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Sulfur and the Black Layer

We have been getting mixed signals from the agricultural colleges. First we were told by Dr. Goss at Washington State that SULFUR plays a role in the suppression of poa seed-heads when applied at relatively high rates. Then Dr. Joe Vargas, not quite sure that he was getting proper suppression of poa, was actually seeing overall improvement of turf from SULFUR applications — particularly in highly alkaline soils.

These reports were enough to get superintendents on a SULFUR kick. Sales of our flowable SULFUR soared. Suddenly, we have been getting sporadic reports from various parts of the country about a BLACK LAYER. It has been identified and described quite accurately as a sealing off of the soil to the point that air is not getting down to the root system and that an anaerobic condition prevails in which microbial action is producing toxic hydrogen sulfide. The hydrogen sulfide in turn quickly reacts with most of the salts forming black insoluble sulfides. This is especially true of iron. To complicate matters, the black iron sulfide can regenerate more hydrogen sulfide under acidic conditions.

Now the pendulum has swung far to the left in the other direction. The superintendent is being told to lay off of SULFUR in any form — no more sulfates, no more sulfur coated urea, no more elemental SULFUR, as if this will cure BLACK LAYER.

SULFUR is not the cause, but the lack of oxygen is responsible. A layering of soil which prevents precolation and aeration, can be rectified by aeration. This is a quick fix that remedies the situation, as I found out on one Southern California course last summer. Only two or three hundred square feet on three greens were involved. Within a week, aeration remedied the situation. Ironically, this course had not used our flowable SULFUR. But one can find sufficient SULFUR in the soil to accommodate the BLACK LAYER effect under anaerobic conditions.

Recent experiments reporting increased use of phosphates to help the roots to develop and grow out of this stress situation are encouraging. But this, I'm sure, must be accompanied by adequate aeration.

But where does all of this information leave us? How are we to correct high alkaline and saline soils without SULFUR? Impossible — the only adequate products proposed for this correction — are SULFUR products.

The age old remedies of sulfate of ammonia or gypsum — both of which are acidic sulfates — have been used extensively. More recently, carefully metered dilute sulfuric acid through the fertigation system, is receiving extensive testing. Finally — one pound rates of flowable SULFUR - which oxidizes to sulfuric acid eventually — has shown very promising results. Most important of all these remedies work under aerobic conditions, but could backfire under anaerobic conditions.

Isn't it sensible to eliminate the real cause of BLACK LAYER? Excluding SULFUR products is not going to solve the problem, especially if one has an alkaline saline soil. Under this condition — the use of sulfur products is not only essential — but imperative.

Paul Sartoretto, Ph.D.