

Compost Grass, Leaves, Plant Wastes To Improve Garden

UNIVERSITY PARK (Centre Co.) — Composting allows home gardeners to recycle organic material into a useful gardening product.

"Leaves, plants killed by frost, vegetable scraps, and grass clippings — all these materials can be composted," said Robert Nuss, professor of ornamental horticulture in Penn State's College of Agricultural Sciences. "You can operate a compost pile year-round. The composting process will continue through the coldest days of winter."

Nearly 30 percent of the material homeowners throw away can be composted. This keeps these wastes out of landfills and creates a product that adds valuable organic matter to the lawn and garden. "Many landfills no longer accept leaves or garden wastes," said Nuss. "Composting may be the easiest way for homeowners to dispose of them."

Composting decomposes organic matter into a dark, crumbly material similar to humus. Along with providing nutrients, finished compost helps soil retain water by increasing its organic content.

"Compost is a valuable soil conditioner that can be used in gardens, around trees, and on lawns," said Nuss.

"You don't need a special

compost bin, but unconfined heaps can be visually offensive to neighbors," Nuss said. "If you have neighbors living close by, you may want to consider using a compost bin. Other than that, you need few tools except for a manure or garden spading fork for turning the material, and a soil thermometer."

Composting tools and bins are available at hardware stores and garden centers, or you can order them from gardening catalogs. An inexpensive bin can be made from masonry blocks, boards, wire, or snow fencing. "Make sure your bin is at least three feet high and three feet wide, so that it can hold enough material to function properly," said Nuss.

Once you have your bin situated on level ground, you can fill it with plant and vegetable scraps, egg shells, coffee grounds, sawdust — even small bits of paper.

The pile should contain a mix of carbon- and nitrogen-rich materials because both are essential for the microorganisms that do the decomposing. "Green, leafy wastes usually are high in nitrogen, while woody materials tend to be high in carbon," Nuss said. "Fertilizer and manure also are good nitrogen sources."

The microorganisms that aid in composting need some moisture, so you may need to water the pile from time to time. One way to gauge moisture is the squeeze test. "Tightly squeeze a handful of the material," Nuss said. "If a few droplets of water come out, it's just about right. If it looks and feels dry as a bone, hose down the compost pile."

Decomposition without oxygen can cause bad odors, so turn the pile every few weeks with a gardening fork to aerate it. Using a fair amount of coarse material — dry leaves or bulky plants, for instance — also helps ensure that the pile gets proper aeration. If you detect any odor, turn the pile.

Complete information about starting a home compost pile is available in "Composting to Reduce the Waste Stream: A Guide to Small-Scale Food and Yard Waste Composting," a 48-page publication featuring easy-to-read charts and guidelines.

Copies of the guide are available for \$8 from the College of Agricultural Sciences Publications Distribution Center. For ordering information, call (814) 865-6713 or visit the college's publications Web site at pubs.cas.psu.edu. To order using Mastercard or Visa, call toll-free, (877) 345-0691.

Researchers Use Constructed Wetlands To Reduce Odors

UNIVERSITY PARK (Centre Co.) — Feces, urine, and wastewater that are by-products of hog farms smell to high heaven.

To reduce the odors, two researchers in Penn State's College of Agricultural Sciences have found that low-tech, constructed wetlands work well to clear the air.

Field trials in small-scale, constructed wetlands in a greenhouse showed an 80 percent reduction in offensive odor compounds from unadulterated swine facility wastewater, said Eileen Wheeler, assistant professor of agricultural engineering. Wheeler and doctoral researcher Susan Wood sought to confirm anecdotal evidence that water treatment in a constructed wetland can reduce odors.

"Swine and other livestock producers in southern states have used constructed wetlands to treat animal waste, and researchers had noticed that smells were not as strong," Wheeler explained.

"We wanted to see if we could quantify a reduction in odor in trials that would reflect real-world practices."

Wood, of Batavia, N.Y., constructed eight experimental wetlands in 100-gallon livestock tanks. She filled the tanks with gravel, added a layer of peat moss, and planted a commercial wetlands seed mix containing a wide variety of plants, including fescue, redtop, and wild rye. She also tested unplanted wetlands containing just gravel.

"Some of the grasses died where the water entered the wetlands," Wood said. "But in general, the planted wetlands effectively reduced odors."

Wood organized eight volunteers in a sensory odor panel that compared air samples from untreated swine wastewater and water that had been treated in the wetlands. The panel rated air samples on an odor scale of 0 to 5, with 5 being the most offensive.

"Most of the untreated sam-

ples were rated as a 4, and the samples from wetland treatment had an average rating of 1," she said. "The water that had been through the wetland had a stagnant, earthy smell, but it wasn't offensive."

Wheeler said Wood's research is focused on finding an alternative to other methods of treating swine waste for odor reduction. Current swine waste treatment practices include:

- Mechanical aeration of manure lagoons. Oxygen is bubbled into the wastewater, preventing anaerobic conditions that produce smells. "However, this technology has large power requirements that results in high energy costs," Wheeler said.

- Anaerobic digestion of wastes into biogas. This method requires expensive investment in equipment and high maintenance costs.

- Chemical or biological additives that counteract smells. Research has indicated that the effectiveness of most additives has been questionable.

The next step in Wheeler's research is to construct a large wetlands treatment facility on a local hog operation. If the larger wetland continues to effectively reduce odors, the researchers then will focus on whether it is economically feasible to use treatment wetlands on commercial farms.

The researchers also want to test how the wetlands function under different temperature conditions.

"The constructed treatment wetlands that have been built in the South have warmer weather year-round," Wood explained. "We would like to see how these wetlands function during a Pennsylvania winter, or whether some kind of protective structure is required to keep them working."

Wheeler said swine operations can use the treated water as wash water for hosing out hog pens, or they may be able to store the water for use as fertilizer for crops.

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