THE NATURAL LAWN & GARDEN

Healthy Landscapes for a Healthy Environment

Growing Healthy Soil

2010

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 guide:

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

Climate Change

Building Your Soil With Compost Can Help

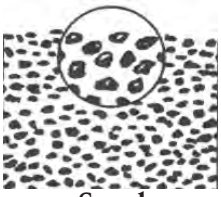
- Composting keeps yard and food waste out of landfills (where it would generate methane, a potent greenhouse gas).
- Compost builds the soil, removing carbon dioxide from the atmosphere and storing it as organic matter.
- Compost also reduces the need for chemical fertilizers and pesticides (another source of greenhouse gases), and composting at home reduces fuel burned for transport.

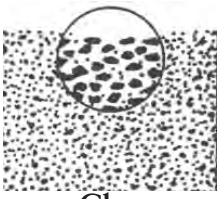
Be Climate Smart – Use Compost!

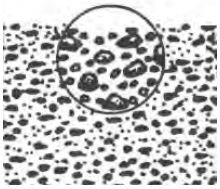
Understand Your Soil

"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 much 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.


Sand


Clay


Loam

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:

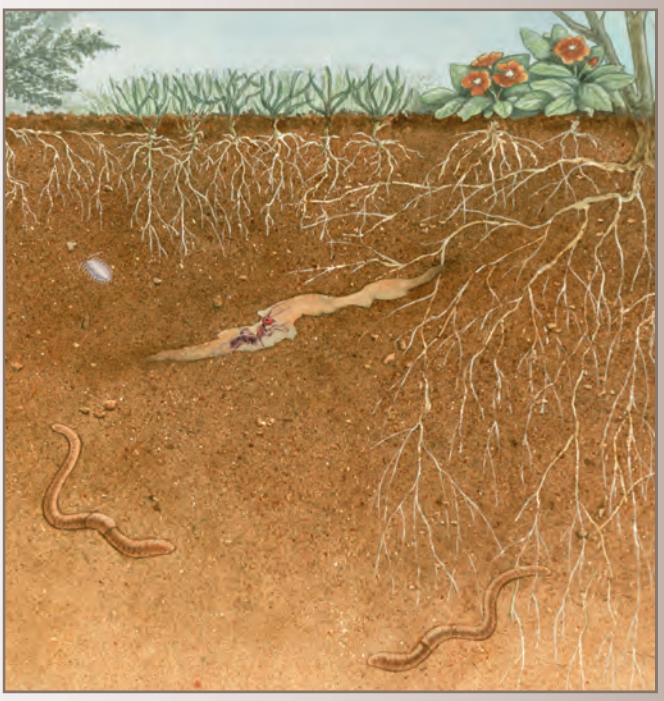
- supplying balanced nutrients to growing plants.
- fighting plant diseases and pests.
- storing fertilizers and natural nutrients for gradual release, while preventing them from washing into streams.
- storing water, which reduces runoff and your garden's irrigation needs.
- making clay soils better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

You can get to know your soil better by digging in with a shovel or a soil core sampler. Refer to the back of this fact sheet or contact the WSU Master Gardener Hotline, (425) 357-6010 for additional information.

Protect Your Soil's Health!

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

- Think twice before using pesticides that may damage soil life.
- Don't overfertilize. More is not better.
- Avoid overwatering. Too much moisture can promote plant disease, exclude air from roots, and leach soils.
- Prevent soil compaction by walking on garden beds as little as possible, keeping heavy equipment and cars off lawns, and minimizing the use of rototillers.



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.
- replanting after dividing perennials.
- repotting container plants.

Recommended amount of compost to dig into each 100 SQUARE FEET of planting area

Lawns: mix compost down to 6-inch depth

– **Clay soils:** 8 cu. feet (.3 cu. yard) = 1 inch layer of compost
– **Sandy soils:** 13 cu. feet (.5 cu. yard) = 1.5 inch layer of compost

Gardens: mix compost to 10- to 12-inch depth

– **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.

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 at least 4 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.

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.

Which Soil Amendment To Use?

Amendment Choice	Pros and Cons
Best All-Purpose Materials	
– 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. Compost is the best choice for any soil.
– Leaves (composted or fresh)	Free. Rich in nutrients. Usually contain a few weed seeds.
Other Materials	
– Aged bark or sawdust	Improves drainage in clay soils. Good for trees and shrubs. Fresh materials must be composted until dark brown in color; if not 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. 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 surface. (Although usually organic, mulches can also be products such as landscape fabric.) Mulches reduce evaporation, limit weed growth, and limit soil erosion that can choke streams and fish. Most mulch products provide these benefits, but organic mulches—such as compost or wood chips—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 cardboard or layers of newspaper to smother aggressive perennial weeds before mulching.

How Much

- Grass clippings: 1 inch deep.
- Compost, leaves, composted sawdust or aged bark: 2 to 3 inches deep (fine bark not recommended).
- Coarsely shredded 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
Annuals, Perennials, Berries and Roses	
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.	
– 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	Free and readily available. May spread weed seeds. Don't use diseased material. For a finer texture, leaves can be composted or run over with a lawn mower before being applied. May be considered unattractive.
Other Shrubs and Trees	
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.	
– Fresh bark	Tidy appearance. May shed water and inhibit growth of some plants.
– Wood chip/shredded prunings	Natural look. Free and readily available. Don't use diseased material.
– Cardboard or newspapers layered under other mulch materials	Decompose to feed soil. Aggressive weeds may grow through.
– Woven fabric weed barrier	Not recommended. Long lasting, but does not break down to feed soil. May get tangled in weeding hoes. Aggressive weeds may grow through fabric over time.

