulation failure to roll sufficiently to bring the seed into contact with soil moisture is the plausible explanation. The evidence up to now, and the very high cost, does not justify the use of chemical conditioners on an acreage basis. Apparently surface applications of small amounts prevents crusting of the soil and stops erosion. If true, their use in this way on banks and slopes may be justified.

The matter of cost is of secondary importance on greens, but how long these soil conditions will stabilize soil in greens is open to question because of the terrific compaction from traffic and heavy watering. Based on present knowledge, the large scale use of chemical soil conditioners on new or established greens is hardly justified. They should be tried in a small way first, because they may be the answer in part to a vexing problem. Some soil workers contend that soil conditioners of themselves do nothing to improve soil tilth. They stabilize the physical soil condition. According to them good soil tilth must be developed while mixing the conditioner with the soil. Working the soil develops good structure and then it is stabilized. If this be true, a surface application on a hard, compacted green is not the way to improve soil structure.

Lime Is Necessary

The use of lime is necessary for the successful maintenance of a good bluegrass turf. Otherwise the bluegrass will disappear gradually over a period of several years. Excessive soil acidity and low content of available soil phosphorus are the reasons for the absence of volunteer bluegrass in New England and along the Atlantic Seaboard.

If the soil is moderate to strongly acid, the use of some lime is desirable for the best performance of bent grasses.

A soil test for reaction is the correct way to determine need for lime. Present practice is to express reaction in terms of pH. By this method the figure 7 represents a neutral soil. Lower figures denote increasing acidity. The use of lime is justified when soil reaction is below pH 6.0. There are several reliable and inexpensive quick test kits on the market. Dyes which change colors over a specific

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RATES FOR APPLYING GROUND LIMESTONE TO NEW FAIRWAYS

Soil pH the Yardstick Used to Express Acidity	Degree of Acidity	Blue Grass, Bermuda Rye Grass		Fescue Bent Grasses	
		Sandy Loams	Loams & Clays	Sandy Loams	Loams & Clays
7	Neutral	0	0	0	0
6.3 to 7.0	Very Slight	0	0	0	0
5.8 to 6.2	Slight	1000	1500	0	0
5.3 to 5.7	Medium	2000	3000	1000	1500
4.8 to 5.2	Strong	3000	4000	2000	3000
4.0 to 4.7	Very Strong	4000	6000	3000	4000

RATES FOR APPLYING GROUND LIMESTONE TO NEW GREENS

Soil Reaction	Limestone Rates Pounds per 1000 Sq. Ft.
6.6 to 7.0 pH	0 lbs.
6.1 to 6.5	0-10 "
5.6 to 6.0	10-20 "
5.1 to 5.5	20-40 "
4.6 to 5.0	40-60 "
4.0 to 4.5	60-80 "

at the proper time has saved many greens and probably many superintendent's job, even though golfers criticized the superintendent for watering during play.

When discussing grass during summer months, poa annua always receives much comment. Keeping poa annua out of watered fairways is always a headache. But if we had a reasonably-priced liquid fertilizer that could be used in a power sprayer during the summer and a fairway sprinkling system that permitted a light and more frequent watering we might be able to hold the poa annua through the hot summer. Since this method works on greens it should be satisfactory on fairways.

Research and experimentation have solved many equipment problems, but power putting green mowers, one of the most essential articles, can stand improvement. Some putting green mowers may do a good job on level greens but not on contoured greens. Others may do a fair job on the contours but fail to cut short and smooth. To overcome this defect the casters or rollers supporting the front end should be styled and placed to allow the mower to cut equally as well on soft, contoured greens at 3/16 in. as on hard, flat greens at a greater height. Furthermore the number of blades in the reel and the speed of the reel should be great enough so that the green is not left washboarded. The design engineers should also eliminate warping in the center of the bedknives.

Good Stand of Grass

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range of pH are the basis of these tests.

