

# Stolon Method of Planting and Developing Putting Greens

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The health and vigor of putting-green turf and cost of maintenance depend greatly on proper construction. After a putting green has once been prepared and planted, alterations are costly and difficult to make. This paper does not deal in detail with putting-green construction, but there are a few fundamentals that should not be overlooked.

**Adequate sub-surface drainage** is the first step in constructing a putting-green. It is essential to remove excess gravitational water, to aerate the soil, and to help remove the danger of winter-killing and injury from heaving.

Two methods, both satisfactory under proper conditions, can be used for sub-surface drainage: (1) tile drains overlaid or backfilled with crushed stone or gravel, (2) a porous material, such as, coarse gravel. If the topsoil is a good sandy loam, coarse gravel will usually give adequate sub-drainage; topsoils of a heavier texture may need tile drainage.

**Surface drainage** should begin with the leveling and grading of the sub-grade to the desired contours of the finished green. This will allow for uniform topsoil over the sub-grade.

After the topsoil has been placed on the green, it is graded to correspond with the contours of the sub-grade. Be sure that excess surface water will drain readily from the surface. Areas in the green that hold surface water will become sources of trouble.

The topsoil should consist of 10 to 12 inches of sandy loam containing organic matter such as a good grade of peat or humus. The organic matter is thoroughly mixed into the topsoil by cultivation, or the materials can be mixed and screened before placing on the green. Screening will remove stones and other objectionable debris. The upper 9 inches of the soil should be free of stones, which interfere with the "hole-cutter".

**Avoid layers** of any kind of materials that might interfere with movement of water either up or down. Provide a good bond between topsoil and subsoil. Let uniformity of application, thorough mixing and incorporation of materials be the keynotes in construction and thus prevent layering effects from use of any material alone such as peat, humus or sand. Also,

avoid any method in construction such as excessive rolling that would cause a layer and interfere with growth of roots.

It should be mentioned also that many layering effects have been caused by top-dressing and composting with various types of materials and compost mixtures which have been quite different from the soil make-up of the green. It is only reasonable to expect, for example, that if a green is constructed of 2 parts sandy loam, 1 part sharp, clean sand and 1 part organic matter, any topdressing should correspond to such a mixture.

Once the grade has been established, the soil is raked and rolled until it is firm and settled. By proper use of the wooden rake as a levelling board, bumps on the soil surface are removed and small depressions filled in. At the same time, all stones should be raked from the soil and removed from the green. Gradual rolls are desirable on the green if they are properly graded for surface drainage and mowing.

**Weed-free seedbeds** have been developed by clean-cultivation, use of certain fertilizers such as calcium cyanamid, and use of chemicals such as PMAS. No changes in grade should be made once fertilizers or chemicals have been applied to the soil.

**Pre-planting treatment.** Careful preparation of the seedbed before planting will greatly help the stolons in the early stages of growth.

The most reliable method of determining the proper amounts of fertilizer and lime is to have a soil test made of a uniform sample taken from the upper 6 inches. This is accomplished by taking samples from various parts of the green and thoroughly mixing them together. Because different grasses vary in their nutrient requirements, information concerning the variety of grass that is to be grown on the green should accompany the soil sample when it is sent to the soils laboratory.

Fertilizer and limestone can be applied separately or thoroughly mixed together and distributed uniformly over the green. Then the materials are cultivated into the upper 4 to 6 inches of soil.

Earthworms and grubs of Japanese beetle, June beetle and others can cause serious injury to a putting-green. These pests are effectively controlled for a mini-

mum of 5 years with lead arsenate at the rate of 10 lbs. per 1,000 square feet. Lead arsenate is spread uniformly over the surface, and raked into the upper inch of soil. Chlordane, a new insecticide, gives promise of replacing arsenate of lead for use on greens. The correct amount is not yet known.

In the final preparation for planting, care must be exercised in raking the seedbed. The soil must not be moved about, but carefully raked free of irregularities.

A final rolling to firm the seedbed, followed by a light raking to loosen the surface of the soil and the putting-green is ready for planting.

### Planting and Developing

The introduction of the new improved selections of creeping bent has renewed interest in and revived the stolon method of planting putting-greens. These improved strains of creeping bent are very poor seed producers, therefore they have to be reproduced vegetatively.

Creeping bent spreads overground by creeping stems called stolons and is especially suited for this type of planting. These stolons have a number of joints, or nodes, from which roots and shoots develop. Once the roots enter the soil and become established, a new plant is formed. From this brief description one can readily realize the rapidity in which creeping bent can increase if conditions are favorable.

The object in planting a putting-green is to produce a good putting surface in the shortest possible time with minimum labor and maintenance.

The planting of stolons is not a difficult job. The soil is prepared in exactly the same way as for seed, with the seedbed firm beneath, but loose on top. If the soil is dry, the area is watered thoroughly and after the surface is workable it is loosened by raking just before planting begins.

