

## LCAT STOP 6

### Managing Kentucky Bluegrass on Compacted Subsoils

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For the lack of quality topsoil, turfs on many grounds in Michigan have been established on subsoils. All too often that soil is a compacted clay loam or clay soil, usually from a basement. The subsoil may be leveled with little soil preparation, then Kentucky bluegrass sod is laid on top. This situation causes a major problem for the turf manager or home owner.

Such soils present a number of difficulties associated with physical, chemical, or biological limitations of subsoils. Physical soil problems associated with maintaining sod growing on compacted soils include: poor rooting, high susceptibility to moisture stress, wet spots, tendency to form thatch, hard surfaces, and runoff of irrigation or rainfall. Chemically, most subsoils in Michigan that are high in clay content have a pH well above 7.0 that could reduce nutrient availability, particularly for the micronutrients. They are naturally very low in phosphorus and nitrogen, but they do have high cation exchange capacities. Because there is little or no organic matter in subsoils they have limited biological activity. Soil microorganisms and macroorganisms feed on organic matter. It will require several years for turf on subsoils to add enough organic matter to encourage soil biological activity. Some subsoils are so dense that even earthworm activity is limited.

What can be done to improve turf on subsoils? Given enough time, grass roots, earthworms, and other soil organisms can provide some improvement in the physical condition and the biological activity of the soil. The best approach is to modify the soil, cultivate, and add fertilizer before laying the sod. Once established, to aid in addressing the compaction problem, provide core cultivation twice a year. The aerifier tines should reach a depth of a minimum of 2 inches with holes 3 to 4 inches apart. To achieve this spacing may require several passes over the site. Regular cultivation will likely be needed for many years to correct a compacted soil condition. If the soil is not too wet or too dry, the aerifier may not work effectively.

Thatch formation is a common problem with sod on compacted soils, particularly when over watered. Turf roots grow in the thatch layer rather than forcing their way into the dense soil. Aggressive cultivation, good control of irrigation and judicious dethatching are suggested for controlling thatch. There is some evidence that the use of organic fertilizers can encourage activity of earthworms and organisms that can aid in thatch control.

Because of poor rooting a key to maintaining a healthy turf on subsoils is control of soil moisture. A shallow root system provides only a limited amount of available water in the root zone. For this reason, light, frequent watering is recommended. Watering daily can provide the moisture needed for the day and is an important tool in an integrated approach to control of necrotic ring spot, a common problem of Kentucky bluegrass sod growing on compacted soils. To provide this kind of control of soil moisture, an in-ground irrigation system is almost essential.

Since subsoils are naturally low in nutrients, these should be provided by fertilization. Phosphorus levels in subsoils are especially low. A soil test can be used to determine the need for phosphorus. If the turf has a purplish, dark green color and grows very little in spite of nitrogen applications, look for phosphorus deficiency. Although the sod will contain a good level of nitrogen when it is laid there is very little in the subsoil. Newly laid sod should not be fertilized heavily with nitrogen until the roots begin to grow into the soil. Then when there is a slowing of turf growth or a loss of color, nitrogen applications should be initiated. Annually, sod growing on subsoils will normally require a little more nitrogen than sod growing on a native topsoil. Unless soil tests suggest

otherwise it is wise to include a little phosphorus (1/2 lb. phosphate per 1000 sq. ft.) and potassium (1 lb. potash) in the fertilizer program each year. If clippings are removed the rates of these nutrients should be increased slightly.

Maintaining a healthy, attractive, stress tolerant turf on compacted subsoils requires greater attention to maintenance programs than when a good topsoil is used on the site. This is a case of pay me now or pay me later. Saving a few dollars on soil and site preparation at establishment time can make the job a lot easier in the future.

The objective of this study is to evaluate the effects of management practices on responses of the Kentucky bluegrass growing on this compacted clay subsoil. Treatment variables include irrigation, cultivation and fertilization.