

CHAPTER 5: COMPOSTING CONUNDRUMS

“co-nun-drum” \kə-ˈnən-drəm\ noun origin unknown

1: a riddle whose answer is or involves a pun; 2 a: a question or problem having only a conjectural answer; b: an intricate and difficult problem.

Merriam-Webster Online Dictionary

Retrieved November 4, 2008, from

<http://www.merriam-webster.com/dictionary/conundrum>



In this chapter, you'll find information about:

- Tricky composting topics that always seem to generate questions at a workshop or other event, including:
 - Pet waste
 - Sod
 - Pesticides

This chapter provides background information and resources to use incorporating these tricky topics into your curriculum.

Pet Waste: A Difficult Problem

Here are several reasons why pet waste is such a problem:

- Increasing pet populations. The number of dogs and cats living among humans in the United States is surprising. A 2007 pet census by the American Veterinary Medical Association revealed 82 million cats and 72 million dogs (up from 71 million cats and 62 million dogs in 2001). Nearly 60% of all homes in the United States have one pet and 21% of homes have five or more.
- The material itself. Pet waste smells bad, it's unpleasant to handle, and it can harbor parasites and other organisms that may cause disease in humans and other animals. And it's generated non-stop, day in and day out.
- Water quality issues. Pet waste, specifically dog poop, is a surface water quality problem because stormwater carries nutrients and pathogens from the waste to surface and ground water.
- Lack of peer-reviewed research data. There are only a few studies available with actual test results for small scale composting of pet waste. Most information in brochures for the public presents advice based on the potential for disease associated with pet waste, but not actual data involving home composting situations.
- Contradictory advice. Currently there is no consensus about how pet waste should be managed. To illustrate, this *Compost Educator's Guide* contains a number of different perspectives in the Resources and References section in this chapter. Some are based on facts, some are based on personal opinions and some are based on a desire to sell pet-related goods and services.

The Debate about Pet Waste

Figure 5.1 frames the debate about managing pet waste. Until recently, each county's or municipality's officials weighed the options and formulated their own approach to the problem and created outreach materials accordingly. Now we have a statewide recommendation developed as part of the Washington Waters campaign. This campaign provides a framework to help people change some of their behaviors that pollute Washington's lakes, rivers, wetlands, and marine waters. The core of the campaign is the web-based tool kit for local governments, organizations and citizens working on water quality projects.

Recommended Practice for Managing Dog Poop

The campaign to protect water quality in Washington State sends a consistent, statewide message: "Scoop the poop. Bag it. Trash it."

The campaign is sponsored by Washington State Departments of Ecology and Health; WSU Mason County Extension; Washington Conservation Commission;

Opposite: Figure 5.1. The debate about pet waste.

The Debate About Pet Waste



Anecdote for Future Dog Poop Research

For an inspiring example of future dog poop research ideas, here's an experiment using spent coffee grounds from Starbucks' recycled grounds program. Chery Sullivan (Olympia resident and Organics Specialist with the Department of Ecology) took an off-the-shelf plastic worm bin with holes drilled in the bottom, and sunk the bin a few inches into the ground. She put a two-inch layer of bulking material in the bottom of the bin and started adding the dogs' daily contributions. Chery added spent coffee grounds after each addition to keep the smell down. Indigenous worms populated the new doggie doo café, along with some red wigglers from an active bin thrown in for good measure. The results were amazing! Little to zero odor, and no-fuss, easy operations!

According to Chery, here's how the experiment ended up: I stopped adding dog poo in the winter and let the worms do their thing. In the spring, the whole entire works looked like coffee grounds, the worms were still happy as clams at high tide (or worms in a manure pile) and there was still no odor! After at least another full year of curing, Chery used the compost to mulch some ornamentals in a back corner of the yard.

Puget Sound Partnership; U.S. Environmental Protection Agency; Thurston County Stream Team.

