The Nature and Control of Black Layer

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Objective

To whether hydrogen sulfide could be responsible for the turf decline observed on greens with black layer and if elemental sulfur or sulfur-containing compounds could directly lower the redox potential of soil, which is necessary for black layer development.

Summary

Black layer is a dark-colored layer in the soil profile of some putting greens. The layer has a rotten egg odor and is associated with a decline in turf quality ranging from thinning and bronzing of turf to turf death.

A series of laboratory experiments using cores of soil from putting greens were conducted to determine if: 1) elemental sulfur reduced to metal sulfide in black layer soil; 2) hydrogen sulfide could be responsible for turfgrass decline in soil with black layer; 3) elemental sulfur or sulfur-containing compounds could lower soil redox potential; and 4) nitrate could be used to prevent the release of hydrogen sulfide when applied at a suitable level for turfgrass fertilization.

Results

- Applications of elemental sulfur to putting greens can induce anaerobiosis and stimulate the production of both free hydrogen sulfide and metal sulfide.
- Hydrogen sulfide is toxic to turfgrass roots and the release of hydrogen sulfide in the soil profile of putting greens has the potential to cause turfgrass decline.
- Fertilizing with nitrate and withholding elemental sulfur helps to control the release of hydrogen sulfide, thereby preventing black layer formation.

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