Rooting ability of sod grown on two soil types

Rooting ability of Merion Kentucky bluegrass sod grown on mineral and muck soil. *J.H. Dunn and R.E. Engel. 1970. Agronomy Journal. 62(4):517-520. (from the Department of Soils and Crops, Rutgers-The State University, New Brunswick, N.J. 08903).*

The objective of this study was to compare the shear strength and rooting ability of Merion Kentucky bluegrass sods grown on organic and mineral soils in various regions of the Northeastern and midwestern sections of the United States.

The shear strength of transplanted sod was determined by utilizing an eight-inch by eight-inch hooked-nail board that was hooked into the sod and then attached to a scale which in turn was connected to a small boat winch. The sod piece under the hooked-nail board was cut free from the surrounding turf with a knife and then sheared from the underlying soil surface by a slow steady horizontal pull from the boat winch. The maximum weight recorded on the scale as the sod broke loose from the soil was used as a measure of the shear strength.

Rooting ability of the transplanted sod was determined by placing a sod piece in a root observation box that was eight inches square by 20 inches deep with one plexiglass side to permit viewing of root growth. Measurements taken from the root observation box study included number of roots appearing, rate of vertical root penetration and total quantity of roots produced during a 22-day period following sod transplanting. The carbohydrate content of the roots was also determined.

Three experiments were conducted during the growing season. In the case of the shear strength experiments the sod pieces from various sources were cut mechanically and placed onto a loam soil that had been fertilized with 50 pounds per 1,000 square feet of 5-10-5 prior to transplanting. The experiments were arranged in a randomized block design of either three or four replications according to the specific test.

In the root observation box experiment, a sandy loam soil having a pH of 7.3 and adequate phosphorus and potassium levels was utilized. The root observation containers were placed in an unshaded outdoor site that had good air circulation. Three replications were utilized. The sods in all experiments were irrigated

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Beard

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regularly to prevent drying during the establishment period.

Sods from Eastern sources, two grown on mineral soil and two on organic soil, were utilized in the June 3d experiment. The sod pieces were cut to a thickness of 1.9 inches. Nitrogen applications were incorporated into the upper inch of soil at rates of 0.75, 1.25 and 2.25 pounds per 1,000 square feet. There were four replications. Shear tests were conducted on the 26th and 40th days following transplanting.

In the July 30th experiment, 10 sods grown on organic soil and seven grown on mineral soil were cut to a thickness of 1.9 inches and transplanted on the site previously described using three replications. Shear strength tests were conducted after 14 and 96 days of rooting.

The July 28th experiment was conducted utilizing 10 Eastern and midwestern sod sources grown on organic soil and seven Eastern sod sources grown on mineral soil. The sods were cut at 0.75 and 1.5 inch thickness prior to transplanting. Three replications were included. Shear strength tests were made at 11, 82 and 196 days following transplanting.

Results: Shear strength comparisons revealed that most of the variability associated with the rooting component of shear strength was attributed to the individual sod source rather than whether the sod was grown on an organic or mineral type soil. This variability among individual sod sources was associated with (a) varying ages of sod ranging from 11 to 32 months and (b) the specific cultural practices during production, particularly the cutting height and frequency as well as the nitrogen fertility level.

Variability according to individual sod sources was also observed in terms of total root production in the root observation box experiment. No specific trends in root production could be found when comparing sod grown on organic versus mineral soil. In addition, root dry weight production in the boxes was not necessarily correlated with the shear strength measurements on the corresponding transplanted sods. Also, rooting ability was not correlated with the carbohydrate content in the shoots and roots of sods grown in the root observation boxes for 22 days.

Shear strength studies where various sod cutting thicknesses were compared revealed that sods cut 0.75 inches thick had consistently higher shear strength values following transplanting than sods cut 1.5 inches thick. Soil nitrogen application rates of 0.75, 1.25 and 2.25 pounds per 1,000 square feet had no affect on the shear strength values obtained in these experiments. Measurements of total rhizome length revealed that shear strength was negatively correlated with the total rhizome length regardless of the sod source.

Comments: The shear strength measurement technique developed by these authors measures a combination of the rooting ability of the transplanted sod to shear or separate from the underlying soil when subjected to a horizontal pressure. This shear plane effect is sometimes noted in the case of divots taken by a golf club, particularly on tees that are reestablished with sod containing a distinctly different soil particle size than the underlying soil.

