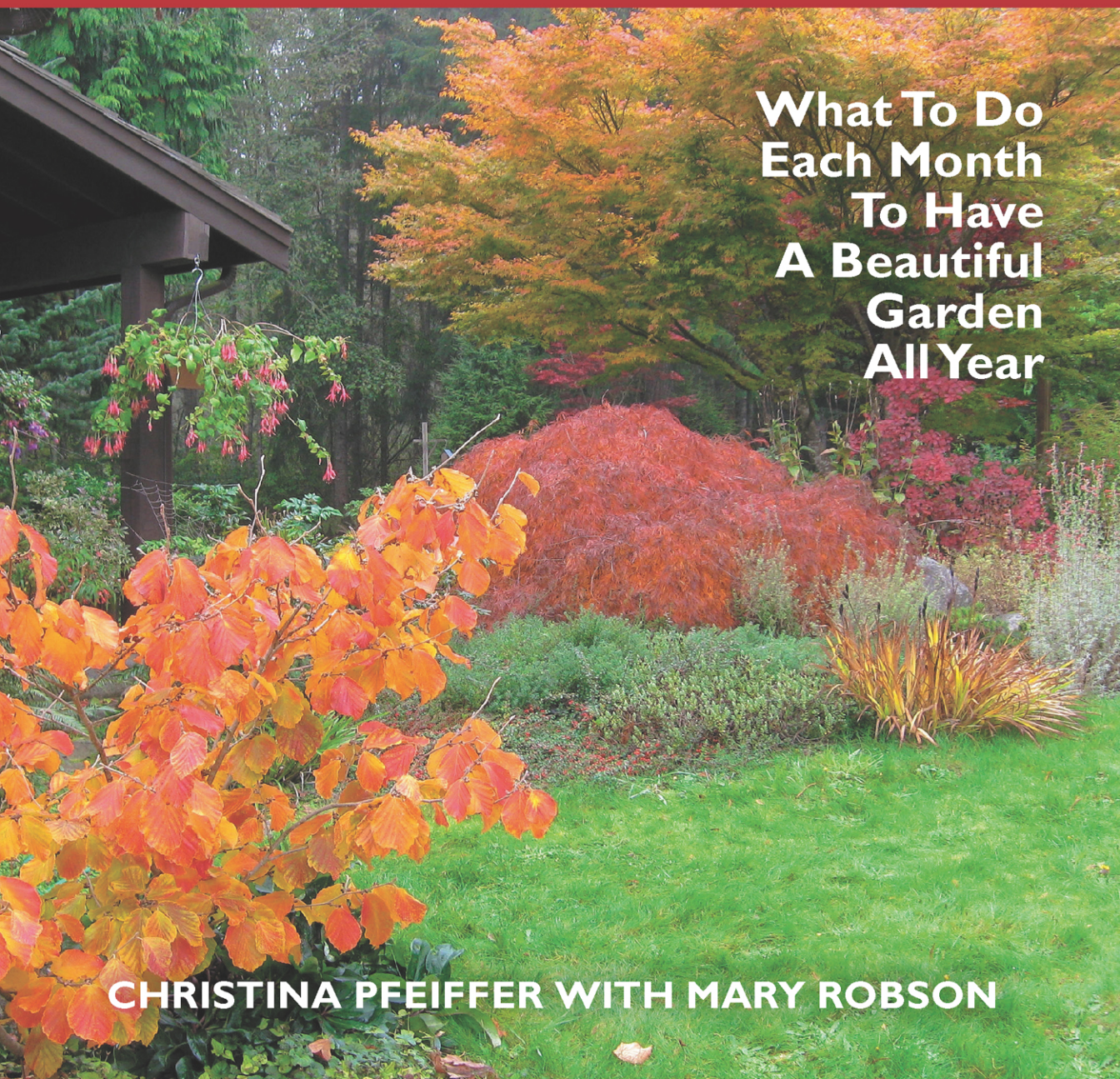
Cool Springs Press

MONTH-BY-MONTH GARDENING

PACIFIC NORTHWEST

Oregon, Washington, Lower British Columbia, Northern California



What To Do Each Month To Have A Beautiful Garden All Year

CHRISTINA PFEIFFER WITH MARY ROBSON

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MONTH-BY-MONTH GARDENING

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What to Do Each Month to Have a Beautiful Garden All Year

CHRISTINA PFEIFFER WITH MARY ROBSON

Cool Springs Press
Home and Garden Experts™
MINNEAPOLIS, MINNESOTA

Dedication

Pacific Northwest gardeners, may you experience the pleasures of gardening with its lifelong lessons on the beneficial connections between plants, people, and the environment. With thankful remembrance of horticulturist Liberty Hyde Bailey, who wrote, “Sensitiveness to all life is the highest product of education” (1898).

