Chapter 1

Basic Techniques in Organic Gardening

In This Chapter

- Understanding the philosophy behind organic gardening
- Nurturing the soil
- Diversifying your garden
- Managing pests
- Practicing conservation

Everyone agrees that organic gardening means avoiding synthetic fertilizers and pesticides. But the philosophy and practice of organic gardening go far beyond that simple concept. Growing organic food, flowers, and landscapes represents a commitment to a sustainable system of living in harmony with nature. For many people, organic gardening is a way of life. This chapter deals with the fundamentals of organic growing, including the philosophy behind organic gardening and the specific techniques that lead to success.

Defining Organic Gardening

The ways that people use — and misuse — soil, water, and air affect the lives and habitats of plants, insects, birds, fish, and animals, as well as humans. Organic gardening is all about preventing and treating problems in the least obtrusive, most nontoxic ways. Dedicated organic gardeners adopt methods that use cultural and natural biological processes to do the following:

- **Improve soil health and fertility:** Organic gardeners nurture the soil ecosystem by adding organic matter, such as compost, and avoiding pesticides that can harm soil life. In turn, soil organisms consume and break down the organic matter, making the nutrients it contains available to plants.

- **Decrease erosion:** Exposed soil is vulnerable to erosion by rain and wind. By covering soil with mulch, cover crops, or other protective materials, organic gardeners preserve the integrity of this precious resource.
- **Reduce pests and diseases:** Organic gardeners minimize pest problems and reduce the need for pesticides by relying on cultural techniques, such as proper pruning, removing unhealthy plant material, and using row covers.
- **Encourage plant and animal diversity:** Through diverse plantings and judicious use of pesticides — even organic ones — organic gardeners promote healthy ecosystems that invite beneficial organisms, including pollinators and predators of garden pests, to take up residence.

Organic gardeners take their cues from nature. Instead of relying on the spray schedules promoted by pesticide manufacturers, organic gardeners observe what's going on in their gardens and intervene to prevent pest problems. When you see white butterflies fluttering around your garden, for example, you know it's time to protect your cabbages, broccoli, and cauliflower from cabbage worm. Instead of sprinkling on a pesticide after the caterpillars hatch, you can cover the plants with a special fabric to prevent the butterflies from laying eggs in the first place.

Organic growers view their gardens as living ecosystems and work with nature to produce beautiful landscapes and healthy foods. No matter what plants you're growing — vegetables, fruits, herbs, trees, flowers, grasses — the same basic techniques apply, as the following sections show.

Depleting soil fertility, damaging and polluting ecosystems, and consuming excess water threaten the future of Earth's safe and abundant food supply. The ways that farmers and individual gardeners and homeowners choose to farm, garden, and maintain their landscapes make a difference in whether the land can continue to house, feed, and clothe us. Gardeners around the globe have adopted organic gardening techniques to help nurture the health of the Earth and all its inhabitants. (If you need more convincing that organic is the way to go, turn to Chapter 2.)

Building Soil

Just as a durable house needs a strong foundation, healthy plants require soil that can provide their roots with nutrients, water, and air. Few gardeners are blessed with perfect soil, and even if they were, keeping soil healthy and able to support plants is an ongoing process. Building and maintaining healthy soil is the single most important thing you can do to ensure the success of your garden and landscape plants.

Building soil means providing soil life — microbes, worms, fungi — with the materials and environment they need to do their jobs. Taking from the soil without giving anything back breaks the natural cycle. Harvesting crops, bagging lawn clippings, and raking fallen leaves removes organic material that's ordinarily destined for the soil on which it falls. If the organic material isn't replenished, soil health declines. Substituting synthetic chemical fertilizers for naturally occurring nutrients may feed plants, but it starves the soil.

Adding organic matter is the most common — and most important — part of building soil. Compost is a perfect source of organic matter; other sources include aged manures and crop residues. Maintaining proper soil pH (a measure of acidity/alkalinity) is also vital, because it affects soil life and the ability of plants to use nutrients.

Avoiding things that damage soil is just as important. Compaction from heavy foot or vehicle traffic and misapplied fertilizer and pesticides, for example, can harm the soil's ability to support plant life. Part II tells you everything you need to know about your soil and how to improve it in an organically sound way.