This study confirms earlier ex-

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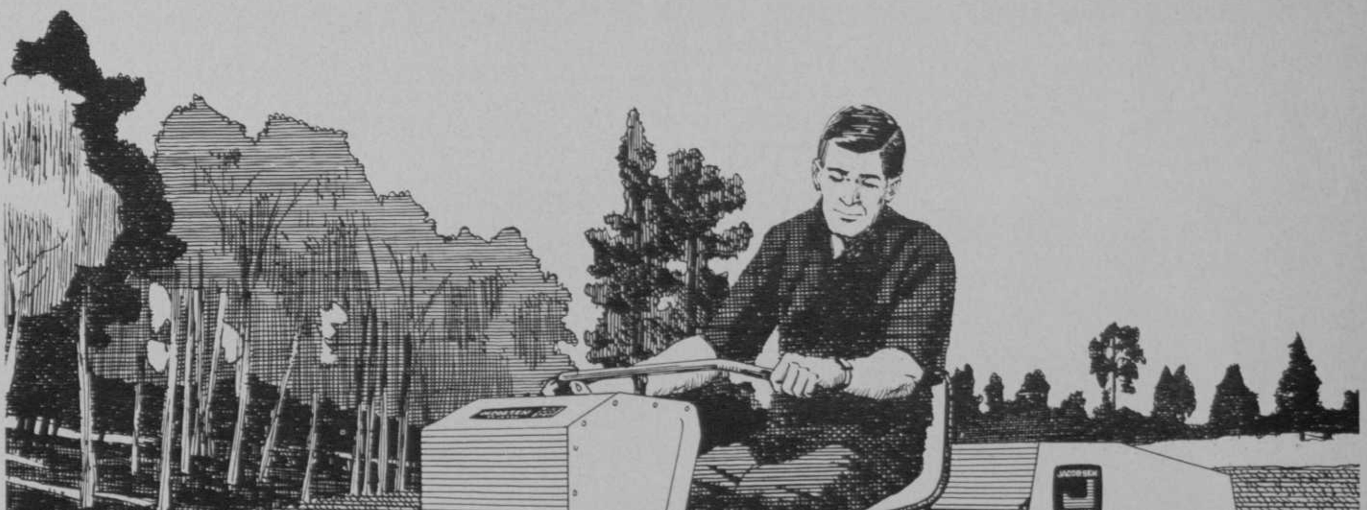

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Municipal Field Day, Cole Nursery Company, Inc., Circleville, Ohio, August 9.

Landscape Architects' Field Day, Cole Nursery Company, Inc., Circleville, Ohio, August 11.

NGF Eastern Invitational Seminar for Teachers, Pine Needles Lodges & CC, Southern Pines, N.C., August 16-20.

Turfgrass Field Day, Crop Science Field Laboratory, Michigan State University, East Lansing, Mich., September 9.

Alabama-Northwest Florida Annual Turfgrass Short Course, Auburn University, Auburn, Ala., September 19-22.

Florida Turfgrass Management Conference, Pier 66, Ft. Lauderdale, Fla., September 19-22.

Midwest Regional Turf Foundation Field Day, Purdue University, Lafayette, Ind., September 27.

Wisconsin Golf Turf Symposium, Sewerage Commission of the City of Milwaukee, Wis., November 4-5.

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FRED V. GRAU

ANSWERS TO TURF QUESTIONS

Juvenility: "Youthfulness or youthful manner of character" (Webster)

For the above word and what it implies particularly regarding turf, we are indebted to Mrs. Edmund B. Ault, who transmitted the word to me via her husband, the golf architect. Over lunch we discussed the meaning of the word.

The best and the most naturally disease-resistant turf is composed of young (juvenile) grass. There seems to be general agreement that severe turf troubles begin after about the second year. Merion bluegrass, for example, develops its weaknesses after three to four years, but retains its well-known resistance to leafspot.

Putting greens become increasingly susceptible to leaf disease as they age. New greens rarely have such difficulties.

If we agree on this premise, we can move to methods of developing and maintaining juvenility in our turfgrass areas. We lay no claim to knowing all the answers, but let's open the subject.

When a farmer's alfalfa or clover field "runs out" he plows and reseeds. It isn't practical, however, to plow and reseed a fairway or an athletic field (but it has been done), so the superintendent must turn to a scarifier or vertical mower to remove thatch and old grass blades that are diseased and dead. Then he has recourse to lime (if needed) and fertilizer to stimulate new growth—new grass blades that are disease resistant.

Another logical approach to the concept of juvenility in turf is regular periodic reseeding. This method has been practical only in relation to the "scorched earth" policy until the advent of the scarifier-seeder, which permits the reseeding of turfgrass areas without disturbing play. Now the superintendent can actively promote fresh young grass blades by growing new grass from new seed.

