Assessing Differential Root Zone Mixes for Putting Greens Over Time Under Two Environmental Conditions

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Goals:

- *Improve recommendations for sand particle size distribution and the depth of the root zone by consideration of the microenvironment.*
- *Evaluate composts as organic additives and inorganic products for root zone mixes compared to peat sources*
- *Assess the potential of various root zone mixes to reduce management and resource inputs*
- *Monitor the physical, chemical, and biological changes that occur in root zones as greens mature for understanding factors that contribute to the success or failure of greens.*

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Ten sand mixes have been constructed to give a wide range of size distributions falling within the USGA's recommendations for root zone mixes. Packed cores of the sand mixes have been made, and characterization of the sand mixes in terms of physical properties is underway. Saturated hydraulic conductivity has been measured for the ten sand mixes (without amendments); all are above the lower acceptable limit, and six of the ten mixes are above the upper acceptable limit for the accelerated range of saturated hydraulic conductivity.

As expected, correspondence of sand size distribution with saturated hydraulic conductivity was evident. Air-filled porosity at 40 cm tension was found to be within or slightly above the range recommended by the USGA. It was evident that air-filled porosity at 40-cm water tension did not completely measure porosity responsible for saturated hydraulic conductivity.

Other physical properties are currently being measured. Irish moss peat, sphagnum moss peat, reed sedge peat, and sewage sludge products have been obtained as organic matter sources and are in the process of being characterized. Leaf compost and mushroom compost also will be obtained for characterization and inclusion in test mixes. Physical measurements of sand mixes with organic amendments will follow in the near future.

Laboratory assessment of the sand mixes alone and in combination with amendments will be completed spring of 1997. Based on these laboratory data, root zone mixes

having a range of characteristics will be identified for study in the two micro-environments of the field research facility at North Brunswick, New Jersey. It is anticipated that putting green construction will be completed in late summer of 1997. Therefore, turf grow-in will be performed over the fall, winter, and spring of 1997-1998.

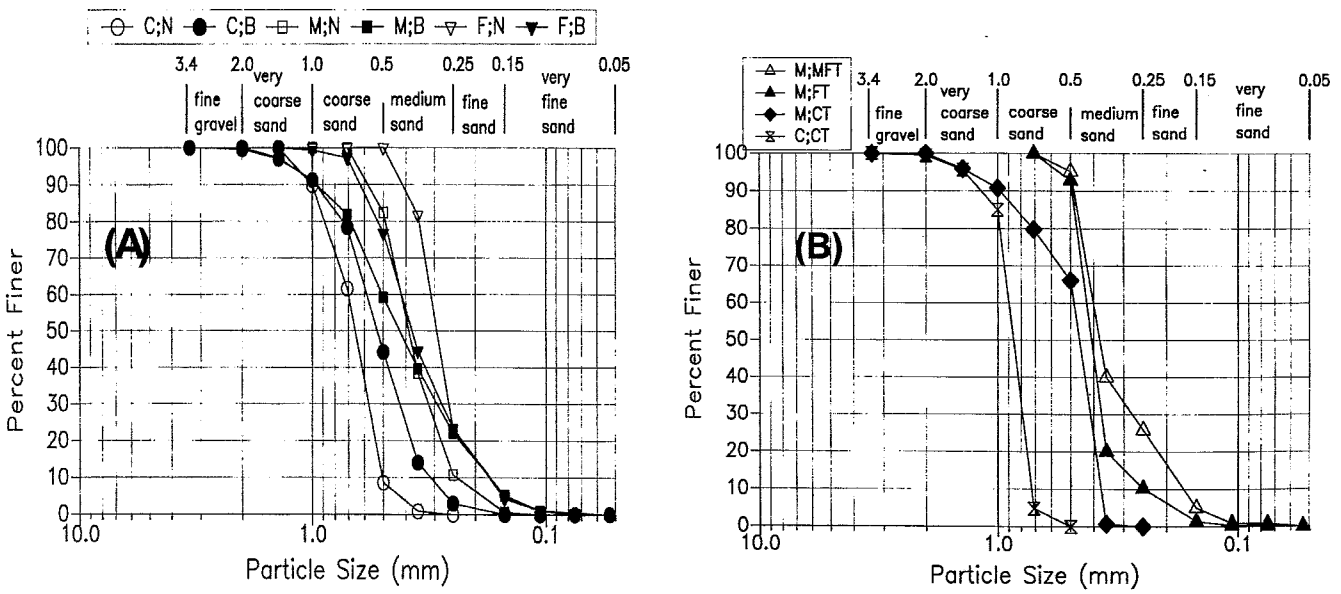

Figure 21. Sand size distribution curves for (A) coarse, medium and fine sand mixes with narrow or broad distributions, and (B) mixes modified within the fine or coarse sand classes.

Table 16. Saturated hydraulic conductivity and air-filled porosity at 40 cm water tension of sands varying in particle size distribution.

Sand Mix	Code	Saturated Hydraulic Conductivity	Air-filled Porosity at 40 cm
Coarse Narrow	C;N	138	30.0
Coarse Broad	C;B	93	29.8
Coarse Coarse Tail	C:CT	153	30.3
Medium Narrow	M;N	80	31.8
Medium Broad	M;B	41	24.0
Medium Coarse Tail	M;CT	97	31.5
Medium Fine Tail	M;FT	73	30.9
Medium Maximum Fine Tail	M;MFT	40	27.7
Fine Narrow	F;N	43	29.1
Fine Broad	F;B	42	25.8
$LSD_{0.05}$		22	1.0
C.V.		19	2.4