AGRICULTURE IN PARTNERSHIP WITH SAN JOSE

Growers' Newsletter

Newsletter for the Agriculture in Partnership Demonstration Project, November 1996

Clean Green Spurs Compost Production

Clean green is composted by itself and with other materials to make a diverse array of compost products

Major changes have transpired in the two and a half years that have passed since the Calilfornia Integrated Waste Management Board awarded the City of San Jose funding to coordinate the Agriculture in Partnership demonstration project.

Compost use has increased. Growers who never used compost have started to experiment with small amounts. Growers who have traditionally used cow and chicken manure-based compost have switched to compost that is made primarily or in part from yard trimmings. Growers who used to apply 3-5 tons per acre have ramped up to using up to 7-10 tons per acre.

Compost production has increased. In June of 1994, Zanker Road Resource Management was the only processor composting yard trimmings collected by the City of San Jose; Guadalupe / Valley's Pride and BFI Organics were grinding and screening yard trimmings and distributing uncomposted yard trimmings to farmers. Now all three processors compost the City's yard trimmings.

The market for uncomposted yard trimmings has changed radically. In June of 1994 screened yard trimmings were delivered to many farms for free. Some of those farms were experimenting with direct incorporation and surface mulching of uncomposted yard trimmings. A few growers were making their own compost. Yard trimmings were also used to surface farm roads.

Some growers are still making their own compost, but now they generally pay at least part of the cost of the hauling. Experimentation with direct incorporation of uncomposted yard trimmings and surface mulching has slowed. Growers in Santa Clara and San Benito counties who want a few loads of yard trimmings for a one-time application are currently finding it difficult to get material.

This is surprising since the tonnage of yard trimmings has actually increased as more local cities and counties have started curbside collection programs.

Compost windrows at Zanker Road Resource Management, San Jose. Agriculture in Partnership Field Days are scheduled at each of the three facilites that compost the City of San Jose's yard trimmings. See back cover for event dates and locations.

Some of the increased demand has come from the composting operations set up by the City's processors and some of the demandis coming from composting operations that have sprung up in Hollister and the Salinas Valley. These operations are all farm-based or run by former growers or seasoned agricultural commodity and service providers.

Whereas much of the compost made by the City's yard trimmings processors is used for landscape applications, nearly all of the compost produced by the operations in Hollister and the Salinas Valley is used by farmers.

The Agriculture in Partnership with San Jose demonstration started out with four Farm Cooperators. As the sun sets on the project, eight Cooperators have hosted field trials in row crops, orchards and wine grapes. We thank those farmers for their generous participation.

Information gained during the project will be summarized in a Yard Trimmings Product Use Guide. We would be happy to send you a copy. This last issue of the newsletter includes a survey to gather feedback on the Agriculture in Partnership demonstration project. We would be very appreciative if you would answer the survey.

Lastly, check out the events on the back cover of this issue. We hope to see you at all of them!

Compost: Comparing the Products

Shopping for compost is like shopping for a new tractor: It's an important decision, and it's helpful to have a list of questions for the dealer. Here are some questions that will help you get past kicking the tires, and with a little luck, choose the compost that's right for your soil, cropping system and budget.

What were the starting materials for the compost?
Yard trimmings can be composted by themselves or with other materials, like manure, sawdust, straw, mushroom waste, biosolids, ground pallets and agricultural by-products. Get a list of feedstock materials percentage by weight or volume at the beginning of composting. Ask if any additives, including bacterial inoculants or amendments, like lime or gypsum, were added.

What was the carbon to nitrogen ratio of the compost feedstock at the beginning of the process? What is the carbon to nitrogen ratio of the finished compost?
Optimum beginning carbon to nitrogen ratios are 25:1 or 30:1. When compost is finished, the ratio should be less than 15:1. A higher ratio could indicate immature compost. High carbon compost competes with plants for nitrogen to continue the decomposition process.

What composting method was used?
Compost can be made in windrows with a mechanical turner, in agitated bays, in vessels and in unturned (static) piles. Each method has an effect on consistency of composition and biological stability.

How was the compost aerated?
Microorganisms that decompose organic materials require air. Decomposition slows if oxygen is not replenished. Aeration can be provided by turning, agitation or blowing of forced air. Static pile composting depends on passive air exchange. Most composters that offer product for sale use turners in a windrow composting process.

How often was the compost turned (windrow composting)?
Some composters turn the compost every day during the early composting stages when microorganisms are most active; others turn less frequently. Some composters monitor temperature or carbon dioxide levels to decide when to turn; others turn on a pre-determined schedule.

How long did the composting process take?
Time required varies with the process, but most composters report composting periods of 45-90 days.

What was the moisture content during composting?
Typical moisture range during composting is 40-65 percent; optimal range is 50-60 percent.

