Watching Your Tees & Q's

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Some Interesting Findings About Putting Green Construction and Materials

Even though not originally intended for research purposes, the development of a new sampling technique by Agri-Systems of Texas Inc. has revealed some very interesting and important findings. The extremely simple technique involves the hammering into the soil profile a section of 3 inch ID PVC pipe to the sub-base of an existing putting green. The pipe is then removed and the ends are tightly packed with newspapers and then sealed so that an intact core can be shipped to the lab for analysis.

Upon arriving at the lab, the length of the core is measured and the sub-soil material is removed from the base. Then a retaining screen is placed in the bottom and the core is then saturated. This procedure allows for a very accurate infiltration test of a putting green. Once the infiltration test is completed, the pipe is split long ways down each side and a physical history along with an analysis of the materials within is made.

The information derived from these procedures is then used to make recommendations and provide solutions to problems. Agri-Systems is also currently developing regional recommendations to further fine tune construction and management practices of putting greens. Some of the factors taken into consideration are: mean temperatures, rainfall, wind velocity, surface contours and other special problems. Thus, recommendations can be made for specific areas, and to the conditions into which the greens will have to be maintained. In a letter dated December 1, 1986, to Mr. William H. Bengeyfield, Executive Director of the USGA Green Section, Judith Gockel of Agri-Systems of Texas Inc. discussed some of their findings from analysis of the cores submitted during 1986. The following are some of her observations.

First and foremost, in the construction of the USGA "spec" type greens, the intermediate or choker layer CANNOT safely be eliminated. The particle size differences between the seedbed mix and the openings of the gravel blanket are too great for the mix to stay suspended in open air. To prevent the seedbed mix from migrating into the gravel blanket, it is necessary to have in place an intermediate layer that is 5 to 7 times greater in particle size than the seedbed mix, and also 5 to 7 times less than the gravel blanket. Even before the green is planted, the gravel blanket will become contaminated if the intermediate level is eliminated, and this results in water infiltration rates being reduced to its lowest common denominator. Thus, even before the green is brought into play, problems begin to arise.

Next, it has been found that in the construction of sand-peat type greens, the use of Michigan-type or bog peats, (and also muck type materials would be included here) will definitely cause problems. These "black" peats possess a very fine particle size and these materials will very rapidly migrate to form a layer within the sand of the seed bed mix. This layer results in reduced infiltration and excessive moisture retention and is a major contributor to the "black layer" phenomenon. When a fine sand is used for the seedbed mix, the high capillary porosity of the sand plus the water retention capacity of the peat causes a seedbed too wet for proper turfgrass growth and developement.

Agri-Systems is recommending the use of sphagnum peatmosses, (or composted rice hulls on the Gulf Coast and in the Mississippi Valley), as the source of organic material in the seedbed mix. There is always a potential for problems associated with any organic additive and this recommendation is based on mechanical considerations. Based on the above information, one would tend to think that a pure sand type of construction would eliminate a layering problem. As it turns out, a reverse and just as detrimental result occurs when pure sand is used. To compensate for the lack of organic matter in the seedbed mix, the root systems of the turf generates large quantities of its own debris, which migrates through the pore spaces of the sand. The resulting organic material tends to accumulate 2 to 3 inches below the soil surface and this creates a shallow, perched water table. Two of the worst cases of reduced infiltration were observed with all sand greens.

It has been my experience observing putting greens all over, that if problems are being experienced, 70% to 80% of the time the problem is due to the use of improper materials or construction techniques. While there are few guarantees in nature, with adherence to tried and true methods along with thorough testing of the available materials, can one be reasonably assured of success. This is true not only for the construction of new putting greens but also for the topdressing and renovation of existing greens. ■