

Black Layer of Putting Greens

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Of all golf course putting green conditions to be investigated during the past ten years, none has generated more interest or concern for curative measures than the "black layer". Dr. Joe Vargas at Michigan State University is an authority in this area and his research results and conclusions are worthy of note. Consider the following points:

- We need to know more about the practice of sand top-dressing of golf greens. Light, frequent applications should not result in the creation of a perched water table or localized dry spots that may require use of wetting agents or nematode problems.

- Natural soil supports good populations of a wide variety of organisms; often sands do not. Sand cultures allow weak pathogens to become stronger. These have been observed, particularly on Toronto creeping bentgrass. A bacterial wilt has been found to plug conductive tissue under some conditions.

- Sands may become nutrient deficient—especially for phosphorus. Calcareous sands may require use of sulfur to acidify for improved nutrient availability.

- The black layer is associated with use of sulfur, particularly dry forms. Sulfates in water wash down into the sand. The black layer has nothing to do with either soil

or sand as it may occur in either substrate. It has to do with the presence of sulfur under anaerobic conditions as the root zone becomes water saturated.

- Algae use a by-product of sulfur to stimulate their development. Control of algae is helped in getting rid of sulfur.

- Sulfur becomes an oxygen sink. That is oxygen is tied up in the oxidation of sulfur. Where there is limited oxygen, anaerobic conditions develop. This condition is enhanced by excessive irrigation, heavy rains, traffic that compacts the soil and the presence of sulfur. One inch of rain can take all the oxygen out for a 24-hour period. Sulfur may come from supplemental application, acid rain, irrigation water and overuse of sulfur-coated urea.

- What management practices can help prevent the black layer:

- aeration;
- light irrigation;
- use of nitrate fertilizer— $\frac{1}{4}$ to $\frac{1}{2}$ of a pound of nitrogen per 1,000 square feet per application because of high salt index;
- avoid applications of sulfur.

—Lawn Institute Harvests Editor, Eliot C. Roberts

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