What is the moisture content of the finished compost?
Compost dries out a bit during the curing process. Moisture content of finished compost should be over 35 percent to minimize dust problems during spreading. Also, some beneficial microorganisms will die if moisture content is too low. On the other hand, if compost is too moist, it is heavy to transport and may have a tendency to clump. For compost sold by the ton, high moisture content can mean you are paying extra money for the excess moisture.

What is the nutrient analysis of the compost?
The content and availability of macronutrients (N-P-K) and micronutrients should be stated. Although large quantities of nutrients are not typically found in compost, it is applied at much greater rates than fertilizer, and can have a significant effect on crop nutrients. Remember that the nutrients in compost are mostly in complex organic form and must be mineralized in the soil before they become available to plants. For 100 percent yard trimmings compost, typical nitrogen is 1.5 percent, phosphorus is 0.25 percent, and pottassium is 1.0 percent.

Have any bioassays been performed on the compost?
Compost maturity can be measured through plant bioassays, such as seed germination, root elongation and plant growth trials.

What is the particle size of the finished compost?
Compost that can pass through a one-inch screen or smaller is preferred to minimize non-biodegradable contaminants, and to limit large woody pieces in the finished product. However, the preferred particle size may depend on the texture classification of the soil being amended, crop to be planted, and spreading and cultivation equipment to be used.

How many cubic yards are in each ton of compost?
If the product is priced by the cubic yard, the bulk density (pounds per cubic yard) is needed to figure out the cost per ton. This information can also be used to figure out how much compost can be carried in each delivery truck.

Compost: The Basics

Composting organic materials involves several steps:

- Incoming organic waste is inspected and tested to verify that it is free of contamination.
- The material is ground or screened to a relatively uniform size.
- The natural decomposition process is encouraged and monitored for a period of time. The material is digested by tiny organisms called microbes, which need adequate moisture and oxygen to do their work. Decomposition is usually done in windrows, which are long rows of organic materials anywhere from 4-10 feet tall and 6-15 feet wide.
- After decomposition, the compost is left to sit in large piles. This step is called *curing* . The object of curing is to eliminate potential toxicity to plants and seeds.
- Compost can be screened to remove undecomposed material and limit particle size.

Product Suppliers

We thank the City of San Jose's processors for their support:

BFI Organics, (408) 432-1234, extension 413
Zanker Road Resource Mgmt., Ltd. (408) 263-2384
Valleys Pride/Guadalupe, (408) 268-1694

Agriculture in Partnership with San Jose Growers' Newsletter is mailed free of charge to growers and others interested in recycling of organic materials. The purpose of Agriculture in Partnership is to disseminate information on use of yard trimmings and other urban organics in agricultural operations. Agriculture in Partnership with San Jose is funded by a grant from the California Integrated Waste Management Board and is administered by the City of San Jose Environmental Services Department.

Research in Row Crops and Orchards

Pepper and Tomato Trials

Richard Fiorio, Dan-Rich Farming Company, Gilroy, tested use of uncomposted yard trimmings, semi-mature compost, and mature compost on processing tomatoes.

All products were applied in the fall. Uncomposted yard trimmings were applied in the fall and the spring to find out if there is an advantage to letting yard trimmings decompose in the field over winter. Tomatoes were transplanted into the field about three weeks after the spring applied yard trimmings were incorporated. Conventional fertilizer was used on all treatments.

There were no differences in tissue nitrogen, yield or plant appearance between the four treatments. Plants looked very similar and crop maturity, disease incidence and weed pressure did not appear to vary between the treatments.

Tree Crop Mulching Trials

The trial at the Van Dyke Ranch in Gilroy compares apricot orchard blocks that have been mulched with 4-5 inches of yard trimmings to blocks that have not received mulch. A natural cover is allowed to grow in all blocks. Nightcrawlers have been introduced into some blocks.

"We're finding that the soil under mulch has a higher percentage of soil moisture going into the dry months," says Matt Werner, Soil Ecologist. "In one trial, right before the first irrigation in May soil under the mulch was at 18 percent moisture, while soil under the conventional clean orchard floor was at 9 percent."

Nightcrawlers introduced by the researchers are enjoying the moist conditions. Earthworm were sampled right before the first irrigation.

"Earthworms were abundant under the mulch," says Matt Werner. " Sampling didn't turn up any worms in the no-mulch blocks."

Tissue sampling in June showed less nitrogen availability in the mulched plots. Tree roots may have grown into the mulch, where active decomposition of the mulch is likely to be immobilizing nitrogen. The mulch has not been effectivly suppressing weeds, and appears to be the source for many of the weeds that are growing in the mulched plots. The most prevalent weeds are malva, burr clover, bindweed and cranes bill. Fruit yield and size showed no significant difference between the mulched and unmulched plots. Earwig trapping in June showed no difference between mulch and unmulched plots.

The trial at the Hain & Sons, Tres Pinos, in a young, non-producing walnut orchard, compares blocks that have been mulched with 4-5 inches of yard trimmings to blocks that have not received mulch. The mulch was expected to help conserve soil moisture and control weeds. The mulch has not been effective in controlling weeds so the mulched plot has been mowed. Weeds are disced in the unmulched plots.