—Christina Pfeiffer and Mary Robson

Acknowledgments

I am ever appreciative of the innumerable horticultural friends, colleagues, and teachers who have enriched my life, personally and professionally. The influence of their shared knowledge and pleasure in the world of nature and gardening is reflected throughout my work on these pages.

Mary Robson, without whose encouragement I would never have made this journey, has been a generous mentor and collaborator in this and earlier garden books. Throughout her years in Cooperative Extension and as a horticultural educator, Mary’s grounded sensibilities about gardening and being in tune with nature’s rhythms have greatly enriched the experience of gardening for many in our region.

—Christina Pfeiffer

Contents

Introduction

Welcome to gardening in the Pacific Northwest!

This is a region of vast proportions and wide variations in the natural landscape. It has a long ocean coast and the north–south run of the Cascade Mountains from British Columbia into California, with deserts east of those mountains and rainforests west of them. Rivers and lakes great and small weave through the terrain. The grand scale of these features creates a variety of climate and vegetation patterns, and they influence the character of the gardens and plant communities that thrive throughout. Garden tasks might occupy part of every day in milder western reaches or be concentrated into the few months of a hotter and shorter growing season east of the Cascades. Dry summer months are the norm throughout, with the majority of rainfall occurring outside of the growing season. The cultivation of drought-resistant gardens and the care of soil to optimize the capture of precious rainfall are becoming ever more important here.

A garden's beauty and benefits carry throughout the year. The rhythm of the seasons reminds us that plants don't live by the traditional written calendar, but according to the cues of light intensity and day length, of temperature and moisture patterns. Seasonal climate factors influence the cycles of growth and dormancy through the year. Monthly garden calendars serve as valuable reminders of what kinds of attention the garden and individual plants may need. But also stay attuned to the weather, as the patterns of temperature and precipitation will affect how plants grow and develop. Using sustainable gardening techniques helps us work in step with nature's seasonal processes to good effect. Most of us seek to spend more time enjoying the garden than tending it, so by using the timely tips and practical techniques described for each month in this book, you can reap greater pleasure from your garden and the process of gardening. As you become better acquainted with your own patch of earth and its seasonal benchmarks, you will be able to develop your own personal monthly guideposts.

KNOW WHERE YOU ARE

To garden successfully, you must first understand the local geography and its effect on climate. The Cascade Mountains divide the region north to south, creating different weather conditions on either side. West of the Cascades, ocean air keeps winter temperatures moderate, seldom dipping below the 20s, though locations along the mountains and in the Willamette Valley regularly turn colder. The high Cascade peaks retain much of the winter precipitation. Mild, rainy winters and cool, dry summers prevail. Most of this maritime climate area is in zone 8, a cooler zone 7 along the Cascade foothills, and a warmer zone 9 along the southern Oregon coast into northern California.

The inland Northwest, east of the Cascades and west of the Rocky Mountains, copes with frigid winters and sunny, hot, arid summers. It is sunnier and drier than west of the mountains. Most of this territory falls into zones 5 or 6, but the deep winter cold of zone 4 touches eastern Oregon's high desert country. The Okanogan spans an area from south-central British Columbia through Okanogan County of north-central Washington State. It has abundant summer sunshine and low precipitation.

The moderate maritime climate of western British Columbia, Washington, and Oregon—including the coastal areas of the Olympic Peninsula—welcomes a broad palette of plants. Conifers, ferns, and broadleaf evergreens dominate native forests. Summer temperatures are moderate, with a typical growing season of May through September, or April to November in the mildest locations. The occasional hot spell can intensify the already-droughty summer conditions. First frosts come around mid-November, earlier in the month to the north and in the foothills, later farther south. In lower British Columbia, the influence of the Pacific Ocean and steep mountain ranges causes wider variations in climate within relatively short distances.

Elevations below 1,000 feet, especially near water, often remain above freezing in average winters. Unexpected freezes can occur in spring or fall. November and December are typically the darkest and wettest months. Non-irrigated soils are usually at their wettest by March and at their driest in September. Northeast winds blowing out of the Fraser River Valley in British Columbia can rapidly draw temperatures down by 20 degrees in a few hours, killing plants from Bellingham and further south, on Whidbey Island, and in parts of the Olympic Peninsula.