More Research Needed

Even with the scoop-bag-trash campaign, avid composters know that composting and vermi-processing dog poop is a viable solution if done carefully and responsibly. Dog poop is decomposable. It is transformed just like other biodegradable residues. However, until we have more research involving pathogen reduction in home composting systems, the recommendation to "Scoop the poop. Bag it. Trash it." is the most reliable approach to protect water quality and human health.

What about Cat Waste?

The conundrum we encounter managing cat waste involves two topics: the disease organism *Toxoplasma gondii* and kitty litter.

Toxoplasma gondii is a protozoan parasite that infects human populations around the globe. Luckily, not all cats carry the parasite. Human infections in healthy adults require no treatment: flu-like symptoms go away after about three weeks. Infection in pregnant women, or women who become pregnant while infected can pass the parasite on to the fetus with severe consequences. Infection in immuno-compromised people can cause severe symptoms. So caution in dealing with cat feces is extremely important.

Several researchers are also studying the connection between *T. gondii* and disease in marine mammals, especially sea otters.

Kitty litter is another part of the cat waste conundrum. Regardless of manufacturers' recommendations, kitty litter should never be flushed down the toilet. And green kitty litter should not be used for mulch until more research confirms safe practices.

For now, the recommendation is to "Scoop it. Bag it. Put it in the trash."

Resources and References

The following resources and references give background information about managing pet waste in Washington State. These references are included because they give facts and opinions that represent the debate on the subject. They are not intended to be a thorough literature search, but rather a framing of the topic for discussions among compost educators. References 1 through 3 have additional detail included following the list. This section gives you background on the pet waste debate but the recommendation is still to "Scoop it. Bag it. Put it in the trash."

The references for pet waste include:

- 1 City of Eugene, OR. Description of a 2004 informal study on pathogens in composted pet waste (from United States Composting Council (USCC) list serve message in 2004 by a Compost Specialist at the City of Eugene. Entire entry included below).
- 2 Natural Resources Conservation Services (NRCS) guidance document on hot composting dog waste in Alaska. Composting Dog Waste is available as a PDF file from the NRCS website. <http://www.ak.nrcs.usda.gov/compost.html>
- 3 Snohomish County recommendations on the Public Works website (November 2008). http://www1.co.snohomish.wa.us/Departments/Public_Works/Divisions/SWM/Services/Water_Pollution/Pet_Waste.htm
- 4 Diseases from dogs – Information quoted from the Center for Disease Control (CDC), National Center for Infectious Diseases. <http://www.cdc.gov/healthypets/animals/dogs.htm>
- 5 Cat litter debate. Article from SFgate.com (online site for the San Francisco Chronicle) that gives a journalist's summary of issues regarding cat litter.
- 6 Cornell fact sheet recommending no pet waste in regular small scale composting (based on a 70+ page report of pathogen testing in home composting systems in New York State). Both the fact sheet and report are available under Small Scale Composting at the Cornell composting website. <http://cwmi.css.cornell.edu/composting.htm>

- 7 Pollution Prevention Fact Sheet: Animal Waste Collection – Published by the Center for Watershed Protection, Inc. a non-profit 501(c)3 located in Ellicott City, MD. The fact sheet is available from the Stormwater Manager’s Resource Center (SMRC). <http://www.stormwatercenter.net>.
- 8 Pet waste removal services (such as <http://www.poopbutler.com/states-washington-pooper-scooper>).

Here are the three of the references in more detail:

City of Eugene informal study (2004)

The following entry appeared on the USCC list serve in 2004. It appears here just as it was posted on the website (except for changes to formatting.)

The City of Eugene Solid Waste and Recycling program very informally looked into the possibility of promoting pet waste composting a couple years back in part to address the issue of pet waste accumulation at several of our city dog parks. Earth Tub in-vessel composters were a possible solution, but that meant transporting pet waste from each park to a central location. We also had doubts about asking any worker or volunteer to take on the awful task of transporting and loading that material into the Earth Tub.