### Materials needed:

1. **Stolons**, enough so that they can be applied at the rate of 1 bushel per 100 square feet or 10 bushels per 1,000 square feet.

2. **Baskets**, for carrying the stolons.

3. **Pails**, for distributing compost.

4. **Roller**, a water ballast roller about  $\frac{1}{4}$  full is used to roll the stolons after they have been topdressed with compost.

5. **Hose with a fine nozzle**. The hose should be long enough so that it can reach all sides of the green. In this way, a person does not have to drag it over the stolons to reach all areas. If all areas cannot be reached this way, have someone hold up the hose so that it will not drag over and disturb the stolons.

6. **Compost-topdressing**. The material used for covering stolons should be a mixture known as compost. This is generally made by mixing thoroughly 2 parts sandy loam, 1 part sharp sand and 1 part organic

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## MILWAUKEE PARKS HOST TO U. S. AMATEUR LINKSMEN



It was the ambition of the late George Hansen, Supt. of Milwaukee's Parks, to bring the National Public Links Championship to Milwaukee. Although he didn't live to see his ambition fulfilled the nation's public links champs will do him honor when they play for the national championship on the Brown Deer Park GC July 9 to 14. The heavily wooded course, one of seven in the Park system, was laid out and developed from farm land by the late supt. The course is 6,573 yards par 71, with four natural water holes. The 13th fairway is shown above.

matter. The organic matter may be well-rotted material from a compost pile which contains grass clippings and vegetation of various kinds, or it may be old barnyard manure. This not only adds organic matter to the mixture but it is a mild fertilizer that releases its elements slowly for the young plants.

The compost is screened through a quarter-inch mesh screen. The compost made this way is friable, and permits the new shoots to easily force their way through and emerge.

The amount of compost varies somewhat with the size and shape of the stolons, that is, if the stolons are cut fine, less compost is used. For average-cut stolons about 2 inches long, from  $\frac{1}{2}$  to 1 cubic yard of screened, loose compost is needed for 1,000 square feet of area to be planted.

**Planting Instructions.** In the planting of an average size green, at least three or four men are needed. The faster the green can be planted the less chance there is of the stolons drying out. If the green does not take over 2 or 3 hours to plant it may not have to be watered in sections. As previously stated, the recommended rate of stolons is 10 bushels per 1,000 square feet. It is suggested that the greens be marked off in quarters. This is easily done by making a light mark with a stick from one side of the green to the other passing through the center and making another mark at a right angle to the first mark. This marks out 4 areas of approximately the same size. If the green is 5,000 square feet, each quarter is 1,250 square feet so that  $12\frac{1}{2}$  bushels are needed for each quarter. Use the baskets for carrying the stolons, and distribute them by hand evenly over the soil. With reasonable care, the stolons can be uniformly distributed. Avoid making holes in the soil with the heels or toes of shoes, and do not scuff or brush up the stolons.

The compost topdressing is carried in pails and is thrown on the stolons with a downward, spreading motion. Do not sift it through the fingers or spread it finely. The purpose of composting is to anchor the stolons by partially covering them. The majority of the stolons are, therefore, about half-covered with compost. This will give the covered part a chance to root, and the uncovered part opportunity to produce green shoots. If the stolons are completely covered, many are apt to be smothered; or if they are not covered at all they may dry out before they can make contact with the soil. Again the importance of friable compost can be seen, for regardless of how careful the planting and top-dressing with compost is made, some stolons are covered and some are not. When friable compost is used, growth from the covered stolons will force its way through the porous topdressing. Stolons that are not covered take root

easier in the friable medium than on hard soil.

After one-quarter of the green is planted, topdressed and rolled, the next quarter is ready to plant and compost in the same manner. Unless the weather and soil conditions are very dry or the planting is progressing slowly, it is not necessary to water until the green is finished. With 4 men, and materials and compost ready it should not take over 3 hours to plant a putting-green of 5,000 square feet.

**Watering.** After planting, watering is the most important operation to consider. It affects the very life and vigor of the stolons and is the main factor governing the subsequent stand the length of time to produce a good putting surface.

Immediately water the planted area adequately with a fine spray, but not enough to wash the compost off the stolons. The new planted stolons should be kept moist and the surface should not be allowed to become dry. This may require sprinkling several times a day. After a week the stolons, if kept moist, will anchor themselves and will only need watering once or twice a day. Two to 3 weeks after planting the green will not need such frequent watering, but moisture should be sufficient for rapid growth. The faster the grass grows the sooner the bare areas will fill in and produce a dense vigorous putting-green turf.

**Early Maintenance.** Water, fertilizer and compost are the prime factors governing the rapidity in which the stolons will grow. Therefore, ample moisture, frequent fertilizing and composting should be provided until a satisfactory putting-green turf is obtained.

