A. The answer to this question is more complex than most people realize. To start with, let's say that both of you share the same concern — uniform application of all nutrients contained in the fertilizer. This objective can be achieved with blended fertilizers **provided** all the fertilizer particles are of similar size and shape and the opening in the spreader at the rate of application desired is slightly larger than the largest fertilizer particles. If the particles of the different nutrient sources are of different sizes, they will tend to segregate by size during handling and application of the fertilizer and you will not get uniform spreading. If some of the fertilizer particles are larger than your spreader opening, segregation during spreading becomes pronounced and your rate of application will not be constant. The lower the rate of fertilizer application, the smaller the opening(s) in the spreader hopper and the greater the decline in rate of application becomes as the spreader empties. One product I examined a couple of years ago contained three N sources. One N source had such large particles that the lowest "safe" rate of application (i.e. the lowest rate where uniform application of all three N sources was assured) was 1.5 lb. N/100 ft.^{2}.

Problems such as those mentioned above do not arise with homogenous fertilizers. This is true **providing** none of the particles are larger than the opening in the spreader. If this condition is not met, your rate of application declines as you empty the spreader. Thus, even homogenous products can be problematic when you're operating at low application rates. Consequently, your cost/benefit ratio for the fertilizer is high because the benefits of uniform turf color and quality are less than desired.

As you can see, the answer to your question depends on uniformity of particle size and shape in the blended fertilizer and the particle sizes of both the blended and homogenous fertilizers with respect to size of the spreader opening which, of course, is a function of the rate of fertilizer application. Uniform application of blended fertilizers at rates commonly employed on fine turf (e.g. golf greens and tees) requires small, uniform particles. "Farmer" fertilizers do not meet this requirement. Rather you're talking about fertilizers manufactured specifically for fine turf. My experience is that the cost of such fertilizers does not differ greatly from the cost of small-particle, homogenous products.

Q. *During a conversation about the natural freeze/thaw aerification that takes place on our golf courses over the winter months, this question came up: "Which expands the most when frozen — sand, silt, clay or water?" What is the correct answer?*
WAUSHARA COUNTY

A. The correct answer is water, **but** how much of this natural aerification occurs during a given winter is very much dependent on how many freeze/thaw cycles occur. Water expands when it freezes and forces apart soil particles. During the thaw cycle water enters the new spaces created. Freezing then causes further expansion, and so the cycle goes.

Sandy soils, because of their inherently lower water contents, generally undergo less freeze/thaw action than do silt or clay soils. Sands are also the least subject to compaction. Hence, in the final analysis, the importance of natural freeze/thaw aerification does not differ greatly among the three soils.