Beating poa with a mole plough

By SCOTT BULEY

Over the years superintendents have aerified greens and then broadcast bentgrass seed hoping to increase their bentgrass stand. After learning that a standard two-by two-inch plugging pattern with 1/2-inch diameter tines actually prepares only two percent of the green surface, I decided to look for a better way.

We first identified the obstacles we faced:

Greens at The Alisal golf course were built over 40 years ago of push-up clay base construction and had no workable drain tile. Years of applying sewage-based fertilizers and various pesticides left a high concentration of copper in the upper soil profile, which served as a very effective root-pruning agent on the poa annua.

Santa Barbara County was facing its worst drought in more than 100 years, and sodium levels in the soil were high. The city of Solvang had asked us to reduce water use.

Our central California coastal transition climate made things even more interesting. Nighttime winter temperatures in our coastal river valley regularly plunge below freezing, with temperatures the next day in the 60s or higher.

With our mild spring and summer temperatures, poa annua had become the dominant species. But July-to-September temperatures regularly over 90 degrees, combined with cool nighttime temperatures, made it impossible to manage the greens exclusively for poa.

Five years ago, our greens were at least 90 percent poa annua, with blacklayer pockets dangerously close to the surface. Getting rid of the poa by chemical means wasn't the answer, as no other putting greens grass could grow any better under those conditions.

Years of plugging to three inches and top dressing with organic materials had created an incompatible interface and wrote a cookbook recipe for anaerobic blacklayer.

We tried several deep aeration machines and weren't satisfied with the unavoidable surface disturbance. Water jet-type aerators worked in some areas. But whereever the soil was layered, the water could not penetrate through the hardpan.

We investigated the British fine turf subsoilers known as mole ploughs. The first 12-inch mole plough we tried worked well in most areas until we got near the bunkers, where sand had been blasted out onto the turf over the years. The sand-influenced zones stopped the tractor as though we'd thrown out an anchor. The plough had the desired agronomic effect, but in the most compacted areas it tended to lift the profile unacceptably.

We finally found a fine turf mole plough manufactured by Sisis Equipment, Ltd., that had a far finer (and sharper) single shank was designed to eliminate surface disturbance. It also had a spring-loaded rear roller that prevented lifting of the soil. It worked to seven inches, which was deep enough to break through our hardpan.

After softening the rock-like interface, we used deep-slice aerified from six to 12 inches deep. The broadsword-shaped slicing blades rolled into the soil and pulled out cleanly without puckering the surface.

We then used a modified vertigroover with vertislicer blades to slice the soil six inches deep on four-inch centers without the mole "anchor." This unit is manufactured by Turf-Tec of Florida.

The author used a British mole plough to drive the poa annua from his greens.

During these deep-slicing and subsoil fracturing efforts, we had also tried six hollow-tine aerifiers. We settled on the Sisis Varicore and plugged five inches deep on three- by three-inch centers. As the root zone deepened over time, we were able to plug five inches deep on two- by one-inch centers.

Within months of working in gray-white sand top dressing, soil profiles showed that the five-inch column of backfilled white sand had absorbed substances from the surrounding soil and turned shades ranging from yellow to orange and black.

To "dilute" the concentration of these materials, we aerified at least four times a year and top dressed with sized sand. Additional sand was lightly broadcast between aerations.

To avoid falling into the trap of merely lowering the hardpan from three inches to five inches, we used rolling deep-slicers at alternating depths from six to 12 inches.

We were then able to run the mole plough to seven-inch depths on six- to 12-inch centers throughout the greens. This created continuous drainage "tunnels" to gather aeration "leachate" from this critical root zone, and move it out the low ends of the greens.

By bringing this "drain" water back to the surface, we were able to re-filter it through yet another turf/thatch matrix.

In front of the most troubled greens, copper leachate again "root-pruned" poa annua, thinning it considerably.

Broadcasting bentgrass seed after sand top dressing gave us far more uniform results than any other sequencing. We also noticed that dragging the greens after seeding didn't improve uniformity.

There was a much better take in the Varicore aeration holes, and in the surface patterns created by the mole plough, deepslicer and vertislicer. By top dressing and seeding over these patterns, the seed "knit" the surface together and quickly flushed more root growth deeper into the soil.

The more aeration practises we could implement at one time, the better the results of our overseeding. Germination improved with the intensively that we aerated prior to seeding.

Much of this success is because properly sequenced aeration activities complement the overseeding process in unexpected ways. I believe the addition of these large amounts of sand at this time actually has a synergistic effect by leaching sodium and excess trace elements away from the juvenile seedlings.

It is crucial to follow this sequence: 1) deep tine or drill as necessary; 2) clean up soil spoils; 3) work sand top dressing in to full depth in troubled areas; 4) compact tractor aerify five inches, with front roler to smooth first deep aerification; 5) clean up soil spoils; 6) top dress five-inch holes until full; 7) deep slice six to 12 inches and/or vertislice up to four-inch centers; 8) mole plough seven inches deep on six- to 12-inch centers with mole to drain water laterally out of the green; 9) drag surface to distribute top dressing uniformly throughout all "seedbeds"; 10) seeder-slice up to four directions from 1/4 to 1/2 pound per 1,000 square feet with a lightweight machine on two-inch centers.

The finishing touch, taking advantage of all this seedbed aeration preparation, was the discovery of a lightweight walking autoseeder. We calibrated it to take up to four passes in different directions over top-dressed greens.

Scott Buley is a superintendent in Solvang, Calif. In the March issue, he showed us how he successfully overseeded new generation Bermudagrass at The Alisal golf courses.