The Tri-Cities (Richland, Kennewick, and Pasco) area boasts a greater number of frost-free days than other parts of eastern Washington. Even though it's east of the Cascade Mountains, a belt of warm, eastward-flowing air comes in from the coast and through the Columbia River Gorge stretching along the Yakima River through this part of the state. Winter temperatures here hover above freezing, at USDA zone 7.

Redmond and Bend in the Oregon central plateau are high, flat country with strong winds and temperature extremes. Frost can come any time of year. Pine, juniper, and sage dominate the native plant communities here. Farther east to Baker, a high basin between two mountain ranges, the area is occupied largely by juniper forests and savannahs. Summers are dry and hot, reaching 100°F highs. Temperatures in the long winters can plunge down to -20°F with scant snow cover. Annual precipitation is 11 inches.

Toward southern Oregon, the Medford area sits at a high elevation, with cooler temperatures and less than 20 inches of precipitation per year. Chaparral conditions with scrubby, dry-land plants are found here. Toward the coast, the vegetation becomes lush with the higher precipitation. Average January temperatures are around 38°F, though cold air draining off the mountains brings cooler night temperatures.

The coastal area of Northern California is home to some of the tallest trees on the planet, sustained by the mild temperatures and moist fog rolling in from the sea. There is little rain between March and November, with the annual 40 to 60 inches concentrated in winter months. In zones 8 and 9, there is a fairly long growing season lasting from mid-February to late November. Coastal mountain valleys can see freezing temperatures in winter and heat up to 100°F in summer. Farther

USDA PLANT HARDINESS ZONES

AVERAGE MINIMUM TEMPERATURE RANGES

ZONES	°F	°C
4	-30 to -20	-34.5 to -28.9
5	-20 to -10	-28.9 to -23.3
6	-10 to 0	-23.3 to 17.8
7	0 to 10	-17.8 to -12.3
8	10 to 20	-12.3 to -6.6
9	20 to 30	-6.6 to -1.1

inland from the coast, conditions are drier (only 10 to 20 inches annual precipitation) with hotter summers and cooler winters.

Recent weather trends point to higher seasonal temperatures with drier summers and wetter winters. Weather events may also arrive in stronger doses or for longer durations, stretching the limits of previous typical patterns. Gardeners need to stay attuned to each season's prevailing weather for its effects on plant growth in the following seasons. The stress of a drier or colder winter can leave some plants vulnerable to drought stress the following summer. Plants that have endured extremes of heat and drought without a reprieve by summer's end will be less resistant to cold damage in the coming winter.

IT WILL BE DRY HERE

The common impression that the Coastal Pacific Northwest has soggy rain year-round is more myth than reality. Though the region boasts genuine temperate rainforests with 100 to 200 inches (2,540 to 5,080 millimeters) of rain per year in parts of the Olympic Peninsula and Vancouver Island's west coast, these are small, isolated corners of the region. Indeed, in the rain shadow not too far to the east of these wet pockets, annual precipitation is a mere 13 to 24 inches (330 to 610 millimeters). Certainly, the 38-inch (965-millimeter) average in Seattle would be ample for gardening, but most of that rain falls during winter months.

This winter-rain/summer-drought pattern is the prevailing pattern of the coastal areas. The inland Northwest is dry country, with an average 12 inches (304 millimeters) precipitation per year.

In all parts of the Pacific Northwest, careful attention to water conservation and the use of garden practices that support drought-resistant gardens are a must. Our lack of reliable summer rainfall is probably the most limiting factor to garden cultivation here. Despite our national reputation, the weather doesn't actually deliver much moisture for the growing season.

MICROCLIMATES

In addition to the prevailing regional and local climate conditions, different microclimates can be found within a neighborhood or single property. The growing conditions within these small areas are modified by, and are slightly different from, the surrounding conditions, such as the shady side of a house or the reflected heat off large paved areas. These spots have slightly different light, wind, temperature, or moisture levels. You can see the microclimate effect on a neighborhood walk: you might pass a lilac bush bursting with color in full sun on the west side of the street, then half a block later see another lilac with no sign of color, in the shade of a pine, facing east with no morning sun. Paying attention to microclimate conditions can help you choose the right kind of plants, or explain why you can't grow a certain plant that thrives in the yard next door.

USING MICROCLIMATES TO YOUR ADVANTAGE

Altitude affects temperature, and as any hiker knows, higher elevation means cooler temperatures. