



FROM THE GROUND UP

Compost News for Landscape and Agricultural Professionals

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Evaluating Compost Quality

Soil Control Lab's Frank Shields Leads Industry in Compost Testing Issues

Compost quality is a contentious issue, frequently debated by compost makers as well as compost users. Frank Shields, Soil Control Lab, Inc., Watsonville, has spent much of his career testing various parameters of compost products. When the U.S. Composting Council decided to undertake the task of developing its own compost testing and information disclosure program, he knew he wanted to be involved. "Compost quality is a key issue for improving the confidence level of compost buyers," he says. "Compost users need to have access to a wide range of information in order to make informed decisions on purchases."

Shields was a leader in developing the testing and sampling protocols which are used for the Composting Council's Seal of Testing Assurance (STA) program. "I wanted to keep the standards very flexible," he says. "Given the variety of feedstocks and processes being used to produce compost around the world, flexibility is key to accommodating all the variables."

Participants in the program sample and test their product, using STA approved labs, for chemical, physical and biological properties. All of the labs use the same standardized testing techniques and test results are made available to the compost producer, who provides them to customers. Numerical standards are not placed on test results—there are no upper or lower limits specified for nutrients, pH, pesticide levels or heavy metals—but, because the protocol is standardized, buyers can compare STA composts, even if the tests have been done by different labs.

The California Compost Quality Council (CCQC), which administers a compost quality assurance program in California, may merge with the STA program. "A key benefit of the STA program is that it allows users to compare compost from two different manufacturers and decide which one is best suited to their needs," says Matt Cotton, a compost consultant who provided technical services to the CCQC and



Frank Shields, Soil Control Lab, checks bioassay trays.

now works to oversee the STA program as a US Composting Council boardmember.

Compost users select the product that is best suited to their prospective use. To make use of the STA program information, compost users need to know which testing parameters are important to their application. For example, stability is a concern for most applications. "If compost is not stable, it will continue rapid decomposition when mixed with soil and the microbial population will take off," says Shields.

"Depending on its composition, it will either pull nitrogen out of the soil or release it, and either way it can cause problems for plants. Rapid decomposition also requires oxygen, and immature compost can cause soil, especially a clay soil, to go anaerobic. However, if users are going to apply compost to well-drained fields at low application rates several weeks before planting, stability may not be a major concern for them."

Compost maturity is a related issue, but is not the same as

DPR Announces Restrictions to Protect Compost

The California Department of Pesticide Regulation (DPR) announced new pesticide restrictions to protect commercial compost from potential contamination due to clopyralid. DPR's action fulfilled a charge by California Assembly Bill 2356 (Keeley), passed in 2002. It directed DPR to assess the possibility that clopyralid residues could persist in compost, and either impose restrictions or cancel registration of those uses by April 1, 2003.

Clopyralid was initially registered for use in California in 1997 to combat yellowstar thistle, a noxious weed. Used to control broadleaf weeds, clopyralid is an herbicide that can also damage susceptible plants at very low levels when it is in compost. Clopyralid surged into the headlines in 1999 when clopyralid-contaminated compost damaged plants in Washington State. Although some commercial compost facilities in California have detected clopyralid residues, cases of non-target vegetative damage have not been documented in the state.

Composters are hopeful that DPR's actions will avert potential problems that could damage the market for compost. DPR expects its restrictions to affect about 15 clopyralid products used in parks, playing fields and cemeteries. Because residential lawn clippings make up a large part of the material brought to composting facilities, clopyralid will no longer be an ingredient in herbicides for residential use. In addition, the DPR will restrict sales of the herbicide clopyralid to lawn and turf professionals. These licensees will be instructed to assure that green waste stays onsite when the herbicide is used, and dealers will be required to provide written notice of the restrictions when they sell clopyralid products. Products containing clopyralid will bear labels specifying that clippings cannot be sent to a compost facility and applicators must give notice to landowners or property managers to not use clippings for mulch or composting.

Regulatory agencies in Oregon have restricted clopyralid use to golf courses, and there is some speculation that Dow may voluntarily restrict use to golf courses in California. Golf courses typically recycle grass clippings back into the

turf, which could limit clopyralid exposure at compost facilities.

Agricultural interests lobbied against restrictions on agricultural use of clopyralid in California, and products for farm, rangeland and forest use will not be affected by the DPR's restrictions.

DPR Director Paul Helliker said the restrictions reflect DPR's commitment to California's environment and the compost industry. "Clopyralid is a useful pesticide, but some applications could cause a problem if residues accumulate in the green waste stream," said Helliker. "We've worked closely with the California Integrated Waste Management Board (CIWMB) to protect the green waste stream while preserving beneficial uses of this herbicide."