Matt Werner (foreground) and assistant sample earthworms. Ground inside the circular ring is saturated with a solution of water and mustard powder. Earthworms that surface are counted, weighed, and identified.

Gypsum blocks were installed in May at depths from one to four feet and weekly soil moisture monitoring is being performed by Paul Hain. Preliminary review indicates that higher moisture is being found in the unmulched plots rather than in the plots with the mulch. Weeds in the mulched plots may be using water and drying the upper soil compared with the clean cultivated control plots.

Mike Ravizza, Ravizza Ranch, Morgan Hill is satisfied with weed control provided by the mulch he applied to his cherry orchard. Monitoring of mulch use at the three orchards crops will continuethrough the winter.

The ability of mulch to control weeds and conserve soil moisture may depend on soil, crop, weed pressure, type of irrigation and tree canopy coverage.

Ben Faber, Ventura County farm advisor, has been researching the effect of yard trimmings mulch on avocado and citrus tree orchards. He has found that 3-4 inches of mulch conserves moisture to a depth of 1.5 feet and inhibits most weeds.

Basal Rot of Onions

Fusarium basal rot of onions may be controlled by compost, according to research conducted by Marc Buchanan, UC Center for Agroecology and Sustainable Food Systems. Onion research plots receiving 2.5, 5, 10 and 20 tons of compost per acre had significantly lower numbers of Fusarium-infected bulbs. Compost was produced at the Herbert Ranch in Hollister.

Buchanan believes that soil microbes may have accounted for the lower incidence of Fusarium in compost-amended plots. "The compost effect may be related to a shift in the microbial status of the soil," says Buchanan. "The compost may have introduced a microorganism or microorganism specifically antagonistic to Fusarium disease, or a general increase in soil microbial activity may have interfered with the disease organism. It's also possible that a specific chemical or group of chemicals antagonistic to Fusarium were present in the compost or formed in the soil."

The research is funded by the California Integrated Waste Management Board.

Learn How Compost is Made at Three Agriculture in Partnership Events

Composting at the Dunne Ranch in Gilroy

Wednesday, November 13, 2PM.

Learn how Valley's Pride / Guadalupe manages yard trimmings, manures, redwood shavings, mushroom waste and wood fines to create compost products for farmers. Ron Ganiats will host this informative and fun session on large-scale compost production.

Witness a delivery of yard trimmings. See the giant windrow turner and the trommel that screens compost to a fine particle size in action. If you've been yearning to learn to operate a windrow turner, this may be your chance.

Hollister and Salinas Valley compost producers have been invited to present information about their products. Expect a lively discussion on optimal turning frequency, moisture management, and product characteristics. Learn more about inoculants and manure teas.

The Dunne Ranch is on San Felipe Road between Shore Road and Hiway 152 East. From 101, take 152 East. Travel about 8-9 miles and turn right onto San Felipe Road. The Dunne Ranch entrance is an unsigned road about one-quarter mile down on the left. Signs will direct you into the composting site.

Refreshments will be provided. If it rains, we'll meet inside of the barn.

Mark Two More Events on your Calendar

You will receive flyers with more information about the following events right after Christmas.

Composting at Zanker Road Resource Management in San Jose, Wednesday January 15, 2PM.

Composting at BFI Organics in Milpitas, Wednesday February 5, 2PM.

For more information on any of the above events, contact Karin Grobe at (408) 427-3452.

Resources

New Information Bulletins

Call the message line, (408) 277-2989 to request the following information bulletins:

Yard Trimmings: Working with Suppliers to Obtain a Quality Product. If you are considering using yard trimmings to mulch an orchard or make your own compost, this bulletin will help you to get clean, biodegradable material that suits your application.

Compost: Comparing the Products. When shopping for compost it's helpful to have a list of questions to ask the dealer. This bulletin follows the format of the article on the second page of in this issue and includes even more questions to help you choose the compost that's right for your soil, cropping system and budget.

Regulations Governing Use of Yard Trimmings. Includes information on uses of yard trimmings that are not regulated and regulations that apply to large composting operations.

Compost Production and Utilization: A Grower's Guide

Effect of compost on the soil, behavior of nitrogen and other nutrients in applied compost, compost quality, practical information on production and use of compost. Order (publication 21514) from Division of Agriculture and Natural Resources, University of California, (800) 994-8849.

Resources for More Information on Compost Quality

California Compost Quality Compost Council, 584 Castro Street, Suite 449, San Francisco, CA 94114. Phone (415) 241-0266.

The Composting Council, 114 South Pitt Street, Alexandria, VA 22314. Phone (703) 739-2401.

Laboratory support for compost testing:

Soil Control Lab, 42 Hangar Way, Watsonville, CA 95076. Phone (408) 724-5422, Fax (408) 724-3188.

Woods End Research Laboratory, P.O. Box 297, Mt. Vernon, Maine 04352. Phone (207) 293-2457.

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