



## The Aftermath of 1993

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In some respects, 1993 was kind to Wisconsin golf course superintendents. The need for irrigation was at a minimum. Here in Madison, even after a dry October, annual precipitation for the year was still more than 15 inches above average. The wet weather kept down temperatures and pressures of diseases such as pythium were light. For those of you that experienced extensive and repeated flooding, 1993 was not a pleasant year. But even if you were fortunate enough not to have to suffer through flooding, you need to be aware that some insidious things may have been going on that could pose problems for you in 1994.

Perhaps at the top of the list is algae encroachment on putting greens and tees. Why this year in particular? The basic requirement for algae invasion is a soil surface that remains moist for prolonged periods of time. This relates to the fact that algae are photosynthetic and can only survive where they have access to light and moisture. Once they've become established, algae can tolerate periods of drying because they produce mucilaginous material that acts like a sponge and provides a reservoir of water for their survival. This complicates control of the algae because surface drying alone, either through reduced irrigation, or better air flow and more sunlight, is often insufficient for eradication. Thus, what may have appeared to be a minor algae problem for you this year may turn into a major problem next season even if rainfall is less than normal.

If algae became a problem for you in 1993, you need to think in terms of a vigorous program of frequent cultivation (spiking or slicing is often very effective), overseeding and sand top-dressing to build up and maintain a good bentgrass population. But these practices alone will likely not be enough. You need to consider knock-

ing back the algae population first. The situation is analogous to increasing mowing height to aid in weed control. The practice is effective, but you have to start with a nearly weed-free turf. I've heard reports that the algicides that some people tried this year didn't appear to be very effective. A recent report out of Texas A&M showed Consan 20 to be notably more effective than 14 other materials tested for controlling algae mat formation on putting greens.

There have been some indications this year that in at least some putting greens and tees, the moist soil surface prerequisite for algae invasion was a result of soil compaction. With the rainfall of 1993, near saturated conditions were fairly common for extended periods of time. Water is the lubricant that allows soil particles to reorient under pressure and the soil to become more compact. Compact soils not only have less total pore volume, but the loss in pore volume comes primarily at the expense of non-capillary pore space.

In essence, non-capillary pores become capillary pores, soil moisture holding capacities increase, water infiltration rates decrease and the soil surface becomes a more hospitable environment for algae. Even if you survived 1993 without the appearance of algae on some of you more heavily shaded greens and tees, it is wise to check for compaction. The best way to do this is to pull soil cores, take them into the shop, let them air-dry for a couple of hours, and then do some probing with a pencil or knife blade. Compaction is much more evident in partially dried than moist soil cores.

I've taken a lot of flack for a recent article on core cultivation of turf. The point I tried to make but which escaped many people is that core cultivation is not a cure-all and is difficult to justify without a good reason. The excess rainfall in 1993, having created

ideal conditions for compaction, may indirectly be one such reason.

Something else that concerns me is the shallowness of rooting I've seen in September and October on putting greens. With all the moisture of 1993 and limited heat stress, one might anticipate root growth not to have been a problem. My personal opinion is that what we're seeing is a manifestation of the fact that with all the rain came a lot of cloudy weather and a marked reduction in solar radiation. The net result is bentgrass that is not as vigorous as we like to see it at the onset of the winter months. Let's hope for a kindly winter.

Finally, let's realize that the excess precipitation of 1993 was a vehicle for heavy nutrient losses via leaching. Compensatory fertilization may be necessary in 1994. A good candidate is potassium on sand-based greens and tees. Soil testing is highly advised for them. On new greens and tees, phosphorus levels may have declined much more than normally expected.

Research we've done in the greenhouse has shown phosphorus to be remarkably mobile in an 80:20 root-zone mix. In the field, we found that in a couple of the rootzone mixes being tested, application of starter fertilizer and 1.5 lb/M of phosphate during the grow-in season resulted in bentgrass clippings collected in September that were low in phosphorus.

Another nutritional problem that I recently encountered may likewise reflect extensive nutrient leaching. What I found is an as yet unconfirmed boron deficiency in a majority of the clippings collected from the greens of a golf course in October. Please note the emphasis on "as yet unconfirmed". I find this very hard to believe myself. Nonetheless, 1993 was an unusual year in many respects and, as I've tried to point out here, not as kindly as some may believe. 🌱