

Chapter 1

Digging into Compost

In This Chapter

- ▶ Understanding the basics of composting
- ▶ Meeting the decomposers
- ▶ Recognizing the benefits

You can't fail at composting. Isn't that a nice thing to know at the start of a project? Organic matter will rot no matter what you do. Fuss over it daily or ignore it for months; it doesn't matter. So, dig right in and enjoy the process!

This chapter defines a few terms, briefly introduces the soil food web, and gives you a quick description of hot and cold composting methods. The remainder of the chapter covers some of the many benefits of compost and composting.

Welcome to the World of Compost

Decomposition of organic matter is an essential biological process that's ongoing in every nook and cranny of the planet. *Composting* is a method for you to copy nature's process, speeding it up if you so choose, to ultimately reap a rich mound of soil-enhancing compost for your landscape.

What compost is

A beneficial, soil-like substance, *compost* is a mixture of decayed and decaying organic matter that improves soil structure and provides nutrients for plants.

If compost is the end product of your composting effort, what, then, is humus? Compost and humus are terms that are often used interchangeably, although there are subtle differences. Have you ever taken a stroll in the woods and uncovered fallen leaves to spy

a rich layer of crumbly, sweet-smelling, black earth? That's *humus*, which is comprised of well-decomposed plant and animal matter. Resembling dark coffee grounds, humus is aromatic, lightweight, and spongy in texture, allowing it to hold water.

Compost resembles humus but is comprised of materials in various stages of decomposition. Some may be broken down quickly; others may require multiple rounds of destruction from varied specialized microorganisms and soil invertebrates. A pile of compost may contain some humus, but there's still plenty of work available in the heap for the decomposers.



Don't let the fact that not all the contents of your compost are fully decomposed stop you from incorporating compost into your garden. In fact, it's a good thing to do because your compost's abundant microbial activity provides benefits to your soil, which I cover later in the chapter.

What tools and equipment you need

You don't need to buy a lot of stuff to begin composting. In fact, you could get started with nothing more than that old shovel propped in the corner of your shed or garage. However, it's much easier — and more entertaining — with a few well-chosen implements, such as a pitchfork and compost thermometer. I describe the most useful tools to enhance your composting experience later in Part I. The list is short, so no need to worry if your wallet is thin!

You may also have questions about compost bins. Are they essential? No, but depending on style, containers use space efficiently, provide a tidy appearance, and help you maintain moisture and heat within your heap of organic matter, ultimately producing compost faster. Some container styles also do a good job of deterring pests, if that's a concern where you live. In Part II, I cover characteristics of all sorts of home-built and manufactured bins and offer guidance for selecting the ideal container for your needs.

How composting works

Composting works best when you mix up the right combinations of organic matter and living conditions for the soil microorganisms and invertebrates performing all the decomposing work.

It may be easy to forget that soil is brimming with life when most of its occupants are microscopic. Imagine the most crowded city street or subway you've ever tried to negotiate at rush hour. That's a stroll in an empty wilderness compared to the multitudes of soil dwellers living beneath your feet. A single gram of soil — about

the size of a navy bean — holds 100 million to 1 billion bacteria, 100,000 to 1 million fungi, 1,000 to 1 million algae, and 1,000 to 100,000 protozoa.

The soil's microscopic multitudes share space with larger invertebrates, many of whom you can see with the naked eye, such as springtails, mites, and beetles. Populations of microscopic organisms and soil invertebrates create a diverse and highly functioning soil food web (see Chapter 3 for more details). And they're the same fascinating creatures that convert your yard wastes and kitchen scraps to useful compost.

You Can Do It! Home Composting Made Easy

I delve into more detail about hot and cold composting methods in this section, but if you're eager to get started, jump ahead to Chapter 4 to find basic instructions for creating a simple, free-standing pile.

Some like it hot!

As microorganisms begin breaking down organic matter, they release heat as a byproduct of their activity. If you build a pile with the right mix of ingredients, moisture, and air, it quickly reaches 120 degrees Fahrenheit (49 degrees Celsius) and higher and may heat up sufficiently to kill weed seeds or pathogens. This is known as *hot* or *thermophilic composting*. Specialized microorganisms known as *thermophiles* (heat-lovers) survive those high temps and continue eating and reproducing until the conditions are no longer favorable — that is, when your pile runs out of food, water, and air.

You can manage your composting to maintain relatively high temperatures by mixing and remoistening (as needed) until the preferred food sources are depleted. At that point, temperatures start dropping, and different microorganisms known as *mesophiles* (which thrive in moderate temperatures) take over. Soil invertebrates also arrive when temperatures drop to join in the decomposition process. Hot composting produces useable compost in as little as 3 or 4 weeks up to 2 or 3 months.