DPR and the CIWMB began investigating clopyralid residues in compost in Fall 2001. The two agencies co-sponsored a statewide workgroup that included compost industry representatives, government agencies, DowAgroSciences and other interested parties.

Michele Young, who manages yard waste contracts for the City of San Jose, participated in the stakeholder workgroup. "Our team was committed to strategies that would allow California to avoid the types of problems that they have seen in Washington State," she says. "California has a very mature and trusted compost industry, and all stakeholders want to protect that." The workgroup explored how clopyralid residues enter the green waste stream, what residue levels pose a risk to non-target vegetation, and what measures would offer effective and reasonable protection to compost.

The workgroup reviewed a recent Woods End study that examined the toxicity of clopyralid to sensitive plants under defined conditions of soil/compost and compost/peat combinations. The Dow-funded study suggested a low probability of extended damage to sensitive plants, given the low levels of clopyralid detected in compost samples from California. The study results indicated that damage to

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Compost and Mulch Product Suppliers

BFI Organics, (408) 945-2844

Zanker Road Resource Management, (408) 263-2384

Z-Best Composting Facility, (408) 846-1574

City of San Jose Organics Diversion Programs

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From the Ground Up Newsletter

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From the Ground Up is funded and administered by the City of San Jose Environmental Services Department. The purpose of From the Ground Up is to disseminate information on production and use of compost, compost tea and mulch to landscape, agricultural and horticultural professionals. Information submissions and inquiries should be directed to Karin Grobe, Outreach Coordinator and Newsletter Editor, (831) 427-3452, kgrobe@pacbell.net or to Michele Young, City of San Jose Environmental Services, michele.young@ci.sj.ca.us.

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Golf Courses Implement Compost Tea Program

Pest management on golf courses has traditionally included regular pesticide applications, particularly on greens. Golf courses are under increased pressure to minimize the use of chemicals and golf course managers are looking for alternatives. Compost tea is emerging as an effective tool for suppression of turf diseases and reduction of synthetic fertilizers.

Phil Rossi, Integrated Pest Management (IPM) Coordinator for Golden Gate Park in San Francisco, has been using compost tea for control of fungus diseases since 1997. Tea is used as a soil drench and as a foliar on golf and lawn bowling greens. "Fungus is the number one problem for greens and we used to apply fungicide on a regular schedule" he says. Greens are under stress due to compaction caused by foot traffic, close-crop mowing and San Francisco's foggy weather. "Ammonium fertilizers also deplete the microorganisms that could help to crowd out agents that contribute to fungus," says Rossi.

Tea is also used in the Conservatory of Flowers. "Tea creates a biofilm on leaf tissue," says Rossi. "Essentially, that's a screen or shield of plant health-promoting microorganisms. They colonize the leaf surface and create a barrier against pathogenic organisms."

Rossi says that compost tea is not the end-all step for turf and plant health, rather it's the last layer of a whole-system biotic approach.

The tea is brewed in two 100-gallon and one 25-gallon brewers purchased from Growing Solutions (www.growingsolutions.com). Compost is a 50-50 blend of vermicompost from a worm farm in Florida and thermophilic compost made by the San Francisco Presidio Trust. The tea is diluted with an equal volume of dechlorinated water and applied at a rate of two gallons per 1000 square feet every two weeks. "Since you have to brew the tea, it's a little more labor than fungicide applications," says Rossi, "But in terms of the application, it's a wash." Boom-type power sprayers are used to apply tea to the greens and gun applicators are used in the Conservatory.

San Francisco's IPM Policy was implemented in 1997 by City Ordinance. City Parks staff must employ non-pesticide management tactics first and use chemicals only as a last resort. The program has improved safety for golfers and lawn bowlers as well as City workers. "From our standpoint, it's definitely a worthwhile program," says Rossi.

Christa Conforti, IPM Coordinator for the Presidio Trust in San Francisco, evaluated the effects of compost tea on golf course greens over a one year period. Greens were sprayed



Compost tea application with a walk-behind boom sprayer, San Francisco Presidio Trust.

with one gallon of compost tea per thousand square feet weekly during times of high disease pressure and every two weeks during times of moderate or low disease pressure. Application methods alternated between drench applications in which the tea was watered in for 5-10 minutes after being applied, and foliar applications in which the tea was left on the surface of the greens.

Turf treated with compost tea had less microdochium patch disease, a foliar fungus, than untreated turf. Thresholds for disease on golf greens are very low. Mean percent of treated turf areas with microdochium symptoms was 0.042%, while 0.604% of untreated turf exhibited symptoms.

