QUESTIONS FROM THE FLOOR

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We're building a new USGA spec green and wonder if we can use local calcareous sand instead of very expensive silica sand. Will each perform equally well in putting green construction? What will the long term differences be? *(Kewaunee County)*

As you're probably aware, the USGA specs do not advise against the use of calcareous sand. There are two reasons for this. One is the fact that the issue has not be thoroughly researched. I think you'll find this problem receiving the attention of researchers very soon. Secondly, because there is no hard evidence that calcareous sands are a potential problem and many people do not have access to non-calcareous sands, the USGA Green Section has properly chosen not to advise against the use of calcareous sands.

My personal experience, which is very limited, and discussions with superintendents have led me to believe that there can be some hazards associated with the use of calcareous sands in putting green construction. Deficiencies of phosphorus and micronutrients can arise due to high pH. This is not of great concern because these are readily correctable problems. Of far greater concern is the potential for chemical breakdown of carbonates near the green surface, downward migration of the disintegration products, and precipitation at greater depth, most likely at the top of the perched water table. The result can be carbonate cementation of the sand particles to form a slowly permeable layer, water accumulation above the layer and eventual development of blacklayer.

My gut reaction advice is to have the sand tested by a laboratory for the liming value or calcium carbonate equivalence of the sand. If this value is 5 percent or less, I believe the sand is safe to use. I would not use a sand whose calcium carbonate equivalence is above 15 percent. What about the 5 to 15 percent range? That's where you make the call! Research is badly needed to define the calcium carbonate equivalence level where the cementation problem becomes a hazard.

Our golf course is going to rebuild some tees and our plans are to use an 80/20 rootzone mix. What organic amendment do you recommend for the 20%? *(Oneida County)*

I'll have a much better answer to this question in a couple of years. The O. J. Noer Foundation is funding a major research effort on our part to establish performance standards for organic amendments. In the meantime, the recommendation is to use a material that contains at least 85% organic matter and 20 to 50 % fiber. It may take a couple of telephone calls to locate a lab that can perform these analyses for you, but there are several that can do so.

Some fertilizer companies, in response to complaints about particle pickup during putting green mowing, are offering fine grade products. Since reactivity is related to particle size, won't this alter the release characteristics from those of larger sized particles? I've especially noticed this with the organic products. *(Vernon County)*

Theoretically, the smaller the fertilizer particle size, the greater the amount of surface area per unit weight and the faster the nutrient release rate. This is a valid assumption providing the fertilizer particle remains intact and that breakdown is strictly a surface reaction. However, the rate of release of nutrients from fertilizer particles is often dependent on other factors as well. Moisture is key to nutrient release from virtually any type of fertilizer. Temperature is also significant when nutrient release is microbiologically dependent.

My personal experience has been that particle size effects on nutrient release from fertilizer are secondary to temperature and/or moisture influences. Some time ago I compared turfgrass responses to fine and regular grades of Milorganite at three different locations for three years. When turfgrass color ratings and tissue N contents were averaged over locations and/or years, there were no significant differences between responses to the fine and regular grades of Milorganite.

Differences did occasionally show up in specific instances. Periods of two or more weeks of unseasonably cool weather sometimes favored turfgrass response to fine Milorganite over the regular grade. In the long run, particle size effects seemed to be too small to suggest a need to adjust fertilizer use practices to compensate for theoretically faster nutri-

ent release rates from finer grade materials.

A friend of mine is a golf course superintendent in a neighboring state. He had an employee interested in a career in golf turf management and rather than recommend the land grant college in that state or even his alma mater, he suggested the young man enroll in the Turf and Grounds Management program at the UW-Madison. Frankly, I was impressed. Can you give a brief update and sketch of your program? Apparently I haven't been paying enough attention to what's been going on there. *(Vilas County)*

Perhaps the easiest way to gauge the quality of our program is to compare our curriculum with the GCSAA lists of required and recommended courses for a four-year B.S. degree in golf course management. Of the 30 courses on the required list, our students must take 24 of them. We do not require courses in genetics, plant physiology, plant ecology, small engines, golf, or psychology. This does not mean that our students do not take these courses. Many do so as part of their elective credits. We do require three of the courses among the 18 suggested as electives by the GCSAA. These are meteorology, accounting, and communications (oral and written). Overall, I feel that from a course standpoint, our program is second to none.

