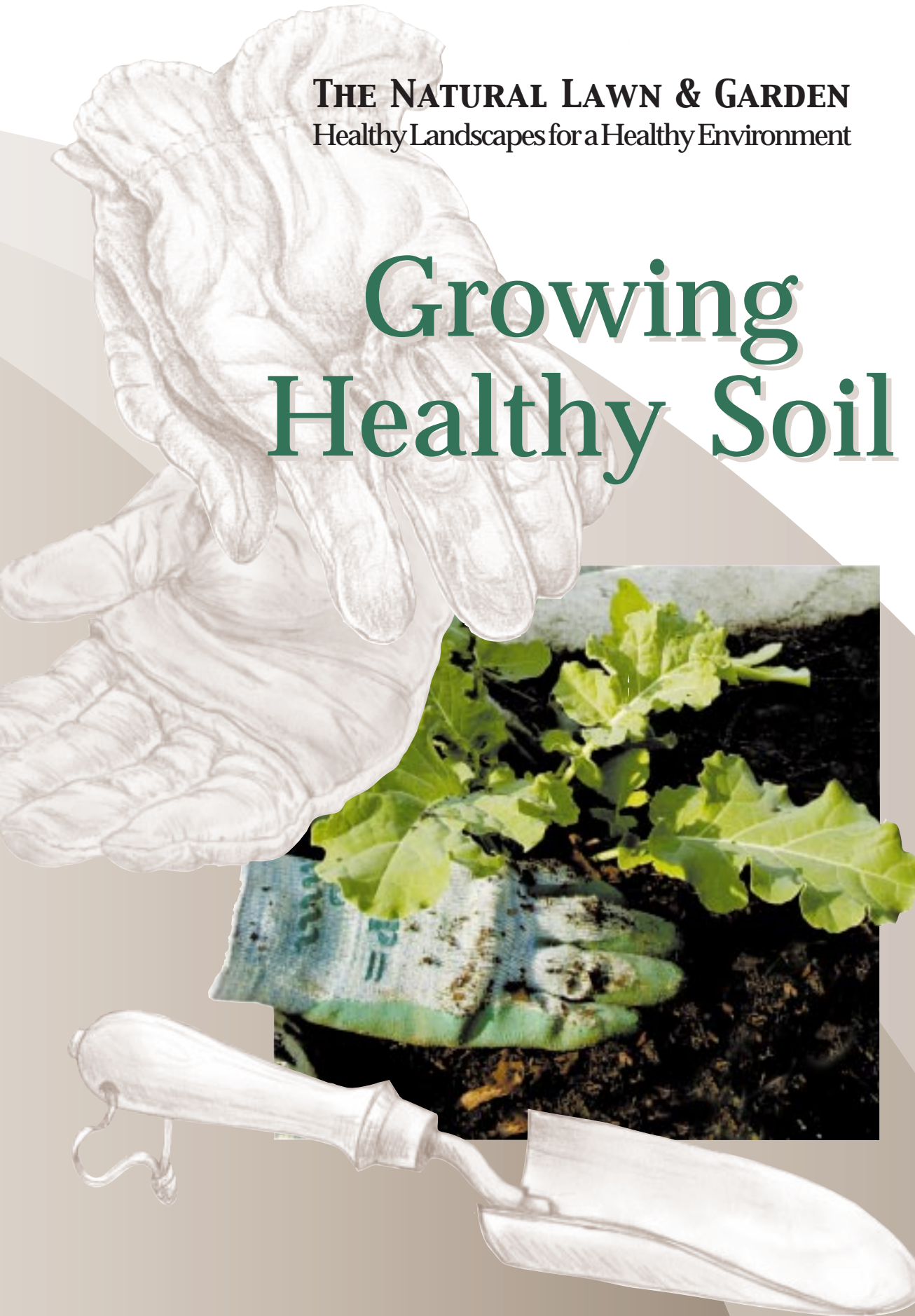


**THE NATURAL LAWN & GARDEN**  
Healthy Landscapes for a Healthy Environment

# Growing Healthy Soil



First Edition 2001





## HEALTHY SOIL - An Investment In Your Garden

Did you know that by simply improving your soil, you can beautify your garden, cut your water bill, improve water quality in our streams, and even reduce your work? Growing healthy soil — and a healthy garden — is as easy as adding compost and other organic amendments to your soil. In fact, this is the single most important thing you can do for your garden.

