Organic Source Effects on Disease Suppression and Physical Stability of Putting Green Rootzone Mixes

Mary Thurn and Norman Hummel, Dept. of Floriculture and Ornamental Horticulture, and Eric Nelson, Dept. of Plant Pathology

The results of these experiments suggest that composts may be satisfactory organic amendments for sand-based rootzones.

Undisturbed cores removed from plots amended with peat, brewery compost, and sludge compost had desirable physical properties, especially in regards to bulk density, total porosity, and capillary porosity.

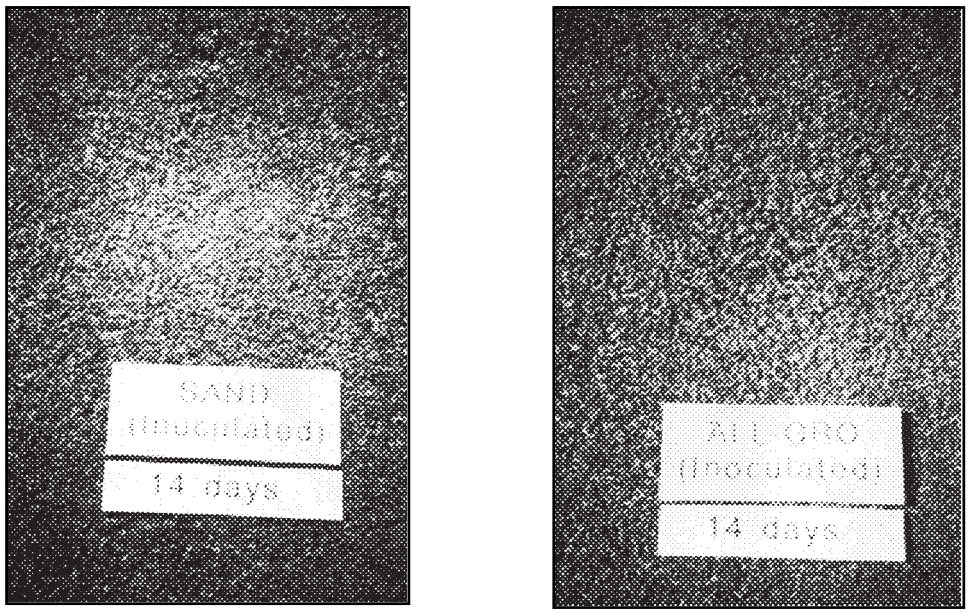
As peat becomes more difficult to mine, alternative organic sources will likely become common in putting green rootzones mixes. A two-year field study was established to evaluate four organic sources in sand-based rootzones for disease suppression, physical stability, and nitrogen mineralization. Field experiments were conducted to determine compost suppressiveness to Pythium root rot caused by *Pythium graminicola*, and the impact of phosphorus treatments on disease severity. Laboratory assays were done to assess persistence of suppressive properties in compost amendments.

Physical properties of laboratory-packed soil cores and undisturbed field cores were determined according to USGA test protocols and included saturated hydraulic conductivity, bulk density, porosity, pore distribution at -4kPa water potential, and particle density. Mineralization samples were analyzed for total Kjeldahl nitrogen, ammonium nitrogen, and percent organic matter by loss on ignition.

Plots were inoculated with *Pythium graminicola* in October 1991 and June 1992. In both trials, a municipal sewage sludge compost, a brewery waste compost, and reed sedge peat provided significantly better disease control than either the sand control or a seaweed product, for all rating dates. The composts and peat generally provided better than 80% control. Laboratory assays showed similar degrees of disease suppression, regardless of age of the rootzone mix. As in the field trials, the sewage compost, brewery compost, and reed sedge peat provided significantly better disease control than the seaweed product or sand. Phosphorus treatments applied at rates of 49, 98, 196, and 294 kg of P/ha/yr, had no effect on disease ratings.

Physical properties of laboratory-packed samples were compared to undisturbed field cores taken one year after establishment. The objective of this study was to determine if measurements taken on laboratory-packed samples could be used to predict physical properties in the field. Simple correlation coefficients for the relationship between laboratory-packed samples and field samples showed significant correlation and regression relationships for bulk density and total porosity. Undisturbed cores removed from plots amended with peat, brewery compost, and sludge compost had desirable physical properties, especially in regards to bulk density, total porosity, and capillary porosity.

The results of these experiments suggest that composts may be satisfactory organic amendments for sand-based rootzones.



Influence of compost on suppression of Pythium root rot in sand-based rootzone.