# 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-