

TIMELY TURF TOPICS

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CREEPING BENT NURSERY AND POSTWAR REHABILITATION PROGRAMS ON GOLF COURSES: Thoughts of golf course officials are no doubt being directed now to a postwar rehabilitation program which will bring their course into good playing condition as efficiently as possible after hostilities have ended. With the more or less curtailed maintenance programs in effect on all greens today, it is inevitable that there will be a sizable demand for vegetative planting material to reconstruct or repair putting greens. Anticipating this need, each golf course has it in its power now to establish or enlarge its turf nursery so as to have available sufficient vegetative material to take care of its own rehabilitation program after the war. Where creeping bent is used for the greens it is probably not too early to start a stolon nursery this year or if one is already established to consider the possibility of enlarging it with vegetative material from the greens as they exist at present or with new strains which have possibilities of being superior in that area.

In the June issue of **TIMELY TURF TOPICS** a summary of the results on the Green Section's experimental greens was published. If in planning for postwar planting there is any thought of changing to a creeping bent other than that in use at present on your greens, it might be well to contemplate the possibility of trying one or two of the strains which proved superior in the Green Section's tests. Of these, only one (C 52) is available commercially. The others, however, are being increased this summer by the Green Section as labor permits and will be available in limited quantities to any member clubs desiring a limited supply this fall. Any club desiring vegetative material of one or more of the superior strains mentioned above should notify the Green Section as soon as possible in order that the available material can be properly allocated for shipment in September.

DISTRIBUTING ARSENATE OF LEAD ON HILLSIDES: Fairways located on steeply rolling ground frequently present serious difficulties when it comes to the distribution of arsenate of lead or other pesticides. The effectiveness of applications on such areas frequently is dependent on a number of factors such as the degree of slope, the condition of the turf, the texture of the soil, etc. Satisfactory applications are much more easily obtained on such areas when the soil is covered with a dense turf which is able to hold the chemical. When the chemical is to be applied as a spray the soil should be sufficiently moist to absorb the spray solution readily. If the purpose of the application of arsenate of lead is to reach grubs and other pests which feed below the surface of the soil and the arsenate of lead is applied as a spray the turf should be sprinkled immediately in order to wash off the spray from the surface of the grass leaves before it has an opportunity to dry on them. On slopes it is particularly important to use the minimum amount of water for this purpose in order to prevent washing. Also according to the Bureau of Entomology and Plant Quarantine in the Department of Agriculture it would perhaps be better to wash up the slope rather than down the slope. According to Dr. Hadley dry applications on thin turf or bare areas are probably more satisfactory than spray applications. Dry mixed with sand or organic fertilizer, the arsenate of lead can be applied easily and the material will carry down between the blades of grass without adhering to them so long as they are not wet at the time of application. In case of bare spots if the material is to be applied dry it would probably be better to rake the spots horizontally first so as to have a series of small ridges making parallel contours. These will hold the arsenate of lead and prevent washing.

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ESTABLISHMENT AND CARE OF THE STOLON NURSERY

The most favorable time of year for planting bent grass either in the stolon or the sod nursery is usually during late August or early September. When possible it is advisable to select the area or the site of the nursery in the spring or, better still, the preceding fall in order to permit the area to lie fallow, with occasional repeated disking and harrowing to remove the weeds before planting a cover crop in the spring. When a good seed bed has thus been prepared, if time permits it is advisable to plant a green manure crop such as soybeans in the North or cowpeas in the South in the spring and give it the best possible growing conditions during the summer for turning under in August. The heavier the cover crop the more humus is added to the soil. After the green manure crop has been turned under, a few weeks should be allowed for its partial decomposition as well as the settling and fining of the soil which are essential for best results.

If the decision is made this fall to plant a stolon nursery, the need for which was not anticipated a year ago, the selected area should be plowed at once in order to permit the ground to settle and the vegetation to decompose as much as possible before planting the stolons in September. For a stolon nursery this is possible, provided no bents have been grown on the area within the last year, because a stolon nursery can be kept cultivated much as is a garden.

SELECTION OF SITE: As was mentioned in the May, 1941, issue of *TIMELY TURF TOPICS* the site of the stolon nursery should be carefully selected. If possible it should be in a location convenient to the work center so that the greenkeeping staff can not have an opportunity to overlook the possibility of using odd moments for caring for it. Unless it is convenient, particularly with the current shortage of labor, the watering, weeding and feeding of the nursery may be neglected. The nursery should be located on a site with good soil and drainage and as free as possible from weeds and seeding grasses. It should never be located on an area formerly devoted to a bent nursery unless at least one year has elapsed since the old nursery was plowed. Contamination of the nursery row with stolons from other strains or with seed from other grasses may be all too easily overlooked until the contaminated stolon material is planted on a green and a spotted turf has resulted.