“Compost” is the dark, earthy material naturally produced by decaying plants and animal wastes. This mix of living and dead organic matter supports an intricate web of soil life, which in turn keeps your soil loose, moisture-holding, fertile and well-drained.

The following three steps for growing healthy soil are explained in this factsheet:

- ◆ Before planting, amend the soil throughout the entire planting area with compost.
- ◆ Mulch existing plantings with compost, leaves, grass clippings or woody mulches.
- ◆ When you need to feed plants, use natural organic and slow-release fertilizers.



# UNDERSTAND YOUR SOIL

“Dirt” is the mineral portion of the soil that supports plants, supplies nutrients and stores water. There are three general types of soil, determined by the size of the soil particles. These affect how the soil functions. You may have more than one kind of soil in different areas of your garden.

**Sandy soils** contain large particles which are visible to the naked eye. They feel gritty and will not form a ball when squeezed in your hand. Sandy soils are loose and drain easily, but do not store water or nutrients for plants.

**Clay soils** are made up of tiny particles that feel sticky when wet, and dry into dense chunks or fine powder. They hold nutrients and water well, but drain poorly.

**Loamy soils** are a mix of sand, clay and organic matter. When squeezed in your hand, moist loam forms a ball which crumbles when poked with a finger. Loamy soils are generally loose, well-drained and able to store moisture and nutrients.

**Air and water** are essential elements that transport nutrients to plants and carry away waste. Together, they make up half the volume of healthy soil. Compacted or heavy clay soils may not have adequate space for air and water to move freely to plant roots.

**Organic matter and soil life** make up just a small part of the soil volume, but are the glue that holds healthy soil together. Decomposing plant materials (like compost) support a great variety of beneficial organisms ranging from microscopic bacteria to earthworms.

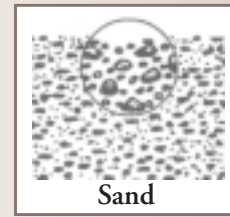
Organic matter and soil life keep plants healthy by:

- ◆ supplying balanced nutrients to growing plants.
- ◆ fighting plant diseases and pests.
- ◆ storing fertilizers and natural nutrients for gradual release, while preventing them from washing into streams.
- ◆ storing water, which reduces runoff and your garden’s irrigation needs.
- ◆ making clay soils better drained and easier to work.
- ◆ trapping and breaking down pesticide residues and polluted runoff.

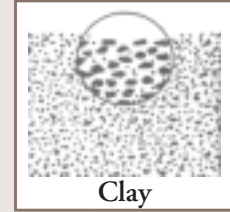
## DON'T DAMAGE YOUR SOIL!

- ◆ Think twice before using pesticides that may damage soil life.
- ◆ Don't overfertilize: more is not better.
- ◆ Don't overwater: overwatering can promote plant disease and exclude air from roots.
- ◆ Prevent soil compaction. This means walking on garden beds as little as possible, keeping heavy equipment and cars off lawns, and minimizing the use of rototillers.

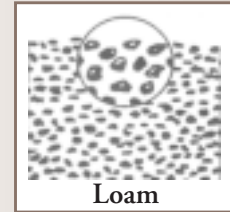
Excessive use of chemicals, overwatering and soil compaction can harm beneficial soil organisms and reduce their ability to keep soil healthy.