Planting Wisely

Organic gardens strive to maintain healthy, balanced ecosystems. Because plants evolved over millennia to adapt to specific growing conditions, they thrive when those conditions are met. By choosing plants that match a garden site's sun, shade, climate, soil type, and soil moisture, you'll be well on your way to creating a healthy, thriving, pest-free landscape.

The first step in planting wisely is understanding your region's climate, as well as your landscape's particular attributes. Then you can effectively match plants to planting sites. You can find out more about evaluating your landscape in Chapter 3. For specific planting information and the lowdown on growing a wide variety of plants organically — vegetables, fruits, nuts, herbs, and flowers — go to the chapters in Part IV. You can also find information in that part on applying organic principles to lawn care.

The second step is ensuring that your garden cultivates stable plant and animal communities. In nature, plants and animals live in *ecosystems* — communities in which each part contributes to and affects the lives of the other parts. In a balanced ecosystem (see Figure 1-1), each plant and animal species has enough food, water, and *habitat* (place to live).

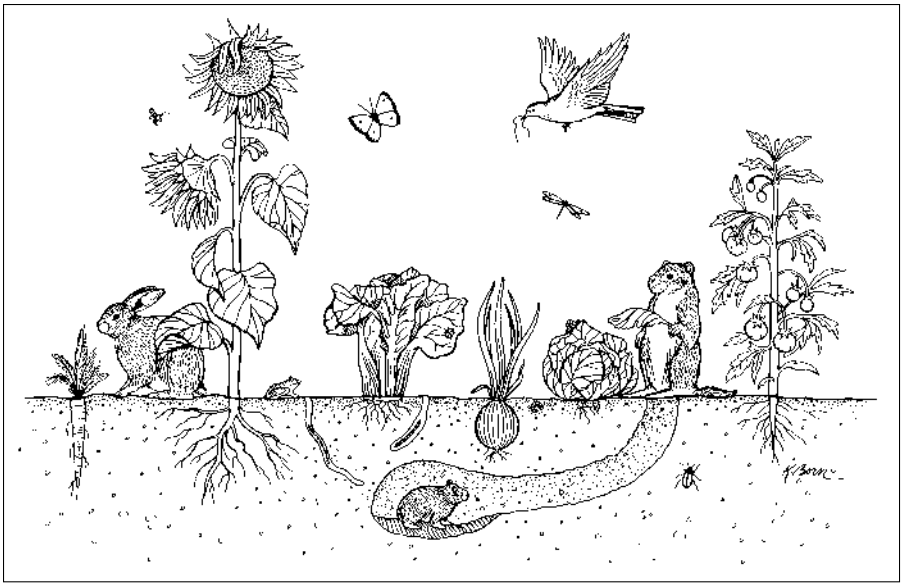

Figure 1-1: Plant and animal communities extend above and below ground.

In a balanced ecosystem, the predators have enough prey, and the prey have enough predators. When one part of an ecosystem dies out or becomes too scarce, the plants and animals that depend on its function in the environment get out of balance, too. If honeybees disappear, for example, the plants that need bees for flower pollination won't be able to produce seeds. If predators such as ladybugs become scarce, the insects they normally prey on — aphids — will become so numerous that they will seriously injure or even kill the plants on which they feed.

Ensuring diversity of plant types

Organic gardeners mimic nature by encouraging diversity in their landscapes. Natural plant communities contain many species of trees, shrubs, and perennial and annual plants. This rich diversity helps each plant species survive in many ways:

- **Mixed populations** avoid insect and disease devastation because all the plants of a particular species aren't located next to one another. While pests damage or kill some plants, they overlook others.
- **Deep-rooted plants** often bring soil nutrients to the surface, where they are released by decomposition, benefiting more shallow-rooted species.

- **Nitrogen-fixing plants,** which can take nitrogen from the air and deposit it in the soil, benefit other species nearby.
- **Tall, sun-loving species** provide shade, shelter, and support for lower-growing, shade-preferring species.

When plants grow artificially in *monocultures,* which are large colonies of a single species, they lose the benefits of a diverse plant community. Pests and diseases spread easily from one plant to the next, and plants rapidly deplete the soil of nutrients. A good example of the risks of monoculture is the American elm, which was planted as a shade tree along streets across the country. When Dutch elm disease was inadvertently introduced in the late 1920s, its carrier, the elm bark beetle, flew from tree to tree spreading the disease.