**1. Fertilizing.** About 2 weeks after planting, an application of 5 pounds of a 10-6-4, 8-6-4 or 8-6-2 turf fertilizer, and 5 pounds of an organic fertilizer, such as milorganite, should be applied per 1,000 square feet. It is suggested that the two fertilizers be mixed thoroughly and applied in one application. If the putting-green is planted in the late summer or early fall, repeat the fertilizer application every 2 weeks until late October, or if planted in the spring, repeat until the turf is dense and strong enough to follow regular fertilizer schedules.

**2. Composting.** Compost should be applied frequently and lightly, starting after the first mowing. It should be applied only after the turf is mowed. Compost adds fertility, provides a friable soil in which the stolons will grow easily and rapidly, and gradually smooths and levels the green to its desired surface. Four applications of compost applied properly will ordinarily produce the desired surface.

**3. Mowing.** The first mowing is generally 3 to 4 weeks after planting and it is

suggested that the mower be set at  $\frac{1}{2}$  inch. If set lower the mower is apt to cut into the stolons and retard their growth. As the area improves in smoothness the mower can be gradually set lower until it reaches  $\frac{1}{4}$  to  $\frac{3}{16}$  inch.

4. **Moisture.** During the application of fertilizer and compost, ample moisture should be available, for this is needed to firm the compost, to place it in contact with the growing stolons, and also to increase the availability of the fertilizer.

5. **Diseases.** A sharp watch must be kept to detect the occurrence of diseases. At the slightest indication of a disease attack apply the necessary treatment.

A green properly constructed and prepared; planted with an improved strain of putting-green grass in late August or early September; and adequately maintained should produce a satisfactory playing-surface by the following June. A green so developed will cut down excessive after-care and will help to eliminate many headaches due to turf injury arising from faulty green construction and inferior grass. Such a green will be of beauty, utility and value to any golf club, provide enjoyment for the players and turf of which the greenkeeper can be proud.

### Superintendents Tell Why Nurseries Are Needed

Robt. Scott, Sr. of Five Farms, Charles Treacy of Congressional and Wm. Glover of Fairfax presented a round-up on turf nurseries to fellow members of the Mid-Atlantic Assn. of Golf Course Supts. In the association's Turf News Letter, the three testifying authorities were quoted as most frequently referring to Arlington (C-1), Congressional (C-19), and Dahlgren (C-115) bents; Merion (B-27) bluegrass; U-3 Bermuda; and the zoysia grasses.

Summarizing major reasons Scott, Treacy and Glover gave for establishing a turf nursery:

1. In time of emergency a turf nursery is essential.

2. Turf nurseries of improved strains of grasses pay for themselves many times over—a case of “having your cake and eating it too.”

3. When re-turfing a green, stolons from the stolon nursery give the quickest and most satisfactory cover. Healthy viable stolons that lift easily with their root systems intact can be obtained by topdressing between the nursery rows with peat or sawdust. Stolons were recommended when the green can be taken out of play. Should the green remain open for play, the plugging method of introducing new strains of grass is very satisfactory.

4. By introducing plugs of turf into a poor green, not only are improved turf grasses introduced, but also the soil structure of the green is changed painlessly. By introducing a good soil mixture attached to each plug, it is possible to improve considerably a poor green without a major operation. A good portion of this conversion can be accomplished with normal cup changing. It is understood that if the plugging method is used the putting green nursery should be established on the type of soil mixture desired in your present greens. It should be understood further that plugging will not alleviate all built-in headaches such as impervious clay layers and lack of sufficient sub-surface drainage. In many instances complete re-building will be necessary.

5. A turf nursery is an ideal place for testing new fungicides, herbicides and other chemicals. It is a valuable place to experiment without risking putting greens and other areas on the golf course proper.

6. In addition to alleviating problems on the golf course, a turf nursery is valuable for general landscaping around the clubhouse.

7. A turf nursery is a Golf Course Superintendent's proving ground. It is a place where he is able to observe the performance of new strains of grass. After they have been proven to the superintendent's satisfaction in his own nursery, their ultimate use can be decided upon. Research workers make valuable recommendations but each superintendent should test recommended grasses under his own growing conditions.

8. On days when employees cannot work on the golf course they can be kept busy with nursery work.

9. A turf nursery aids each superintendent in the identification of new strains of grass, and if only for the purpose of enhancing his position as a turf specialist he should have three grasses in his nursery.

10. The nursery can be used as a lever to action. If club members see how well grasses perform in the nursery, the superintendent easily can “sell” the members on changing over to the newer and better strains.

11. Public interest in better turf grasses for all purposes is furthered through the establishment of turf nurseries. Public recognition of improved turf should be stimulated by the Golf Course Superintendent.

12. To convert nursery rows of bent, bermuda, and zoysia into sod, topdress in between the rows as the grasses spread. If regular mowing practices have been adhered to the need for topdressing may be eliminated. If the nursery rows have been allowed to grow tall for stolon or seed production a gradual decrease in the height-of-cut will benefit the sod.