SELECTION OF THE GRASS: The selection of the grass for the stolon nursery should receive careful consideration from the standpoint of the ultimate use of the planting material which is to be produced. If the goal is to increase material for the planting of a sod nursery to furnish turf for patching the established greens the stolons which are to be used in its establishment should be taken from plugs from the greens in order to match the grass in color, density and texture. If the purpose of the stolon nursery on the other hand is to raise stolons for planting new areas or replanting entire old areas the possible strains which do well in your community should be considered and the one or several which seem most desirable should be selected. The experimental greens which were summarized in the June, 1944, issue of *TIMELY TURF TOPICS* were established in many golfing districts throughout the country. Since on these greens numerous of the Green Section's selections as well as the commonly used and commercially available strains were tested, results of the green in your district should help you to select the strain or strains you wish to plant in your stolon nursery.

PLANTING THE STOLONS: For the stolon nursery the stolons should not be chopped fine as for planting with sod but the grass should merely be torn apart. The stolons should then be planted in rows about $1\frac{1}{2}$ inches deep and 6 feet apart. They should be covered lightly with about 1/4-inch of soil, leaving portions of the leaves showing above the soil. If care is exercised in separating the sod and planting the stolons, 1 square foot of sod will probably provide enough stolons to plant 100 feet of nursery row. When ample material is available, however, it is often better to use 3 square feet of

ab 100 feet of row. If more than one strain is to be planted 20 or 30 feet should be allowed between the last row of one strain and the first row of the next. Even so, in the case of creeping bent, fragments of one may be carried into the other by cultivators or other tools unless extreme precautions are observed. The slightest mixture in the nursery may later result in a mottled turf.

CARE OF THE NURSERY: The surface should be kept moist until the stolons are rooted and have started growth. The need for watering will of course depend on the weather but under no circumstances must the stolons be allowed to become dry. The nursery should receive care comparable to that given a garden. The soil should be cultivated between the rows as often as is necessary to keep down the weeds. The weeds should be kept out of the rows by hand weeding. After each cultivation it is also well to comb out the stolons or runners from the center of the row with a rake. This encourages spreading and the production of more stolons to the row. This system of cultivation should be continued until the rows spread to such an extent that a cultivator can not pass between them. If growth is slow it may be advisable to mix a nitrogen carrier - sulfate of ammonia or ammonium nitrate with compost and apply it to the soil along the tips of the stolons, working it well into the soil and being careful not to cover the stolons. Sulfate of ammonia applied at the rate of 3 pounds to 1,000 square feet or ammonium nitrate at the rate of 2 pounds to 1,000 square feet should give satisfactory stimulation.

Perhaps the most important precaution of all is to make certain that the grass in the nursery does not go to seed. Vegetatively propagated strains produce seed but do not come true from the seed. Therefore if the grass in a stolon nursery is permitted to set seed, young seedling plants may arise among those produced from stolons and these will probably vary in type from those of the true strain. When stolons from such mixed plantings are later used for the establishment of turf the result may be a mottled and uneven sod.

TIME REQUIRED TO DEVELOP A NURSERY: A stolon nursery planted in late summer or fall will be ready for use a year later. It is not advisable to plant a nursery during the spring or summer because of both the unfavorable conditions during the hot summer months and the weed problem. Plantings made at any time other than late summer or early fall are likely to necessitate an excessive amount of weeding. Best results are secured from a young (one year old) stolon nursery.

QUANTITY OF STOLONS REQUIRED FOR PLANTING TURF: A one-year old nursery row should be from 4 to 7 feet wide, depending on the fertility of the soil and the amount of available moisture. It is usually estimated that 1 square foot of well developed nursery row should furnish sufficient stolons to plant 10 square feet of turf. It is therefore reasonably safe to estimate that 100 feet of nursery row will supply enough stolons at the end of one year to plant from 4,000 to 7,000 square feet.

ERADICATION OF EARTHWORMS: Casts of earthworms are a decided nuisance on putting greens from the standpoint of the player as well as because of the fact that in the earth which is brought up by the worms weed seed which are otherwise buried are brought to the surface and are likely to be left on the turf when the worm casts are removed. These undesirable features of the casts more than outweigh the good which the worms do in the way of loosening the soil through their subterranean activity. Their eradication from putting greens, therefore, is a "must" in a maintenance program.