Sand

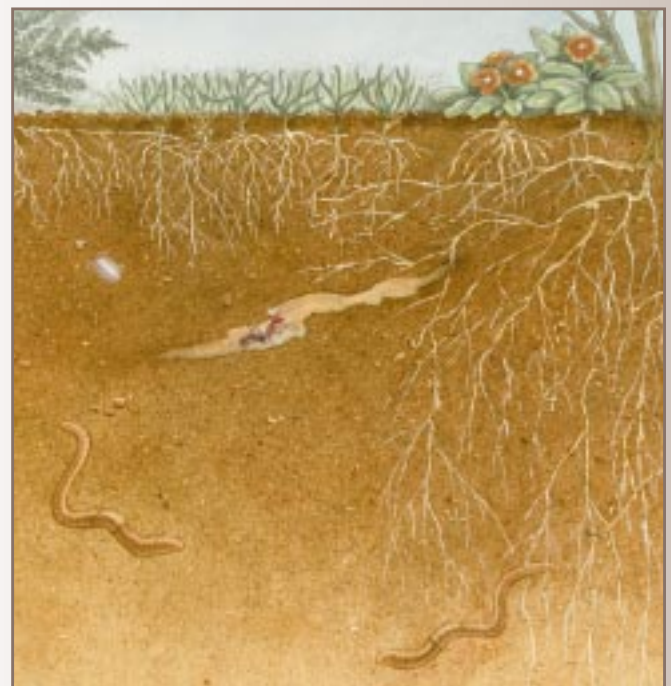


Clay



Loam

You can get to know your soil better by taking a soil core sample. Refer to the back of this fact sheet to contact the Natural Lawn & Garden Hotline and request the *Get To Know Your Soil* fact sheet.



# 1 ENRICH YOUR SOIL BEFORE PLANTING.

The best way to improve the soil is to add plenty of compost or other organic matter throughout the entire planting area before planting. Thoroughly mixing these materials deep into the soil helps provide water, air and nutrients to plant roots.

### When

Mix in organic material before:

- ◆ planting lawns, perennials, trees and shrubs.
- ◆ replanting annual beds (every time).
- ◆ dividing perennials.
- ◆ repotting container plants.

### How

Use a shovel or digging fork to mix amendments into the top 6 to 12 inches of soil. **It is important to amend the entire planting bed — not just small holes for each plant.** When planting individual trees and shrubs in lawns or existing beds, amend an area at least 3 feet wide, or 3 to 5 times as wide as root balls over 12 inches in diameter. Rototill large areas where digging is impractical.

### What

Different types of organic amendments may provide special benefits for certain plants or soil types, as the chart below describes. But any clean composted or aged organic amendment will improve the soil. The best advice is to use what is reasonably priced, plentiful and readily available.

Recommended amount of compost to dig into each 100 SQUARE FEET of planting area
<p><u>Lawns: mix compost down to 6-inch depth</u>                      Clay soils: 8 cu. feet (.3 cu. yard) = 1 inch layer of compost                      Sandy soils: 13 cu. feet (.5 cu. yard) = 1 1/2 inch layer of compost</p>
<p><u>Gardens: mix compost to 10- to 12-inch depth</u>                      Clay soils: 16 cu. feet (.6 cu. yard) = 2 inch layer of compost for new gardens. Use 1 inch per year in established gardens.                      Sandy soils: 24 cu. feet (.9 cu. yard) = 3 inch layer of compost for new gardens. Use 1 - 2 inches per year in established gardens.</p>

**How Do I Know Good Compost?**  
 Poor quality compost can introduce weeds to a planting bed, and make nutrients unavailable to plants while it finishes decomposing. Signs of good compost are:

- ◆ sweet, earthy smell.
- ◆ dark brown or black color.
- ◆ fibrous texture (like peat).
- ◆ no weed sprouts, mushrooms or other growths.



Which Soil Amendment to Use?	
Amendment Choice	Pros and Cons
<b>Best All-Purpose Materials</b>	
Compost made from yard debris, biosolids or barnyard manure.....	Recycled and readily available. Balanced nutrients. Yard trimmings can be composted at home.) Properly composted materials are free of weeds, pests and diseases.
Leaves (composted or fresh).....	Free and rich in nutrients. Usually contain few weed seeds.
<b>Other Materials</b>	
Aged bark or sawdust.....	Improves drainage in clay soils. Good for trees and shrubs. Fresh materials must be composted until dark brown in color, or they can tie up nutrients and inhibit plant growth.
Peat moss.....	Improves moisture and nutrient storage in sandy soils, but does not support soil life. Production can be harmful to environment.
Coconut coir.....	Improves moisture and nutrient storage in sandy soils, but does not support soil life. Renewable product from coconut palms.
Topsoil mixes.....	Good for raised beds on top of compacted or poorly drained soil. May contain poor fill soil or weeds. Best to use mixes containing only compost and clean sand.

# 2 MULCH YOUR PLANTINGS

“Mulch” refers to a material placed on the soil’s surface. (Although usually organic, mulches can also be products such as landscape fabric.) Mulches reduce evaporation, limit weed growth, minimize soil temperature fluctuations, and limit soil runoff that can choke streams and fish. Most mulch products provide these benefits, but organic mulches — such as compost or bark — can be especially beneficial because earthworms and other soil life gradually break them down, mixing them into the soil to nourish plants.

