Compost seen as future replacement for methyl bromide

Methyl bromide, used to sterilize putting surfaces for reconstruction, will be replaced by compost mixes on golf courses, according to Ohio State University Professor Harry A.J. Hoitink.

Most of the nursery industry has not used methyl bromide for a decade now, Dr. Hoitink said, adding: "To do that on golf courses will require the same kind of procedure — blending and formulation — that we have perfected over the years for the nursery industry.

"The technology exists to replace methyl bromide with compost because compost, produced and cured properly, can be colonized with appropriate micro-organisms to control those soil-borne plant pathogens against which we fumigate with methyl bromide."

In 1972 OSU revealed technology with procedures of composting which essentially led to the elimination of methyl bromide by the nursery and greenhouse industry by 1976. Very few nurseries have used methyl bromide since then.

Hoitink predicted that in agriculture, "by and large, only those crops fumigated with methyl bromide today will be able to pay a relatively high price for compost. The reason is that compost will substitute for methyl bromide for control of soil-borne plant pathogens.

In addition, fungicide applications required after fumigation are reduced or eliminated in some cases. This is due to the disease-suppressive properties of composts used by nurserymen today. Proof for this was first published from OSU in 1978. It has been practiced increasingly by both florists and nurserymen since that time.

Compost research

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wood forests, you never see an epidemic of soil-borne diseases. Only in disturbed ecosystems do we see epidemics of soil-borne plant pathogens."

Nelson said he started five years ago trying to identify composts that were suppressive as top dressing applications to a variety of turfgrass diseases.

"Every disease for which we've looked for a suppressive compost, we've found at least one," Nelson said. "We now can suppress brown patch, dollar spot, Pythium blight, Pythium root rot, Typhula blight [gray snow mold] and red thread.

"Other composts have shown suppression of necrotic ring spot. In the coming years we will look at pink snow mold, anthracnose and leaf spot."

Hoitink, Nelson and their colleagues are trying to understand more of the microbiology of the composting process itself. And, more importantly, the microbiology of suppressive composts.

"We clearly know that disease suppression in most of the composts we work with is related to the microflora in that compost," Nelson said. "So there are key elements in the microflora providing the disease control. We need to understand what the activity of those key components are.

"We hope to characterize the disease-suppressive microfloras and have a fingerprint of what it looks like," Nelson said. "Once we've been able to fingerprint these communities, we'll have a biochemical picture of what a suppressive microflora looks like. Then we can go to other composts, take similar pictures and try to more accurately predict suppressive properties."

That done, they will be able to inoculate compost with the disease-suppressive microflora.

For potting mixes, the ideal biocontrol agents already have been identified at OSU.

"It's a tall task but it's possible with what we know already," Nelson said.

Calling the fine-particled yard-trimming composts "ideal for construction of golf courses," Hoitink said more of it will be available as time goes on and landfills are closed to grass, leaves and brush.

Dr. Eric Nelson

Nurseries use coarse-particle compost.

"Yard-trimming composts are not waste. They are resources, because the topsoil industry has capitalized on them by producing a rather homogeneous-in-quality compost," Hoitink said. "The result is, they can start to blend these materials with soils and sands and produce products that can be used in construction of golf courses, in the extreme, and very much so for gardens and lawn construction for homeowners..."

Nelson predicted it will be five or 10 years before scientists will have "a good handle on the microbiology of disease suppressiveness and the predictable use of composts on golf course turf. The problem ... is that sometimes they work and sometimes they don't. A given batch of a material might work sometimes and not others, on some sites and not others, and we have no understanding why that is happening."

Turf research is different than container ornamentals research because turf and pathogens are perennial, Nelson said. "In a container you start with a clean plant and you can protect it more effectively than a plant like turf that's already infected."

Nelson said, however, that in new plantings turf is very similar to container mixes.

"In fact, we've used compost as construction mix amendments — replacing peat with compost — and we get dramatic results, especially in regard to Pythium root rot control," he said.

"In the absence of any amendment, or in the presence of peat, you get complete destruction of turf within two weeks after inoculating with a root-rotting Pythium application. With these compost amendments, disease losses can be avoided."

Country Club of Rochester (N.Y.) superintendent Bob Feindt, who has experienced extraordinary results in tests he has done with Nelson on his course, said: "Other superintendents were laughing at me when we started five or six years ago. But we're seeing promise now, so people aren't laughing any more."

Feindt is also using organic fertilizers, turkey and brewery wastes, but said: "This is not a panacea. There is a lot of promise, but a lot of things are happening we don't understand. There are variables to deal with, from different climates to different soils. We need more research. There are so many variables — climate, terrain...

"We're [the industry] growing grass under stress. We're cutting it so short and putting a lot of stress on the grass, so we're relying on chemicals to keep the grass alive. I think we have to start feeding our grasses more, raising the height of cut and other cultural things as well as using natural organics."