

## RELATING TURF GROWTH TO DISEASE CONTROL

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The proper establishment and maintenance of grass only important in producing a high quality turf, but is also essential if a lawn is to reduce the threat of disease. I will use the processes of sod transplantation and maintenance to illustrate the relatedness of proper establishment to the reduction of stress in a turf. Much of what I will say also relates to the establishment of a lawn from seed, as well. The sodding process is different from that of seeding because a living plant is being transplanted. Consider for a moment the idea, that if handled properly, the life and quality of sod can be extended in terms of a longer lasting lawn with less disease, when the sod is grown over a broader range of soils.

Sod establishment can be divided into three phases: i) sod production; ii) sod bed preparation; and iii) post transplant management. The selection of the grass specie to be used is the most critical decision that is made in turf establishment. At no other time will there be as much control over characteristics such as spring greenup, disease resistance, leaf texture, vigor of growth, density, or survival. In addition, the decision of blending or mixing can be made. For both seed and sod, the selection of the grass species or varieties is very important and should be considered very carefully. Also, the geographic location and purpose of the turf should be considered in selecting the seed, for the general quality of a turf will change with the season, i.e. one variety may be of higher quality in April, but lower quality in July. For example, the bluegrass I-13 is of greater quality in April than in July while variety Adelphi is about the same during both months. Likewise, the response of bluegrass, in terms of quality, to the level of maintenance can vary among bluegrass varieties. For example, the quality of Adelphi will significantly increase if the rate of nitrogen is increased from 2 lbs/M/yr to 4 lbs/M/yr. Even more important are the differences in rooting among the different varieties. The variety Parade produces many more shoots than roots compared to the variety Touchdown (data from the University of Iowa, N. Christians).

The establishment of a sod is a very important process and if done poorly can cause many problems, including disease development, to plague a lawn for years to come. In the state of Illinois, the most important problems that develop in turf are those that reduce the vigor of the root system. Stresses such as drought, poor or compacted soils, reduce interfacing and inappropriate management cause weak root development. A poor root system will lead to stress and possibly disease. Diseases that attack the roots and rhizomes are the most destructive, because these structures are the recovery and survival mechanisms of the grass plant. Several important questions can be asked concerning the development of proper root system. How does the sod-soil affect interfacing? How does the sod age affect rooting? Can core aerifying of the sod bed increase the rooting of sod? Does fertilization of the sod bed soil increase interfacing?

The soil under a turf can determine the type of grass that will do well as a lawn. Soils heavy in clay generally support less dense lawns, show more stress and more disease. Unfortunately, many lawns are established on these

poor soils. In the case of sod, the sod-soil is generally an excellent soil and often of a different textural class than the sod-bed soil. This presents the possibility of developing an interfacing problem. Interfacing refers to the process of two different soil layers coming together and acting as one layer. The greater the difference in the texture, drainage and organic matter between the two layers, the poorer the chance they will interface. In Illinois, sod soils can range from silty clays to peat soils. This range of soil types combined with the range of sod bed soils found in the state present a challenge to the turf industry to establish and maintain high quality lawns.

What sod should be used, "peat" or "mineral," and does the age of the sod affect establishment? Research has shown us that the most important characteristic of a sod, in terms of interfacing, is the age of the sod. The optimization of this factor will generally be more important than interfacing problems. This is good news, because the age of the sod can be managed. In fact, one-year-old peat sod established stronger roots than did mineral sod, but both significantly out performed three-year-old sod. The method used to establish how strongly a sod roots is that of pull-strength. The actual force (lbs/square foot) are measured. The sod bed soil will have an effect on the rooting but only during the early months of establishment. A clay soil will retard the establishment of sod compared to a silt soil. This is not surprising, but generally this problem is not seen after 12 months. The first 6 weeks following the laying of sod appear to be critical in the proper establishment. Special care should be given during this period. I would again state that the age of the sod is the most important parameter in terms of root establishment and sod that is about 12-18 months old is the best in terms of rooting and handling.

The second phase of establishing a lawn for optimal performance is the sod bed preparation. Are soil preparations necessary for this? They are very important and often overlooked or underestimated. During the preparation of a site you should consider the soil type, soil cultivation, soil moisture and heat, previous vegetation and the geographic location of your area. I will not discuss all of these, but instead introduce you to some new ideas relating to this subject. Again, the importance of root establishment can not be emphasized too much. To improve the interfacing of sod into poor soils, the surface area under the sod was increased. When sod is laid, it is placed on a flat surface. Therefore, each square foot of sod must root into only one square foot of soil. If we core aerify a soil with 1/2 inch tines on two inch centers, the surface area of the soil is increased more than 2 times. This could offer a greater opportunity for roots to establish. It was found that this difference was realized even after 12 months from the time of laying the sod. In both poor soils and in good soils, the coring improved the quality of the sod, but the root strengths were not equal. In good soils, the cores improved the root strength, but in poor soils there was an initial period where the root strength appears weaker than uncored soil. However, after 12 months both the quality and the strength of roots in poor soils that were cored were greater than uncored.

Does a sod need nitrogen incorporated into the sod bed soil for optimal establishment? In poor soils, the rooting strength can be increased by the incorporation of nitrogen, but not in all cases. For example, during the first four weeks following sod establishment, only urea improved the rooting while slow-release forms did not improve the rooting significantly. After 12

months, the slow-release forms of nitrogen improved the rooting in poor soils. Generally, in good quality soils the use of nitrogen is less important than the sod age or soil preparation.

The final phase of sod establishment is that of post transplant management. There are two important periods to consider: short term management and long term management. Short term management is that period of time (6-12 weeks) immediately following the transplanting of the sod. During this time, the root and rhizome activities are paramount to the success of the sod. Excessive heat and limited moisture are the two main threats during this process. It is very important during this period that the sod be watered deep and the sod cooled. It is not advisable to apply fertilizer or pesticides to the top of a newly sodded lawn until after the critical period. The length of this period will vary depending on the climatic condition and the quality of the sod bed. The long term management is what most of you do for a living. I will not comment on this topic today except to point out that lawns are dynamic and change with time. A newly established lawn (one or two years) is not the same as lawn that is 5-10-years old. Lawns must be rejuvenated if they are to continue to grow and maintain the optimal root and rhizome mass. Lawns that have excellent roots and rhizomes will tolerate more stress and develop less disease.