Managing thatch with fungal laccase

Objective

Determine whether the degradation of organic matter can be enhanced by applying laccase to the thatch layer and whether laccase has no appreciable adverse effects to the turf quality.

Sudeep S. Sidhu, Ph.D.; Qingguo Huang, Ph.D.; Robert N. Carrow, Ph.D.; and Paul L. Raymer, Ph.D.
University of Georgia
Summary

High organic matter accumulation in the form of thatch or mat is one of the major problems in modern turfgrass greens. It is believed that the rate of degradation of organic matter is related to the presence of lignin content in the organic residue. Lignin is extremely resistant to degradation. Fungal laccase, a lignolytic enzyme, may enhance the rate of organic matter degradation in the thatch layer.

A greenhouse experiment was established at the University of Georgia’s Griffin Campus using Crenshaw creeping bentgrass (Agrostis stolonifera) sod, which was approximately 1.18 inch (3 centimeters) thick and consisted of existing thatch and mat, but not the underlying soil. The laccase enzyme used was from Trametes versicolor, a white rot fungus. Parameters used to determine the effectiveness of treatments were total organic matter content for a depth of 0-2 inches (0-5 centimeters), saturated hydraulic conductivity, organic layer thickness, extractive-free acid-soluble lignin, acid-insoluble lignin and total lignin content.

Results

- Applying active laccase once every two weeks reduced buildup of organic matter and thatch layer in highly maintained turf, with good results observed after nine months.
- Using laccase enzymes could prove to be a nondisruptive treatment for reducing organic matter buildup in greens.

Funded by

Georgia Golf Environmental Foundation

Published in GCM, December 2012, pages 84-90.