Then, an avid backyard composter explained she’d been composting her pet waste for years, and used the resulting pet waste compost around trees and shrubs. This was not a hot pile, but a simple plastic bin filled with leaves, some worms and regular deposits of dog feces. She mixed it with a winged compost turner that she dug into her compost pile several times each time she added pet waste. When her composter got full, after loading it for six months to a year, the material was transferred to another large plastic planting pot and there it matured for another year. Finally, she decided she could use the soil-looking material around trees and shrubs, and occasionally around her raspberry beds.

We took a sample of this one-year old soil-looking material and had it tested at BioVir Laboratories, Inc. for *Helminth Ova Assay*, *Salmonella Assay*, *Fecal Coliform Assay* and *Total Solids Assay*. We then allowed the material to sit for another six months and tested it again, hoping time and microbial competition would bring the material into the safe level. It didn’t.

We knew most backyard compost enthusiasts rarely make hot piles, and even more rarely turn those piles to bring all parts of the pile into the pathogen reducing temperature zone. We hoped a ‘best practices’ could be developed that didn’t include temperatures and turning, but simply time. This one compost pile was added to for a year, left to mature for a year, tested, left to mature for six more months, and tested a final time.

Here is what we found. At one year: *Helminth Ova* Assay: 8 viable *Helminth Ova*/4 grams total solids. At 18 months: *Helminth Ova* Assay: 2 viable *Helminth Ova*/4 grams total solids.

At one year: *Salmonella* Assay: 2.4 MPN / 4 grams total solids. At 18 months: *Salmonella* Assay: less than .84 MPN / 4 grams total solids.

At one year: *Fecal Coliform* Assay: 330,000 MPN / gram total solids. At 18 months: *Fecal Coliform* Assay: 620 MPN / gram total solids.

At one year: Total Solids Assay: 46.1% At 18 months: Total Solids Assay: 36.2%

In short, while *Fecal Coliform* and *Salmonella* levels decreased over time, and even viable *Helminth Ova* numbers decreased from 8 to 2, that is still 2 too many for me to feel comfortable recommending backyard composting of pet waste.

We have not done any further testing. We don't recommend composting pet waste to the public based on this information. I include picture of viable *toxocara* ova found in our pet waste compost when I teach Composting 101 to our new Master Composters. The risks are real. More testing certainly needs to happen before best practices recommendations can be made to the public. For now we recommend burial, and landfilling.

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Natural Resources Conservation Service guidance document Composting Dog Waste

This document, published in 2005, gives how-to information on composting dog waste based on a project started in Fairbanks, Alaska in 1991. Some of the suggestions in the brochure either directly contradict more recent recommendations, or are not as strongly worded. For example, the authors don't recommend waiting one year to use the finished compost. And the importance of restricting use of the finished compost to ornamental plants is not stressed. This NRCS document is intended for managing dog waste from 10 to 20 dogs housed in one location. The document is available in PDF form on the NRCS website:

<http://www.ak.nrcs.usda.gov/compost.html>

Snohomish County Public Works (Surface Water Management Division) recommendations

Snohomish County recommends bagging and landfill disposal as the preferred method of managing pet waste. The reasons cited are human health and water quality. The website explains:

- Composting at home doesn't reach high enough temperatures to destroy pathogens in the pet waste;
- Commercial yard debris composters aren't required to follow the process to further reduce temperatures or PFRP (prescribed process, time and temperatures needed to destroy pathogens);
- Burial and digesters are water quality hazards;
- Flushing may be OK in municipal sewer systems but would likely overload a septic system.

The website concludes the pet waste topic with this statement: *"Composting is good for yard waste and bad for pet waste."*

http://www1.co.snohomish.wa.us/Departments/Public_Works/Divisions/SWM/Services/Water_Pollution/Pet_Waste.htm

Sod

Composting sod and weeds that reproduce by rhizomes is not difficult. But it takes a different approach than regular composting and some additional patience. Many people need convincing that sod and grass roots need separate treatment from the rest of your compostables in your yard. Adding these materials to a compost pile invites grass takeover.