Turf treated with compost tea had longer root length than untreated turf. Mean root depths of treated turf was 2.5 inches, while that of untreated turf was 1.9 inches. A deeper root system improves the ability of turf to withstand foot traffic.

Compost and compost teas are made on-site. Compost is made from equal parts wood chips, grass clippings, horse manure and horse bedding. Biodynamic preparations are added to the windrows and compost is processed for a minimum of four months. Growing Solutions tea brewers are used and additives (molasses, sea kelp, cane sugar, rock dust, yeast) are added before brewing. Tea is applied with a boom sprayer within four hours of brewing.

Conforti has made compost tea an integral part of the Presidio Golf Course turf maintenance program. "The differences in rooting depth and microdochium patch were small, but they were significant," she says.

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compost stability. Maturity is the degree to which compost is free of organic substances that could compromise seed germination and plant growth. Most of the maturity tests Shields runs are bioassays, involving germinating and growing plants in controlled conditions. “People don’t understand chemistry, but they understand plants,” says Shields. “If plants don’t thrive, that tells us something and we usually can look a little closer and figure out why.”

But Shields is the first to point out that toxicity in the lab may not translate to toxicity in the field. “It’s important to remember that composts that are toxic to plants in the lab may not be toxic in actual field conditions,” he says. “High salts, acid or alkali pH and ammonia toxicity can be corrected when compost is mixed with soil in the field.”

Shields is optimistic about the future of the composting industry. “When I first got involved with compost, people were using tests designed for soil to try to determine compost quality and landscapers and farmers had no idea how to use compost,” he says. “Now, we have developed special analyses geared to compost and people have learned, more or less, how to use it. A lot of composters that weren’t able to do a good job have gone out of business and the ones that stayed in have improved their production techniques. I’ve seen a lot of exciting growth in the industry and a world of improvement in compost products.”

References and More Information

Compost Quality Standards and Programs

- US Composting Council Seal of Testing Assurance Program, <http://tmecc.org/sta/index.html>
- California Compost Quality Council, <http://www.ccqc.org/>
- Compost Standards in Canada, Composting Council of Canada, <http://www.compost.org/standard.html>.
- Rodale Organic Gardening Compost Quality Seal Program, <http://www.organicgardening.com/compostseal/>

Clopyralid

- See ‘Hot Topic: Clopyralid’ at www.urbancompost.org.
- Search the Waste Board website for ‘clopyralid’ at <http://www.ciwmb.ca.gov>.
- Washington State University clopyralid page, <http://www.puyallup.wsu.edu/soilmgmt/Clopyralid.htm>.
- See “Data on Clopyralid Effects Presented in Sacramento to CA-DPR, CIWMB”, Woods End Research Lab News, by searching on clopyralid at <http://woods.end.org/articles.html>.

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plants occurs only at higher levels of clopyralid than was originally suspected. The Woods End research also found that clopyralid slowly degrades in compost, at about the same rate as it degrades in soil.

Woods End posed a general rule of thumb that there are not likely to be adverse field effects from tainted composts containing as much as 50 ppb clopyralid when used at ‘normal application rates,’ for example 10 tons per acre. (See “References and More Information” box below for article on the study.)

Workgroup members reacted to the Woods End findings with a degree of scepticism, pointing out that the research is not in line with earlier findings, which held that clopyralid survives the composting process and very low levels can cause toxic effects on susceptible plants.

The California Compost Quality Council coordinated lab submittals from 26 California compost facilities to test for clopyralid. Results showed the highest level of clopyralid residue in composts sampled was 16 parts per billion, with 67 percent of composts showing no detectable residue. However, the relatively small sampling was voluntary, and many composters have not tested for clopyralid or have not shared information on their samples. Additional testing of yard trimmings composts is needed to get a clearer view of the potential threat of plant damage in California.

Compared to Spokane, Washington, where clopyralid problems first surfaced, California greenwaste compost typically has lower clopyralid levels because it includes a higher proportion of woody materials to grass clippings. Also, it is believed that many Spokane residents employ commercial lawn care services, which frequently use clopyralid to control broadleaf weeds.

Compost professionals remain concerned about the impact of clopyralid on compost quality and use. They are satisfied that DPR made the right decision by restricting turf use of clopyralid products.

Linda Moulton-Patterson, Chair of the CIWMB commented: “Using organic material to make compost is an essential part of our efforts to prevent valuable resources from ending up in landfills, a major reason why California’s statewide diversion rate has grown to 48 percent. We are very pleased with DPR’s determination to further limit the use of clopyralid. It is a crucial step in protecting the viability of compost markets and the continued success of our waste diversion efforts.”