The amount of lime to apply depends upon the degree of acidity, the kind of soil, and the kind of grass. Sometimes the soil supply of available magnesium is low. This can be determined quickly by making a soil test. Then a dolomitic lime of high magnesium content should be used to correct soil acidity, because it supplies magnesium also, which plants need for normal growth. The figures in the foregoing tables can be used as a rough guide to decide upon the amount of lime to use.

Apply Phosphate Generously

Phosphate should be applied generously before seeding because this is the one time when it can be incorporated into the soil by cultivation. Phosphates are fixed in the soil and do not move freely. The rate of application for 20 per cent grade superphosphate should be 500 to 1,000 lbs. per acre. The half-ton rate is not excessive where a test shows the soil to be low in available phosphorus. When mixed fertilizers, such as 5-10-5 are used to supply phosphorus and nitrogen, the rate should be such that from 100 to 200 lbs. of actual phosphoric acid are applied per acre.

Some frown upon the use of nitrogen before seeding, in favor of making the application after growth starts. This may be sound practice in Southern regions because of the possibility of damping off, but nowhere else. It is extremely important to use enough nitrogen to get the seedlings off to a good start so there is a dense stand of deeply rooted grass before growth stops in the fall. Mixed fertilizers should be used at the rates suggested above for phosphoric acid. Where superphosphate is used along with a natural organic, the rate for the organic should be such as to furnish 80 to 150 lbs. actual nitrogen per acre, and the phosphate should supply 100 to 200 lbs. of actual phosphoric acid.

Distribution of Seed

There are a number of ways to distribute seed. Uniform coverage is important. The best plan is to scatter half the seed in one direction and the other half in a crosswise direction. This is wise to eliminate any streaks due to failure of the operator to overlap. On large areas the wheelbarrow type seeder is good. The new Gandy spreader applies seed from one hopper and fertilizer from the other. An ordinary fertilizer spreader can be used provided the outlet holes are spaced close and the seed is mixed with an inert carrier to provide bulk. Sand or dried activated sludge are good for this purpose. On small areas an inexpensive cyclone seeder is excellent, or a hand-operated fertilizer spreader can be used by bulking the seed with an inert carrier. After seeding some like to use a brush harrow before rolling with the Meeker. The rolling is important.

Depth of Planting

Depth of seed placement is dependent upon seed size. It is an axiom in agriculture that the smaller the seed the shallower the depth of planting. The same applies to golf courses. Bent grass seed and red top should stay at or near the surface, bluegrass should be within the top half-inch — and no deeper — whereas large seeded grasses, such as fescue, should be placed at a depth of one-half to three-quarters of an inch.

Rate of Seeding

Opinions differ widely about seeding rates. The farmer uses 10 to 15 lbs. of seed per acre on new pastures. He does not expect immediate cover. Fairway seeding rates in the past have been at rates of 100 to 300 lbs. per acre. As seed prices have advanced, the trend has been toward lower rates, especially when bent is in the mixture. There is always some mortality of seed. But at low seeding rates the actual numbers of seed is great. At 40 lbs. of seed per acre, the number of bluegrass seed is in the order of 100 million, and about 240 million bent grass seeds. These amounts correspond roughly to 2000 seeds per sq. ft. for bluegrass and 6000 seeds for bent grasses. Good seedbed preparation and a highly fertile soil are more vital than seeding rates. Alton Rabbitt showed the relationship between soil fertility and seeding rates. On fertile soil there was no advantage with seeding rates above 80 lbs. per acre, and the 40-pound rate produced a good quality of turf, but the time required was a trifle longer.

On steep slopes subject to erosion, it is customary practice to include a little rye grass for quick growth to stop wash. The amount of seed per acre should be nominal in order not to check the development of the permanent turf grasses. A light cover of straw or marsh hay is another way to prevent wash. The highway people often disc a little straw into the soil during seedbed preparation for that purpose.