Biostimulators Enhance Sod Strength

Researchers at the Polytechnic Institute and State University of Virginia, Blacksburg, studied the effects of various foliar applied biostimulators (non-fertilizing materials which enhance plant growth at low application rates) on the tensile strength and rooting activity of Kentucky bluegrass sod.

Materials tested in field trials, all of which are known to have some type of biostimulator activity, included the systemic triazole fungicides propiconazole and triadimefon (stimulates root and shoot initiation), the synthetic cytokinin benzyladenine (BA) (delays leaf senescence), seaweed extract (SWE) (stimulates root growth) and chelated iron phosphate (promotes greening).

Mature Kentucky bluegrass ("Plush") was treated in place, then transplanted to wire mesh screens pressed into a prepared soil surface. Sod tensile strength was measured on a mechanical sod stretcher, and rooting activity was measured as the force necessary to lift the screens and sod free of the soil. Measurements were taken 4 and 8 weeks after transplanting.

The iron treatments produced no effects, either alone or in combination. BA treatments produced either no effects or were inconsistent. SWE appeared to slightly enhance rooting activity, but not sod strength. Triadimefon occasionally enhanced sod strength, but gave inconsistent results. Triadimefon did, however, consistently enhance rooting activity. Propiconazole was the best performer, significantly enhancing both sod strength and rooting activity in nearly all experiments.

The researchers surmised that the beneficial results obtained with the triazole materials was not due to their fungicidal activity, but to their ability to stimulate root growth directly, much like the cytokinin growth regulators produced by the plant itself. Previous research has shown that these same triazoles, in high concentrations, actually inhibit sod formation and plant growth generally. Treatment rates in the current experiments were low, as recommended for fungicide application.

(From: J.M. Goatley, Jr. and R.E. Schmidt. 1991. Biostimulator Enhancement of Kentucky Bluegrass Sod. HortScience 26(3): 254-5.)

Clinoptilolitic Zeolite as a Sand Amendment

Clinoptilolitic zeolite (CZ) is one of 40 known naturally occurring zeolites (crystalline, hydrated alumino-silicates). CZ has the particle density of sand, but a much higher cation exchange capacity, absorbs and retains water, and generally combines some of the desirable physical qualities of sand and chemical properties of clay. Additionally CZ is reported to selectively retain ammonium and potassium cations, the two nutrients in highest demand by turfgrass. In field trials at the University of Washington, Puyallup, researchers compared the effects of CZ, sphagnum peat, and fresh Douglas fir sawdust as amendments to quartz sand on the establishment of Penncross creeping bentgrass.

All amendments were tested at volume/volume ratios of 5, 10 and 20% in 1x2 meter plots 30cm deep overlying a native sandy loam soil. All plots were fertilized after seeding with diamonium phosphate (18-48-0) and potassium chloride (0-0-60). In addition to bentgrass establishment, the cation exchange capacities of the amendments and their effects on moisture retention of the mixes were measured.

At the 5% levels, all amendments were equally effective in improving bentgrass establishment over the sand controls, but the 10 and 20% rates of sawdust were actually less beneficial than the 5% level. This effect was attributed to competition between the bentgrass and decomposers for available N from the decaying sawdust. The investigators suggest that weathered sawdust may have produced a more satisfactory result. For both CZ and peat, however, establishment ratings continued to improve with higher amendment rates.

Moisture content and water retention of the mixes was highest for peat, followed by sawdust and then CZ, the sand control being by far the worst.

In other studies, high volume amendment with CZ has produced undesirable results, especially when using material of fine particle size (<1mm). This effect has been attributed to the high sodium content of CZ. The authors caution that long-term studies are needed to determine the leaching requirements of the finer grades of this material as well as its resistance to weathering and breakdown in the field.

(From: J.L. Nus and S.E. Brauen. 1991. Clintoptilolitic Zeolite as an Amendment for Establishment of Creeping Bentgrass on Sandy Media. HortScience 26(2): 117-9.)

Scanning the Journals

A review of current journal articles

Researchers surmised that the beneficial results obtained with low application rates of triazole materials was not due to their fungicidal activity, but to their ability to stimulate root growth directly.

At the 5% levels, all amendments were equally effective in improving bentgrass establishment over the sand controls, but the 10 and 20% rates of sawdust were actually less beneficial than the 5% level.