What Inorganic Soil Amendments Really Have to Offer

When it comes to inorganic vs. organic amendments, consider carefully.

BY BUD WHITE

Many inorganic amendments are relatively new products to the turf industry over the last 10 to 15 years. Some, however, have a much longer history. One of the calcined clays, for example, with the brand name of Turface, was used by many superintendents as far back as the mid to late '60s. At that time, the calcined clay was incorporated into aeration holes, ostensibly to provide drainage and moisture retention.

It was claimed that this product would be tremendously helpful in improving soil/water/turf management. But university research had not verified their benefits or stability in the field, and in fact the product caused major problems for greens that received it. Quite simply, the calcined clays were not processed well, and their stability or structure was not permanent.

Today we have a variety of inorganic amendments, including the porous ceramics (formerly called calcined clay), diatomaceous earth, and clinoptilolite zeolite products. All make various claims and benefits, but superintendents must weigh these benefits in the field in relation to price. They are expensive, and not all situations justify the cost in comparison to sound, basic soil management and appropriate cultural practices.

The inorganic amendments are used in various ways in the field. One of the more popular uses is blending inorganics in the putting green rootzone mix in place of peat moss or other organic products. For an 18-hole putting green renovation, it is not uncommon for these products to add as much as $100,000 compared to the cost of peat moss. Significantly, university research clearly shows that inorganic products do not perform any better than peat moss, and in some cases are not as good as organic amendments when used with sands in a putting green rootzone. See http://turf.lib.msu.edu/2000s/2000/000707.pdf. This research article shows that organic and inorganic rootzone blends provide comparable performance.

These two golf course workers applied a blend of sand and inorganic amendment and are brushing it into the aeration holes. This technique has been a very effective means of treating localized dry spots.

One claim tries to justify the cost of an inorganic product in new construction by stating that the material improves performance in a putting green by allowing the elimination of the gravel layer and by reducing the mix depth from 12 inches to 10 inches. This certainly would save money, but eliminating either one or both of these would compromise the proper function of the USGA green, which is clearly the best researched and most effective green construction method.

The other current use for inorganics is in the renovation or resurfacing of greens, where the sod is stripped off, an inorganic material and sand are added to the top, and the materials are blended to a depth of five to six inches. This method has produced some good results, particularly on a straight sand profile where no organic had been added during initial construction. Needless to say, it is essential to test and determine the proper amount of inorganic material to be added.

Yet another use for inorganic materials is their incorporation into aeration holes on straight sand or poor quality sand-based profiles to improve moisture retention in localized dry spot areas or to improve drainage in

wet areas. Inorganics are incorporated in conventional aeration holes as well as deep drill and fill types of aeration with good success.

It is important to weigh the advantages and disadvantages of inorganic amendments with cost, making sure the greater expense of these products is justified by their benefits in your particular situation. Begin by testing the product with an accredited lab; the inorganics should be tested for their compatibility with the existing sand (modification or resurface) or a proposed sand that will be used for new construction or renovation. Use an accredited lab to determine the suitable proportions of these materials with a particular sand, just as it is done with peat moss to determine the best rootzone mix ratio.

The same testing is needed when resurfacing, where the material is rototilled into the top five or six inches. Oftentimes, recommendations are made to add a certain amount of inorganic product to the surface and then rototill. This usually results in a much higher percentage, by volume, of inorganic material being used. For example, let's say a lab recommends a 90/10 mixture of sand and inorganic. Without this laboratory procedure, as much as 25% to 35% inorganic material could easily be blended into the upper five to six inches by applying too much to the surface. A 10% rate applied and rototilled into the surface is surprisingly light by appearance. A drastic change in rootzone mix composition, comparing the rototilled zone and the existing mix below, can disrupt downward water flow.

Before incorporating an inorganic product into aeration holes, it should be mixed with a high quality topdressing sand. That's because inorganic material alone is more expensive, and there are long-term benefits of having a mixture of sand and inorganic in the holes, as opposed to inorganics alone. The results of rootzone performance and moisture management are improved when an appropriate 10/90 to 30/70 mixture of inorganic and sand are incorporated into aeration holes — verified by lab testing.

After an inorganic is incorporated into aeration holes, thorough watering of the putting greens is needed immediately. These materials have a tremendous affinity for holding water and can cause rapid turf desiccation as they absorb water from the surrounding soil.

In closing, it is important for superintendents to carefully weigh the advantages of inorganic amendments as compared to traditional organic amendments. There are only a few scenarios where the inorganics have been shown to be advantageous vs. organics as a part of a management program with aeration. In these days of cost-cutting, it is even more important for superintendents to carefully weigh expenditures to ensure the maximum value for the dollar.

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The Drill and Fill aeration machine was first developed by Ray Floyd's father in the early 1970s. It drills 10" to 11" deep and then completely fills the hole with the selected sand or sand/inorganic amendment blend.

When applied as a topdressing material, inorganic amendments alone can create a layer that holds too much water at the surface. This condition can lead to algae or increased disease incidents.