### When

- ◆ Apply annually or as needed.
- ◆ Mulch in early summer to conserve moisture, feed plants and prevent weed seeds from sprouting.
- ◆ Mulch in fall to protect soil from erosion, smother weeds and retain warmth.

### Where

- ◆ Mulch annual and perennial planting beds, as well as the surface of container plantings.
- ◆ Cover entire tree and shrub planting beds, or make mulch rings at least 3 feet wide around each plant in lawns.
- ◆ Keep mulch a few inches away from stems, crown and trunks to prevent rot and pest damage.

### How

- ◆ Remove weeds and grass before spreading mulches.
- ◆ Use porous weed barriers such as woven landscape fabric or cardboard to smother aggressive perennial weeds before mulching.

### How Much

- ◆ Grass clippings: 1/2 to 1 inch deep
- ◆ Compost, leaves, sawdust, medium- or fine-ground bark: 1/2 to 2 inches deep
- ◆ Coarsely shredded bark, wood chips or tree trimmings: 2 to 4 inches deep

Note: One cubic foot of mulch covers 12 square feet 1 inch deep. One cubic yard will cover 324 square feet 1 inch deep, or 108 square feet 3 inches deep.

Mulch Choice	Pros and Cons
<b>Annuals/Perennials/Berries &amp; Roses :</b>	<i>Annuals and perennials benefit from mulches like compost, aged manure or grass clippings which feed plants quickly, and can be mixed into the soil without tying up nutrients.</i>
Composted yard debris, bark, barnyard manure or biosolids.....	Neat appearance. Important to use aged manure or quality compost that is free of weed seeds.
Leaves and grass clippings.....	Leaves and grass clippings are free. May spread weed seeds or disease. For a finer texture, leaves can be composted or run over with a lawn mower before being applied. Any of these mulches may be considered unattractive.
<b>Other Shrubs and Trees</b>	
<i>The best mulches for shrubs and trees are coarse, woody materials that protect the soil for a year or longer, slowly releasing nutrients for steady plant growth.</i>	
Fresh bark.....	Tidy appearance and readily available. May inhibit growth of some plants.
Sawdust/wood shavings.....	Usually free. Best if aged. Cannot be from chemically treated lumber. May be unattractive.
Wood chip/shredded prunings.....	Natural look. Free and readily available. May spread weed seeds or disease. May be unattractive.
<b>Weed Barriers</b>	
Cardboard or newspapers layered under other mulch materials.....	Decompose to feed soil. Aggressive weeds may grow through.
Woven fabric weed barrier.....	Long lasting, but do not break down to feed soil. May get tangled in weeding hoes. Aggressive weeds may grow through fabric over time.

## FERTILIZE MODERATELY AND RESPONSIBLY

Fertilize moderately with natural organic and slow-release fertilizers to grow healthy, easy-to-maintain plants. Too much fertilizer can produce excess growth that is easily damaged by pests, wind, frost and drought. Many of the nutrients in quick-release fertilizers may wash off to pollute lakes, streams and groundwater.