Cool customers

In cold or slow composting systems, it may take 6 to 12 months or even longer to obtain useable compost. Piles don't heat up

sufficiently to kill weed seeds or pathogens. However, the advantage is that the pile requires no maintenance on your part after you build it. Even though you aren't turning the pile to improve aeration or adding moisture, decomposer organisms will continue to break down the refuse. Mesophile and *psychrophiles* (cold-loving organisms) perform the work at a slower pace.

Vermicomposting (worm composting) and most forms of *sheet composting* (spreading organic material on top of the soil to decompose in place) are considered cold systems. Because they vary from the traditional approach of working with a pile, these methods are covered in their own chapters.

Reaping the Rewards of Composting

Composting saves you money, reduces global warming, helps you lose weight, and improves your love life! All right, there might be some exaggeration in that statement, but given a choice between composting and product infomercials blaring similar claims, I'd go with composting because it

- ✓ Saves money by cutting trash collection fees and reducing, or eliminating, the need to buy soil amendments, conditioners, and fertilizers. You can also save on your water bill because incorporating compost into your soil improves its moisture-holding capacity.
- ✓ Reduces the amount of methane (a greenhouse gas) produced when organic matter decomposes in landfills.
- ✓ Burns about 350 calories per hour as you turn the pile (for a person weighing 150 pounds).
- ✓ Might get you noticed by someone who cares about one of the previous three items.

Still not convinced? This section offers more good reasons to take up composting.

A healthier, more prolific garden

If you want to grow a fabulous vegetable, flower, or herb garden, start with your soil. Healthy, fertile soil equals healthy, productive plants. And the best thing you can do to create healthy garden soil is to add compost. Here's what compost will do for your beds:

- ✔ **Add organic matter to improve soil structure and porosity:** Soil is made up of sand, silt, and clay particles. Soil structure refers to the arrangement of these particles — how they aggregate or clump together and form pore spaces that permit air and water flow through the soil. Soil porosity creates a healthy environment for plant roots to thrive. Incorporating compost helps sandy soil retain moisture and nutrients so you may be able to water and fertilize less frequently. Adding compost also loosens compacted clay soil, reduces erosion, and promotes better drainage so plant roots don't rot in overly wet soil.
- ✔ **Add and feed beneficial soil microorganisms:** Compost is chock-full of beneficial microbes that add life to your garden soil. When you add compost to your soil, the microbes continue breaking down organic matter to release nutrients and even keep “bad” organisms in check.
- ✔ **Provide slow-release nutrients:** Because its nutrient content varies widely based on the original ingredients and decomposition process, compost is considered a soil amendment, not a fertilizer. Even so, compost contains essential plant nutrients and trace elements to improve soil fertility. Also, compost releases its nutrients slowly while it decomposes further in your soil. Garden plants make use of the nutrients over a longer growing season. Most chemical fertilizers release their nutrients in a quick burst; some of the value may be lost if plants aren't ready to utilize it or heavy rains or excessive irrigation leach it away.

A healthier community and planet

The many virtues of composting reach beyond improving individual gardens. Composting your yard waste and kitchen scraps at home, rather than setting them out for trash collection, offers you an avenue to be a part of the solution for issues such as overburdened landfills, pollution, and global warming. Here are a few reasons to divert your compostable organic materials from heading to the landfill:

- ✔ Composting extends the life of existing landfills and reduces the need to create others.
- ✔ Composting reduces transportation costs and related air pollutants from trash collection and hauling.
- ✔ As organic waste decomposes in landfills, it generates acidic liquid (*leachate*) that may combine with other contaminants in the landfill and seep into groundwater supplies.

- ✓ Organic waste that is tightly compressed in landfills to decompose without oxygen produces methane, which is a greenhouse gas.
- ✓ Burning yard waste is not a suitable option for disposal in urban areas, because it pollutes the air and exacerbates problems for people with allergies, bronchitis, asthma, and other respiratory issues. Burning waste is also banned in some rural areas, so composting is a good alternative.
- ✓ A compost heap is a wonderful wildlife habitat that teems with invertebrates and makes a snug home for beneficial creatures such as toads that provide free insect control in your garden.



Yard waste includes any type of organic residue from landscaping or gardening activities: pruned branches, spent plants, dead flowers, grass clippings, twigs, leaves, and weeds. Many of our commonly accepted landscaping practices generate enormous piles of organic waste. For example, freshly mown grass clippings or autumn leaves are raked, stuffed into plastic bags, and piled high at curbside for trash pickup. According to the U.S. Environmental Protection Agency, 12.8 percent of municipal solid waste generated in 2007 consisted of yard waste!