Many farmers and gardeners recognize and take advantage of the benefits of *polyculture* — growing more than one crop in a field. Growing plants that mutually benefit one another makes sense and is simple to do in home gardens and landscapes. You can add clover to your lawn, for example, because clover takes nitrogen from the air and adds it to the soil. Also, you can plant shade-loving, ground-covering plants under leafy trees to protect soil and tree roots from erosion.

Encouraging animal and insect diversity

A variety of plants naturally invites a variety of wildlife and insects. Berry-producing trees and shrubs attract birds; nectar-rich flowers draw butterflies and hummingbirds. Why, you may ask, do you want to encourage wildlife and insects in your garden? Answer: Your garden needs them. Beneficial insects and other creatures prey on plant pests and pollinate plants. Some of gardeners' best friends include ladybugs; syrphid flies; and tiny, nonstinging parasitic wasps.

Edible gardens

Since ancient times gardeners have combined plants grown solely for their beauty with those grown for food. Ancient Babylonians mixed ornamentals and edibles in their gardens; so did early American colonists. The trend to separate food gardens from ornamental plantings began in the Victorian era and culminated during the last few generations, when people began relegating food gardens to a corner of the backyard. Some homeowners' associations even forbid food gardens in the front yard! But in the past few years, gardeners have shown renewed interest in *edible landscaping* — using edible plants throughout the landscape, growing vegetables, fruits, and herbs among flowers and shrubs. Organic landscapes invite this mingling; you don't need to worry that the chemical pesticides you've sprayed on your roses will affect the edibles nearby. Refer to Chapter 7 for organic alternatives to synthetic pesticides.

Encourage beneficial creatures by providing a variety of habitats. Plant a variety of flowers so that something is in bloom all season long. Particularly good choices are herbs, such as basil and cilantro; plants with tiny flowers, such as alyssum and thyme; and plants whose small blooms are arranged in flat-topped flower heads, including yarrow and dill. Avoid spraying insecticides, because most of them will harm beneficial creatures too; see Chapter 7 for more information.

Here are some other ways to encourage diversity:

- Provide specific foods for the organisms you want to attract. Plant parsley for the larvae of swallowtail butterflies or milkweed for monarchs, for example.
- Build shelters designed for birds, butterflies, native bees, and toads.
- Mimic nature by creating a layered garden with tall trees, medium shrubs, and lower-growing perennials and annuals.
- Include a variety of different plants, including some evergreens, to provide winter habitat and food.
- Provide a source of fresh water.
- Leave a section of your yard wild, or at least minimally cultivated.

In most natural ecosystems, pests and predators are in a balanced but dynamic relationship. Coyotes and bobcats keep rabbits and rodents in check; without these predators, the rapidly reproducing prey would soon overpopulate, leading to death by starvation. Pests also have a place in your garden because they provide food for beneficial organisms — if food is scarce, the beneficials will starve or leave. The tiny, nonstinging braconid wasp, for example, is a beneficial insect that helps control pest caterpillars called hornworms. The wasp reproduces by laying its eggs on a hornworm. The eggs hatch and the developing wasps slowly devour the caterpillar as they mature. If you kill every hornworm, including the parasitized ones (as evidenced by the white cocoons along its back), you're killing the next generation of beneficial braconid wasps. Tolerating some pests will assure predators that your garden is a good place to hang around.

Using Integrated Pest Management

When faced with pest problems, many gardeners automatically reach for a can or jar of poison. Using pesticides to kill insects deprives the pests' natural predators of food, which causes the predators to decline, necessitating

more pesticides to achieve pest control (refer to the preceding section for details). It's a vicious cycle. In addition, pesticides often kill more than just their intended targets. Beneficial insects and spiders that prey on plant pests and pollinate flowers die, too. And if pesticides drift on the wind or water away from their target, fish and birds may be poisoned as well.

Organic gardeners choose a different approach. Instead of fighting pests and disease with chemical warfare, organic gardeners strive to create healthy, balanced ecosystems. If pest problems arise, the gardeners look first for the least toxic, least environmentally disruptive solutions.

Integrated pest management (IPM) combines biological, cultural, physical, and chemical strategies to control pests. In plain English, that means using the easiest, least environmentally harmful, cheapest methods first and using the more expensive, toxic methods only as a last resort.

Managing pests through IPM involves the following steps:

1. **Prevention.**

   Keeping pests and diseases out of the garden in the first place is more than half the battle won. Inspecting new plants, cleaning your tools, eliminating weeds, and using best watering practices help prevent the spread of potential problems.

2. **Crop monitoring.**

   You have to know exactly what pest you're dealing with, when it appears, how many individuals you have, and on what plants.

3. **Cultural controls.**

   Strategies such as rotating crops to avoid planting related plants in the same spot each year and choosing pest-resistant varieties will minimize problems.

4. **Mechanical controls.**

   You can prevent pests from getting on your plants in the first place. Examples include covering plants with special fabrics or using hot water, air, fire, and the heat of the sun to kill pests without poisons. Simply knocking pests into a can of soapy water does the trick too.

5. **Biological controls.**

   Take advantage of nature's law that every organism has a natural control. You can buy and release many of these control organisms, such as ladybugs and beneficial nematodes, or encourage the ones that already exist around your garden.

6. **Chemical controls.**

   Chemicals are the last resort. Start with the least toxic pesticides, choosing kinds that target only the pest and don't affect innocent bystanders, such as bees and spiders.

Part III is devoted to pest management.

Managing Nutrients

Plants need nutrients to grow; flourish; and fend off pests, diseases, and environmental stresses. Giving them what they need is a key to successful organic gardening, but as with humans, overdoing poor food choices spells trouble. The best way to feed plants is to feed the soil. Vast numbers of beneficial organisms call the soil home; nourish them, and you nourish the plants. Adding organic matter, such as compost, provides fungi, bacteria, earthworms, and other soil dwellers both food and a hospitable environment. In turn, they break down this organic matter into nutrients that plants can use.

In some cases, you may need to apply extra nutrients to keep plants healthy. Using organic slow-release fertilizers encourages strong, steady, healthy plant growth. Most organic fertilizers provide a broad range of nutrients, and they won't harm soil life or hurt plant roots.

The synthetic fertilizers that conventional gardeners use provide a few specific nutrients in a form that plants take up immediately. They make plants grow quickly but don't necessarily make them grow strong and healthy because fast-growing leaves and stems are soft and juicy — and very inviting to pests. Plus, any applied nutrients that the plants can't use are wasted, sometimes running off to pollute waterways. Synthetic fertilizers usually come in concentrated liquids or granules that you must dilute in water, and improperly diluted solutions can burn plant roots.

Turn to Chapter 5 for information on soil-building, and see Chapter 6 for information on organic fertilizers.

Conserving Inputs

Most organic gardeners are conservative — in the true sense of the word. We reduce, recycle, reuse, and in general try to limit what we buy. In the garden, conservation means reusing the nutrients contained in plant matter by composting kitchen scraps and garden trimmings. It also means taking care not to waste water and making sure that the products you use in your garden don't put an undue burden on the environment.

Water

Communities across the country are experiencing record drought, and some municipalities are enacting watering restrictions. A well-designed, organic landscape adapts better to restricted watering because the soil has been nurtured and plants are well adapted. Still, even organic gardeners must water once in a while.

The ideal watering system applies moisture directly to the place where it's needed: the roots. Soaker hoses and drip irrigation are best; they apply water slowly, right to the soil, where it can soak in rather than run off. Overhead sprinklers are worst, especially if they're used on a hot, sunny day. Up to one third of the water applied is lost to evaporation, and water inadvertently applied to driveways and sidewalks runs off into storm drains, carrying pollutants with it.

Consider the source

Look at where the products you use in your garden originate. You may be surprised. Is using bagged bark mulch shipped thousands of miles good for the environment, especially if local mulch is available? Does it make sense to buy bat guano from distant caves when a local farm can supply aged cow manure?

As the price of fuel rises, the cost of shipping goods thousands of miles will force consumers to look for products that originate closer to home. You may be surprised by what you can find just down the road: wood shavings from furniture factories; grounds from nearby coffee shops; brewery waste; mulch from municipal Christmas-tree-recycling programs and tree-trimming companies; and small-scale composting operations.

Think creatively! I buy the ends of newsprint rolls from the printer of our daily paper. Instead of laying down individual sheets of newspaper under mulch to prevent weeds — a daunting task on a breezy day — I simply unroll the newsprint and spread mulch as I go. Shredded paper is a good addition to the compost pile.