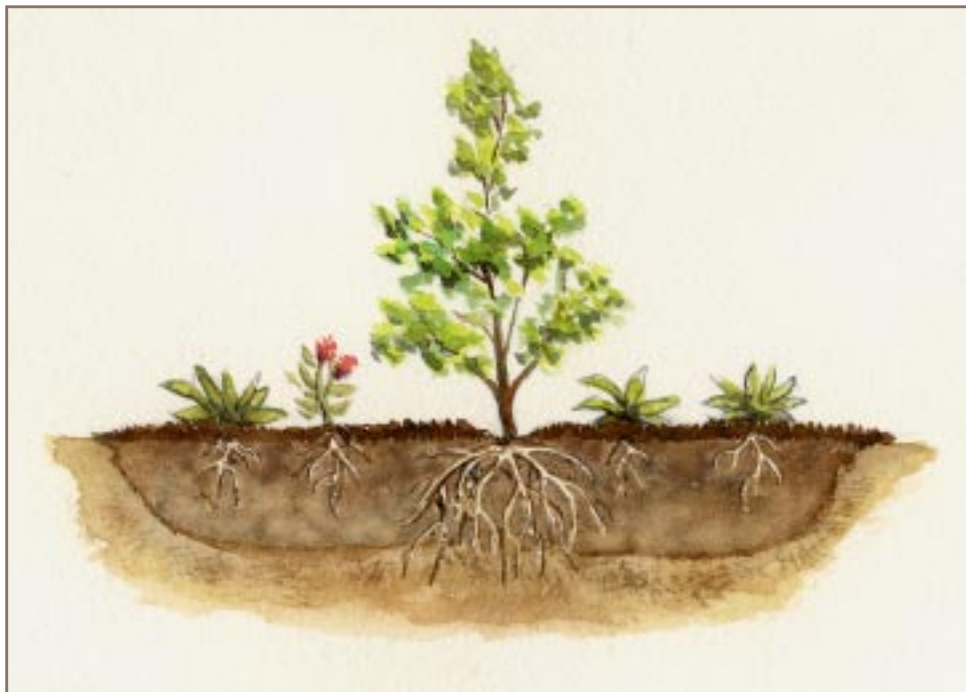
**Most established trees and shrubs do not need regular fertilization.** Mulching can provide all their nutrient needs in most cases. Even heavy feeders like roses, annuals and flowering perennials take in adequate nutrients through yearly compost applications.

When choosing a fertilizer, look for the words “natural/organic” or “slow-release” on the fertilizer bag. Though these fertilizers may cost more, they offer better value and greater protection of water quality as more of their nutrients actually feed plants, instead of washing into streams or groundwater.

“**Natural organic fertilizers**” include rock phosphate and other minerals, plant products such as alfalfa meal, as well as animal byproducts like bone or fish meal. Most nutrients in natural fertilizers must be digested by bacteria before they dissolve in water and plants can use them. These nutrients are slowly released when warm soil stimulates the bacteria, which is when they are needed by actively growing plants.

“**Slow-release fertilizers**” such as sulfur-coated urea become available as outer coatings are dissolved by moisture and soil bacteria when plants are actively growing.

“**Quick-release fertilizers**” like urea and ammonium sulfate quickly dissolve in water. They wash through the soil with rain or irrigation if not immediately used by plants or absorbed by organic matter.



- ◆ Amend the soil in the entire planting area instead of making individual holes for plants. As in a forest soil, organic matter should be most concentrated near the surface.
- ◆ Mulch the entire area, keeping mulch away from the crown of trees and shrubs.
- ◆ Fertilize established trees and shrubs only if they are stunted or show signs of need, or as indicated by soil tests.



## Fertilizer Tips

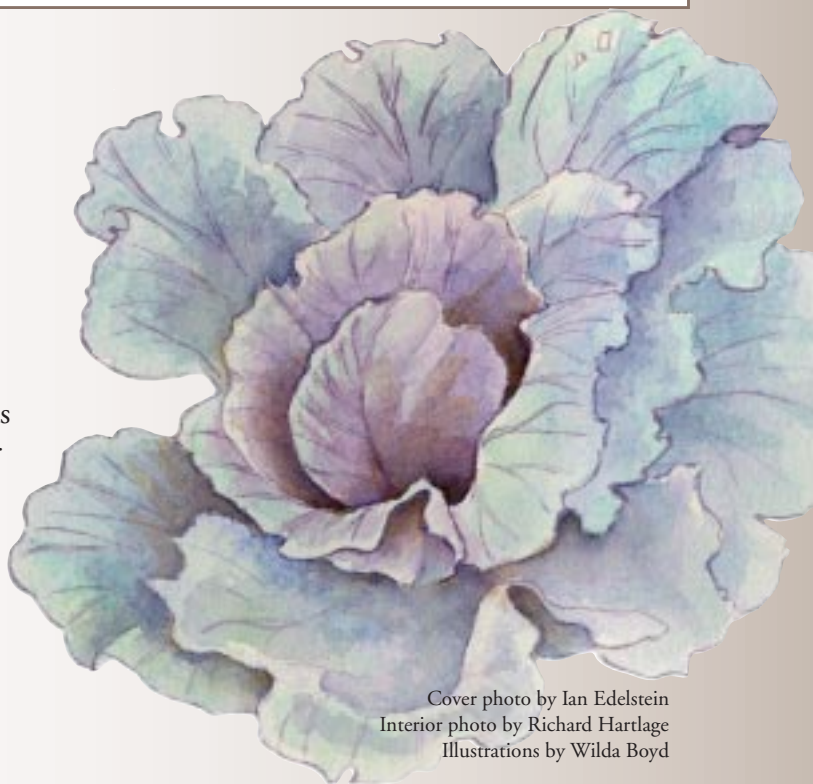
\* *The three numbers on the fertilizer bag refer to the percentages of nitrogen, phosphorus and potassium in the fertilizer.*

	Lawns	Annual Gardens	Trees and Shrubs
<b>Best Fertilizer</b>	<ul style="list-style-type: none"> <li>● 3 parts nitrogen, 1 part phosphorus, 2 parts potassium (or a formula with the same ratio of these ingredients, i.e. (6-2-4, 12-4-8, etc)</li> <li>● Lime. For new lawns apply 10 pounds of lime per 100 square feet. For established lawns apply 3.5 pounds per 100 square feet every year on sandy soil, every other year on clay. Use dolomite lime every other time.</li> </ul>	<ul style="list-style-type: none"> <li>● Balanced fertilizer (5-5-5, 10-10-10, etc) or soil test recommendation.</li> <li>● Lime. Sandy soils — mix in 3 pounds of lime per 100 square feet once every 2 years. Clay soils — mix in 6 pounds of lime per 100 square feet once every 2 years.</li> </ul>	Use a low phosphorus fertilizer. Organic mulches can provide most nutrient needs.
<b>When</b>	September, if once a year; May and September if twice a year.	At planting and mid-season.	Fertilize when growth starts in spring, only if plants are stunted or show signs of need, or as indicated by soil tests.
<b>How</b>	Fertilizer spreader.	Mix into soil below transplants and seeds or in shallow bands along rows of plants.	Scratch into soil in a circle below the outer edge of branch growth and cover with mulch.
<b>How Much</b>	1 lb nitrogen per 1000 sq ft.	Follow fertilizer label or soil test recommendation.	Follow label or soil test recommendation.

### Reality Check

Fertilizing should ideally be based on observed plant needs or soil tests. If you would like to have your soil tested, call the Natural Lawn and Garden Hotline at (206) 633-0224 for a list of soil testing labs and sampling instructions.

If you use soluble fertilizers, you can reduce nutrient runoff by applying half the suggested amount, twice as often as recommended. Avoid using any fertilizer near bodies of water to prevent pollution.



Cover photo by Ian Edelstein  
Interior photo by Richard Hartlage  
Illustrations by Wilda Boyd

For more information on soils, purchasing compost, composting at home or discounts on compost bins for Seattle residents, call The Natural Lawn & Garden Hotline (206) 633-0224 or visit us at [www.cityofseattle.net/util/rescons/](http://www.cityofseattle.net/util/rescons/)

For information on compost bins for King County residents, call The King County Compost Hotline at (206) 296-4466

For more information on water conservation, call (206) 684-SAVE (684-7283) or visit us at [www.savingwater.org](http://www.savingwater.org)

For expert advice contact a nursery or landscape professional, visit our website at [www.cityofseattle.net/util/rescons/](http://www.cityofseattle.net/util/rescons/) for links to landscape professional organizations and related sites, or contact Washington State University Cooperative Extension, King County at (206) 205-3100.

**Additional Resources:**

*Let It Rot: The Gardener's Guide to Composting*  
by Stu Campbell, Storey Books, 1988

*The Mulch Book: A Complete Guide for Gardeners*  
by Stu Campbell and Donna Moore (Editor), Storey Books, 1991

*Soil Biology Primer*  
Soil & Water Conservation Society  
Order from 1-800-THE-SOIL, or online version at [http://www.statlab.iastate.edu/survey/SQI/soil\\_biology.htm](http://www.statlab.iastate.edu/survey/SQI/soil_biology.htm)

*Start With the Soil: The Organic Gardener's Guide to Improving Soil for Higher Yields, More Beautiful Flowers, and a Healthy, Easy-Care Garden*  
by Grace Gershuny, Rodale Press, 1997

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## 2001 WATER CONSERVATION PARTNERSHIP

For TTY assistance, please call (206) 233-7241. This information can be made available on request to accommodate people with disabilities and those who need language assistance.

