Additives Boost Pathogens in Compost Tea

Using compost to make a foliar spray or soil drench to promote plant growth and suppress plant diseases has gained popularity in the United States during the past 10 years, especially among organic farmers. These "compost teas" are made by adding small amounts of finished, mature compost to unheated water and allowing the mixture to steep or brew.

The self-heating process of composting generally reduces pathogens. But Agricultural Research Service microbiologists David Ingram and Patricia Millner have found that ingredients commonly added to compost tea may promote growth of bacteria that can cause illness in humans.

Ingram and Millner, who are in the Environmental Microbial Safety Laboratory in Beltsville, Maryland, examined the potential for such bacteria to grow during both aerobic and anaerobic compost-tea production. They studied the effects of additives—such as soluble kelp, fish hydrolysates, humic acid, rock dust, and proprietary nutrient solutions—on growth of pathogenic bacteria as well as microbes that some farmers feel are beneficial and necessary to enhance soil and inhibit foliar pathogens.

Ingram found that, in general, when compost with low numbers of *Salmonella* and *E. coli* is used to make compost tea, the pathogens only grew when additives were included in the initial watery mixture; pathogens remained undetectable in all the compost teas made without commercial additives.

"This debunks the view among some compost-tea producers that the aerobic bacteria in compost will inhibit growth of human pathogenic bacteria when aerobic conditions and nutrient additives are present," says Ingram.

Such a scenario raises public-health concerns about potential contamination of treated crops, particularly those intended for fresh consumption.

"Use of supplemental nutrients and other additives to produce compost tea gives even a few pathogenic bacteria a growth boost, so testing of the final tea before spraying may be necessary to ensure the absence of human pathogens," says Ingram.

Recommendations and guidelines for safe production and use of compost tea have been provided by the Compost Tea Task Force, formed by the National Organic Standards Board. The report can be found at: www.ams.usda.gov/nosb/meetings/CompostTeaTaskForceFinalReport.pdf.—By **Sharon Durham,** ARS.

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Erosion at Warp Speed?

Fifty to 100 years from now, rainstorms at some places in America may be more intense—and may be more frequent—some climate experts predict.

Among the expected consequences: significant increases in stormwater runoff and in the amount of soil that's washed from fields, orchards, vineyards, grazinglands, and perhaps even from sloping backyards or hilly parklands near you.

That's according to Mark A. Nearing, soil scientist and research leader at the Agricultural Research Service's Southwest Watershed Research Center in Tucson, Arizona. In a series of studies reported over the past several years in the *Journal of Soil and Water Conservation, Catena,* and other scientific publications, Nearing and colleagues ran climate data from the past century through seven leading mathematical models. That yielded intriguing computer simulations of the potential soil-erosion punch that tomorrow's thunderstorms might pack.

The projections for two watersheds—one in the southwestern United States and one in Europe—indicate that stormwater runoff at those locales could increase by 23 to 31 percent during this century. In turn, soil erosion could increase by 25 to 55 percent.

These worrisome estimates are based on an array of factors, including the presumption that the U.S. climate trends of the past 100 years—and farming practices—will continue along the same lines.

Another investigation, this one encompassing eight sites from Oregon to Georgia, indicated that stormwater runoff and soil erosion would increase in all but two of the venues, according to computer simulations from two of the models.

And results from still another investigation suggest that increases in soil erosion will outpace increases in rainfall. For every 1-percent increase in rainfall, there will be a 1.7-percent increase in soil erosion.

These findings and others are helping scientists get a better idea of the possible soil-erosion-related consequences of global climate change. From that foundation, they can develop ways to better protect vulnerable topsoil from the erosive power of tomorrow's thunderstorms.—By **Marcia Wood,** ARS.

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