I won't bury you beneath a mountain of statistics, but there's good news to report. Yard waste is biodegradable and clean (as in non-hazardous), making it perfectly suited for composting rather than transporting it to landfills. More people seem to be accepting that idea. In 2000, 56.9 percent of yard trimmings were "recovered" as compost in municipal programs. That's a giant leap in ten years from 1990's recovery rate of a paltry 12 percent.

Composting organic waste is also on the rise in Canada and the United Kingdom. In 2000, the average Canadian sent 32 kilograms of organic materials to centralized composting facilities. In 2004, the amount jumped to 51 kilograms. In the 10-year period from 1997 through 2006, recycled green waste collected in England jumped from 347,455 metric tons to 2,212,600 metric tons.

Whether you compost at home or have access to community collection programs, transforming your organic waste into beneficial compost is an earth-friendly path to take on behalf of future generations.

Soil characteristics of the American West and Southwest

If soil native to arid climates was a paint color, it could be marketed as “Boring Beige” or “Drab Dirt.” Most gardeners in the arid West and Southwest regions of the United States encounter significantly different soil characteristics than gardening compatriots in other areas. Folks who relocate from regions where easily plunging a spade into dark soil is the expected norm are often flabbergasted when they have to wield a pickaxe to chip a dent in hard, rocky, organic-matter-challenged soil at their new abode. However, that doesn’t mean it isn’t good soil. It just has different characteristics.

That black earth in other regions forms because native plants drop large amounts of litter. All that organic matter continuously decomposes with the aid of plentiful precipitation, and over eons it builds layers of rich topsoil. In comparison, the desert’s native plants drop insignificant organic matter. Consider the teensy leaf size of a mesquite tree versus a maple tree’s large leaf, or the barely noticeable plant litter at the base of a cactus versus the thick bed of needles surrounding a pine tree. Also, extreme aridity slows the rate of decomposition. Mother Nature just doesn’t have sufficient organic matter and moisture to work with! Consequently, arid-land soils may contain less than one-half of 1 percent organic matter.

Lack of organic matter contributes to a lack of nitrogen in desert soils. Although nitrogen is one of the primary elements required for plant growth, native trees and shrubs seldom suffer from nitrogen deficiency. They’ve either evolved to thrive without much nitrogen, as cacti do, or they make their own. Many arid-land plants are legumes, such as acacia and mesquite, which manufacture nitrogen in their root systems with the aid of soil bacteria.

Another common characteristic of arid-land soil is alkalinity, ranging from 8 to 8.5 on the pH scale. (pH is a measure of acidity or alkalinity. On the scale of 0–14, 7 is neutral, below 7 is acidic, and above 7 is alkaline.) Soil’s pH level affects a plant’s ability to absorb nutrients.

Native and desert-adapted plants readily absorb what they need from existing soils. The challenge occurs if you try to grow plants native to different climates and soils, which includes many favorite annual vegetables and flowers. Annuals, by definition, complete their life cycle in one relatively-short growing season. To fuel this furious growth spurt, you must enrich your arid-land garden beds with compost.

Composting with kids

The National Gardening Association (NGA) offers a wealth of resources to parents and educators to help them engage children in gardening activities, including composting and vermicomposting. At NGA's Kids Gardening Web site (www.kidsgardening.org), you can find project ideas, suggestions to tie composting activities to curriculum requirements, grant sources for financial and material assistance, and real-life experiences.

One inspirational story comes from a Simi Valley, California, teacher. Over a period of several years, her sixth-grade classes progressed from observing a handful of red wiggler worms process food scraps in plastic soda bottles to designing a vermicomposting system that could handle their cafeteria waste to ultimately starting a worm-based business. Vermicomposting activities in the classroom gave students a hands-on laboratory of scientific exploration that offered opportunities to teach skills in all basic subjects.

But garden-based learning offers benefits beyond the 3 Rs. In a survey conducted by NGA, garden program leaders reported remarkable improvement in essential life skills that are not easily taught to youngsters. They noted participant improvements in the following characteristics: environmental attitudes, 96 percent; community spirit, 92 percent; self-confidence, 89 percent; social skills, 87 percent; leadership skills, 85 percent; attitude towards school, 82 percent; volunteerism, 81 percent; nutritional attitudes, 77 percent; motor skills, 65 percent; and scholastic achievement, 63 percent.

You don't have to be an experienced teacher to share the world of composting and gardening with a new generation. Often it's the simple things that spark enthusiasm and set kids off on a path of natural discovery. For example, a friend of mine took her compost crank (see Chapter 2) when giving an outdoor demonstration to kids. They were thrilled with the opportunity to stir the compost, and she reported they didn't want to give it up when she was ready to leave!