We do have some areas that need strengthening. For the first time this fall I will be offering a one credit course on turf fertilization. We expect to have comparable mini-courses in turf disease identification and control and in turf insects being taught within the next year or so. Another area of weakness that we hope to correct soon is experience in equipment maintenance and repair. To do this, we'll have to utilize the O.J. Noer Turfgrass Research and Education Facility maintenance shop evenings or Saturdays during the winter months. In this way we overcome the difficulty of attempting to teach "vocational skills" within the university per se.

Once our turf group in the College is fully staffed, we'll also be examining the need and viability of one or more additional turf management courses. The difficulty in developing such courses is in providing assurance that student enrollment will justify use of professorial time for that purpose. We also need to work with some of our colleagues in terms of helping them integrate more turf related subject matter into their courses.

Finally, there's the vital matter of work experience. This is another area in which I feel our program excels. In some programs many graduates can claim but a single season on a golf course. It is rare and the result of late entry into our program that our graduates have but a single season of work experience. Many graduates have 3,4 or even 5 seasons behind them when they enter the job market. Thanks to the incredible cooperation of Madison area superintendents, we are also capable of doing something that often is not done elsewhere. By working part-time during the school year our students are able to experience the operations involved in the spring start-up and fall shut-down of a golf course. These are experiences that cannot be acquired through summer work.

As you can see, I'm very proud of our program. We are continually seeking ways to strengthen what already is one of the finest in the country.

How is the Noer Facility working out for you? Is it functioning as expected? *(Jackson County)*

Permit me, if you will, to answer this question in full view of the recent history of the Facility. Let's start back in August of 1991. This was when final grading was completed and the field research area was seeded to a blend of Kentucky bluegrasses. No irrigation other than sprinklers and rain trains were available and rainfall was scarce.

Understandably, we did not achieve a good stand of turfgrass in all areas. Then, this past spring when the normal practice would have been to supply ample N to promote rapid grow-in, we had cool, dry weather and the irrigation system did not get installed and become fully operational until mid-June. It is against this backdrop of unavoidable circumstances that I say that the Noer Facility is meeting my field research needs as well as can be expected. We couldn't initiate some research as early as we may have liked and its been necessary to do some patch work in the plot areas. Thanks to the excellent co-operation from Tom Salaiz, we've been able to get some studies underway.

Is the Noer Facility fully functional? No, but we didn't expect this to be the case. Tom and Marsh Finner, Ag Experiment Station Director, have seen to it that our field research needs are being met. As expected, we need another $100,000 or so in lab and classroom furniture, basic lab equipment, plant and soil driers and grinders, etc. before the Noer Facility can fulfill all of the functions for which it was designed. It will take time, but we all have faith that this will happen.

Any thoughts or opinions of the new water-absorbing polymers that have been getting a lot of ink in industry publications of late? *(Juneau County)*

For a thorough description of the various types of polymers available and their potential uses, I suggest you read the article by Jeff Nus that starts on page 26 of the June 1992 issue of *Golf Course Management* magazine. As Jeff points out in the article, the polymers have the potential for reducing irrigation requirements of sandy soils, soil compaction, and soil aeration while increasing water infiltration rates and turf resiliency. As I see it, the polymers have two limitations. One is lack of permanency. Depending on the type of polymer used, life expectancy ranges from as little as one year to five years or so. The second and major limitation is cost. Take for example, the function of reducing irrigation frequency. Depending on the rate of polymer used and soil texture, you may be able to double the time between irrigations. Does the savings that results when computed over a 5-year period more than offset the cost of the polymer? If not, then use of the polymer is not cost effective. On the other hand, if you're in a situation where a reduction in water use is mandatory, then there may be no choice but to experiment with a polymer and ignore the cost factor. I have great difficulty in believing that use of the polymers for purposes other than increased moisture retention is an economically viable management practice.

Twenty-five years ago, when I was first working in golf course management, lots of superintendents were using calcined clay as a soil amendment as well as a backfill material for aerified greens when cores were removed. I haven't seen or heard of its use for probably almost twenty years. What caused its fall from favor? Or is it still a viable material to use as a rootzone amendment? *(St. Croix County)*

Once again I refer you to an article in the June 1992 issue of *Golf Course Management* magazine. The article