

Synopsis

A Location-Based Model of Organic Matter Fate within the Sand-Based Surface Layer of a Putting Green, Version 5.1

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This model estimates future Soil Organic Matter (SOM) contents within the surface, 12.5 cm (ca. 5-in) depth of a putting green subject to various SOM control measures. The model operates on a monthly time step and the surface layer is subdivided into 2.5 cm (ca. 1-in) increments. The model is location-based through user input of local, long-term monthly high and low air temperatures, easily accessible on the web. SOM accumulation from turfgrass growth and natural SOM decay are also considered through user input of accumulation and decay factors. Version 5.1 provides the application of 2, user designed SOM diluting mixes, each containing up to 2 components, such as unamended sand, a sand/Profile mix, or a sand/Peat mix. The different mixes can then be assigned to individual SOM control measures.

Various SOM Management Options and their occurrences in the course of a year can be chosen by the user; including such operations as routine topdressing (TD), hollow-tyne (HT) aeration, solid-tyne (ST) aeration, direct injection (DI) and deep verticutting (DV). Also, the Operational Details of control operations such as TD depths; HT tube diameters, spacing & depth of coring; ST & DI hole diameters, spacing & depths; and DV blade widths & depth, all may be adjusted by the user.

The model operates on a scenario basis whereby the user specifies a given scenario and results of the model calculations are generated. Output includes plots of monthly (for 60 months) and yearly (for 15 years), spatial mean % by wt. organic matter for each of the 5 depth increments. These results are as if a large diameter core (such as a cup cutter) sample was withdrawn for testing. In addition, yearly volumes (cubic ft per 1000 sq ft green area) of each mix and for each Management Option are calculated. The model is designed for planning purposes whereby the user can run different SOM management scenarios and observe the efficacy of SOM control. This will provide superintendents a decision support tool to better manage organic matter within their putting greens.