Perhaps the treatment which is likely to give the best control this time of year with the least danger of injury to the grass is an application of arsenate of lead at the rate of 5 pounds to 1,000 square feet. On the greens the material may well be applied mixed with the topdressing. When applied in hot weather, particular care should be taken that the foliage is not wet at the time of application in order to avoid any danger of burning the grass as the result of material adhering to the surface of the leaves. After the arsenate of lead has been applied the green should be well watered in order to wash the arsenate of lead from the leaves into the soil.

Another material which is easy to apply and which is not dangerous so far as grass is concerned is mowrah meal. When this material is applied at the rate of 15 pounds to 1,000 square feet it should bring the worms to the surface promptly. It is advisable to sweep the worms from the surface although if labor is not available for this purpose the chances of the worms going back into the ground are not very great. They usually die and shrivel up on the surface.

For use in spring or fall bichloride of mercury is no doubt the most efficient chemical. The rate that is recommended in the Bulletin for the control of earthworms has been 2 to 3 ounces to 1,000 square feet, applied either in 50 gallons of water or dry mixed with sand. Regardless of which method is employed, the turf should be well watered after the bichloride of mercury has been applied. However, care must be exerted in watering in order to avoid the formation of any puddles on the surface of the greens, for in these puddles the chemical will tend to accumulate in stronger solutions and burn the grass. Because of the great danger of burning the grass severely with bichloride of mercury at this rate in hot weather it is not generally advisable to use this material except in spring and fall when the grass is more tolerant to it. If the bichloride of mercury is to be used in the summer the rate should be reduced in order to reduce the possibility of injury.

ZOYSIA MATRELLA: Recently considerable interest has been aroused among the turf-minded public in the possibilities of *Zoysia matrella* as a turf grass. This more-or-less-country-wide interest in Manila *Zoysia*, Manila grass, or Korean lawn grass, as it is variously known, has apparently resulted from publicity given it in an aviation periodical because of its ability to produce a dense, low-growing, wear-resistant sod such as is necessary for airfields. As the common names of this grass indicate it has been introduced into this country from the Orient and should be considered more or less a subtropical grass. It is a low-growing (from 4 to 6 inches of growth during an entire growing season), rather fine-leafed, dark-green grass. It spreads laterally by means of stolons on the surface of the ground and is characterized by a dense mat of tough roots close to the surface of the soil. Once it has become established the dense mat of interwoven tough roots and stolons produces an extremely wear-resistant sod, relatively free of weeds. So dense is the mat of roots and stolons that when dormant sod is lifted and the soil all removed by water the result is a dense mat, not unlike the cocoa door mats in appearance. All of these characteristics considered alone indicate that *Zoysia matrella* might be the panacea for many turf ills.

The fact is unfortunately true, however, that the grass is extremely slow to become established even in the southern states. For planting material reliance must be placed on stolons which are available commercially because at present there is no commercial source of seed of this grass. Speaking of *Zoysia matrella*, Sturkie and Fisher of the Alabama Agricultural Experiment Station say that it "requires about two years to establish a good lawn using 2 inch square pieces of sod spaced 12 inches apart. Under the same basis Bermuda grass would produce one in two months." This slowness to become established is a very serious handicap for the grass as concerns its use on airfields, road sides, and athletic fields, where quick results are imperative. This is extremely unfortunate because of the fact that its other qualities would make it the ideal grass for these purposes in sections of the country which are not so far north as to cause it to be winterkilled.

For lawn purposes in the South, however, where speed of establishment is not so imperative the above mentioned experiment station workers express the opinion that "it is probably the best grass that has been found for Alabama provided the lawn is well cared for." Although it requires water for the production of a dense sod, well-established turf is quite resistant to drought. Ample fertilization is necessary. Also it does not thrive where the soil is too acid. In Alabama the grass died when the soil became as acid as pH 4.5. In the South the grass is recommended particularly for shady areas. In some tests at the Alabama Agricultural Experiment Station it has tolerated a more dense shade than any other grass tested. Also, according to Sturkie and Fisher, it is one of the first grasses in Alabama to initiate growth in the spring and one of the last to die in the fall, remaining green 9 to 10 months out of the year, which is a much longer growing period than Bermuda grass enjoys.