Solar Sod-busting

The solar sod-busting method involves allowing summer sun to desiccate grass roots and runners that would otherwise take up residency in a compost pile. It takes more surface area than the sod pile method, but it also serves more than one purpose: It will smother unwanted grasses and weeds growing underneath while the solar action is taking place above.

Solar sod busting involves shaking excess soil off grass roots and placing them in a single layer on a piece of black plastic. Punch several holes in the plastic so that rain water will drain out. Depending on the dryness and sunlight in your area, it will take a few weeks for the roots to be dry enough to add to the compost pile. If you get some rain during the process, it will encourage earthworms to come through the holes in the plastic, and their activity will create the base for a great potting soil.

Use the fact sheet *Composting sod and weeds that spread by roots*, to teach people how to treat these materials. The fact sheet is included in outreach materials for this chapter.

Pesticides

Many people ask the question, what happens to pesticides in the composting process? To answer the question, documents often refer to a literature review by Rynk, R. et. al., that appeared in two parts in *Compost Science & Utilization* in 1999 and 2000. The literature review, titled *Occurrence, degradation and fate of pesticides during composting*, looked at studies conducted in Portland, Oregon; Westchester County, New York; Seattle, Washington; Illinois; Massachusetts; and New Jersey.

In a review of the subject, the literature review was summarized as follows: Based on these studies, pesticide residues in compost do not appear to be a concern. Many of the detected compounds (chlordane, dieldrin and DDT, for example) have been banned in the U.S. for many years. Their occurrence in these studies suggests that it is difficult to cleanse the environment of these old pesticides. The absence of organophosphates, carbamates and most herbicides in composting feedstocks implies that these classes of pesticides are well degraded, diluted or lost to the environment before the feedstocks were collected for composting.

In more recent studies, researchers have begun to use new analytical techniques to trace pesticide degradation in the composting process. A 2005 study confirms the findings of the Rynk et.al., that most pesticides degrade to very low concentrations during the composting process.

The important exception to this general statement about pesticide degradation is a class of herbicides that were formulated to be long-lasting. Herbicides containing the active ingredients clopyralid and picloram, caused grave concern for the composting industry in 2001–2002 in Washington State and other parts of the country. As a result, the Washington State Department of Agriculture restricted clopyralid-containing herbicides from use on lawns and turf, except golf courses (when used at golf courses the clippings cannot leave the golf course). Clopyralid can still make its way into compost via feedstocks coming from the agriculture sector where clopyralid herbicides are still in use.

Luckily, few instances of clopyralid contaminated compost have occurred since people have become more aware of potential sources of the herbicide, and it is no longer used for residential lawns and turf. For more information about clopyralid in compost, see Washington State University factsheet listed in the resources section of this chapter.

Resources on Pesticides

WSU links/fact sheets regarding clopyralid. <http://www.puyallup.wsu.edu/soilmgmt/Clopyralid.htm>

Clopyralid and other pesticides in compost. Doc# AEX-714-03 from Ohio State University Extension Fact Sheet. <http://ohioline.osu.edu/aex-fact/0714.html>

Kohnke, Helmut, and D.P. Franzmeier. 1995. Soil Science Simplified. Long Grove, IL: Waveland Press, Inc.

References

Frenich, Garrido, et. al. 2005. A study of the disappearance of pesticides during composting using a gas chromatography-tandem mass spectrometry technique. Pest Management Science, Volume 61, Number 5. pp. 458-466(9).

Rynk, R. et. al. 1999. Composting, Pesticides and Pesticide Degradation Literature Review: Part I. Compost Science & Utilization. Volume 7, Number 4. pp 66-82.

Rynk, R. et. al. 1999. Occurrence and Fate of Pesticides in Compost and Composting Systems Literature Review: Part II. Compost Science & Utilization. Vol 8, Number 1. Pp61-81.