Tillering is a device of most grasses whereby new shoots are produced close to the old stem. The new tillers are fresh and essentially juvenile plants.

Rhizomes of certain grasses (Kentucky bluegrass, for example) continue to produce new fresh growth which is much more disease resistant than the old blades.

Stolons of other grasses (Penncross creeping bent is a good example) grow out from the parent plant, take root at the nodes and produce fresh shoots which are highly resistant to disease.

In summary, the turfgrass manager must do everything he can to keep his grass from growing old. Juvenility is encouraged by: 1) liming and fertilizing; 2) periodic reseeding; 3) stimulating rhizome and stolon growth by scarification and cultivation; 4) sensible irrigation, and 5) removing old diseased leaves.

Q—*We plan to use triplex greens mowers, but we are concerned about the compaction that may result. The manufacturer claims that compaction will be minimal. How do you view the situation?*

Similarly, we are concerned about compaction on our fairways even though the golf cars have over-size tires. (Pennsylvania)

A—Compaction from triplex greens mowers and from golf cars does not seem to be one of the major problems with these pieces of equipment. The heel print from a golfer's shoe will show more compaction than will tire tracks from mowers and golf cars. Modern aeration equipment is designed to correction compaction regardless of the cause. Good turf kept on the "dry side" resists compaction better than does overwatered turf. □

A CASE OF SUCCESS AND FAILURE

This is the story of two country clubs, both of which were located in a large midwestern city. Both started out under similar conditions and circumstances. One is now a thriving active club with over 500 members and a waiting list. The other, after 12 years, went broke. The story is true. Hopefully the causes outlined in this story of the success of one club and failure of the other will be of some help to persons involved in the direction of clubs.

The successful club at the start had an old public golf course that was fairly run down, but playable. The pro shop was ancient; it was even heated by an old wooden stove. An elderly couple had owned and operated the facilities for 30 years and wanted to sell to a private club group, but no private club group wanted the facilities. My job as a golf course consultant, therefore, was to form and sell people on the idea of organizing a country club. It wasn't easy, but within four months enough people had bought stock and membership in the club to take it over from the owners. With 225 members, each buying $270 shares of stock, a substantial down payment was paid to the owners. A balance of just under $100,000 was to be paid off over a period of about eight years.

The next problem was to make as many of these charter members as possible feel that the club was theirs and that it was their responsibility to make the club serve their present needs. The board of directors and myself felt that if we could get 50 per cent of the members really sold on the club, we could then set up goals to transform the existing facilities in a fine club.

The unsuccessful club started with a new golf course, a swimming pool and a small but adequate pro shop and grill. Like its cousin, this club began also with about 200 members and about the same amount of indebtedness. The general management of the club was delegated to the board of directors. It was obvious within several months that something was drastically wrong. The membership was inactive and bored.

The first mistake in a series of mistakes in this club's case was not getting the majority of the stockholders to feel a part of the club, which ultimately affected the board's ability to accomplish goals and to communicate with the membership. The board should have put at least 50 of the members on some working committees. Due to poor planning and organization these several hundred members became apathetic.

With the average country club, the success or failure in most cases stems from not actively selling the member after he becomes a member. The board of directors has to appeal to the membership for their support in achieving the goals they all want. It may take from 10 to 15 years to complete the average country club. Very rarely does one begin with a "finished" club. Goals take time and these goals can only be attained by getting the members organized to work for the club.

To sum up, one cause contributing to the failure of the losing club was that the general membership was ignored. Had this same membership been made a part of the team they would have been interested enough to go ahead and make future plans for improvements.

Let's go on. The board at the losing club then decided that a new clubhouse would excite and activate the bored members, but the question of cost had to be considered.

It is a hard job to sell to an already unhappy member the idea that by putting up another $500 he suddenly will become happy. One of the basic functions of the board of directors is to communicate with the entire membership. With no active committees to assist in communications, there is no way the board can know the true feelings and thoughts of its members.

The board at the unsuccessful club was betting that this new clubhouse would attract the 300 more members they needed and concurrently satisfy those members they already had.

This is a poor gamble anyway one looks at it. First, the original stock had to be raised to take care of the cost of the new clubhouse. It is difficult to sell a $1,000 share of stock without a new clubhouse; it is even more difficult to assess the limited membership $500. The directors ignored these important factors and proceeded to build an

THE AUTHOR CHRONICLES THE HISTORY OF TWO COUNTRY CLUBS—ONE SUCCESSFUL, ONE A FAILURE—AND EXPLORES THE VITAL DECISIONS THAT WERE MADE IN EACH CASE

By Gene O'Brien

Golf Course Consultant