3 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.

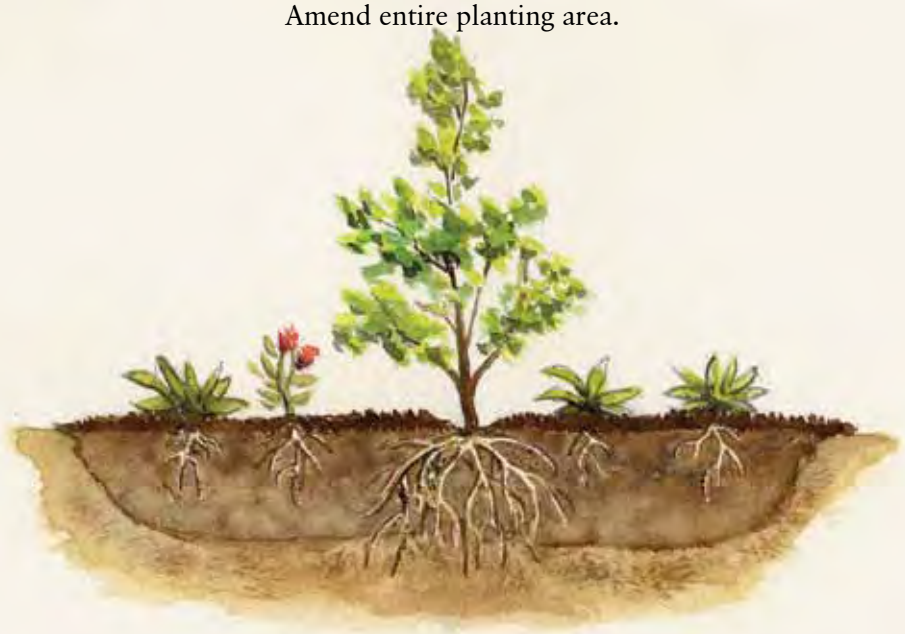
When choosing a fertilizer, look for the words **natural organic** or **slow-release** on the fertilizer bag. Though these fertilizers may cost more, they offer better value and greater protection of water quality as more of their nutrients actually feed plants, instead of washing into streams or groundwater.

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 entire planting area.



Trees and shrubs get the nutrients they need from the soil.

1. **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.
2. **Mulch** the entire area, keeping mulch away from the crown of trees and shrubs.
3. **Fertilize** established trees and shrubs **only** if they are stunted or show signs of need.

Fertilizer Tips

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

	Lawns	Annual & Vegetable Gardens	Trees and Shrubs
Best Fertilizer	◆ 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.) ◆ Lime. For new lawns apply 10 lb. of lime per 100 square feet. For established lawns, apply 3.5 lb. per 100 square feet every year on sandy soil, every other year on clay. Use dolomite lime every other time.	◆ Balanced fertilizer (5-5-5, 10-10-10, etc) or soil test recommendation. Choose "natural-organic" fertilizers. ◆ Lime. Sandy soils: mix in 4 lb. of lime per 100 square feet once every 2 years. Clay soils: mix in 6 lb. of lime per 100 square feet once every 2 years. (Agricultural lime contains mostly calcium. Dolomite lime also contains magnesium.)	Use a low-phosphorus fertilizer. Organic mulches can provide most nutrient needs.
When	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.
How	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.
How Much	1 lb. nitrogen per 1,000 square feet.	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 WSU Master Gardener Hotline at (425) 357-6010 for a list of soil testing labs and sampling instructions.

By The Numbers

Soil tests recommend actual pounds of nutrients to apply, yet fertilizer labels list nutrient contents by percentages. The three numbers prominently displayed on fertilizer packages are the percentages of nitrogen, phosphorous and potassium. To figure out how many pounds of fertilizer are needed to get one pound of a nutrient, divide the percentage of the nutrient contained in the fertilizer into 100. For example:

> Recommendation: Apply 1 pound of nitrogen per 1,000 square feet. Fertilizer nutrient content: 5:3:2 = 5% nitrogen, 3% phosphorous, 2% potassium. Calculate: 100/5 = 20 pounds of fertilizer per 1,000 square feet to supply 1 pound of nitrogen.

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:

- To learn more about general soil information, visit http://forces.si.edu/soils/index.html
- To discover how to build healthy soils, visit www.soilsforsalmon.org
- Find out about specific soils at your site, visit http://websoilsurvey.nrcs.usda.gov/app/
- Hotlines for gardening questions:
  — WSU Master Gardener Hotline at (425) 357-6010 or email MG.help@wsu.edu
  — Plant Answer Line, UW Botanic Gardens at (206) 897-5268
- For expert advice, contact a nursery or landscape professional, or contact Snohomish Conservation District at (425) 335-5634, or WSU Snohomish County Extension at (425) 338-2400.
- Additional Resources:
  — *Mulch It!* by Stu Campbell; Storey Books, 2001
  — *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

To Request A Natural Lawn & Garden Guide, Contact:

- **Snohomish Conservation District** (425) 335-5634, ext. 4, www.snohomishcd.org
- **Snohomish County Public Works, Surface Water Management Division** (425) 388-3464, www.naturalyard.surfacewater.info
- **WSU Snohomish County Extension Master Gardeners** (425) 357-6010, www.snohomish.wsu.edu

The Natural Lawn & Garden Series

- Growing Healthy Soil
- Choosing the Right Plants
- The Plant List
- Smart Watering
- Composting at Home
- Natural Pest, Weed & Disease Control
- Natural Lawn Care
- Natural Yard Care (summary)

For Additional Information Visit:

www.naturalyardcare.info

For TTY assistance, please call 711.

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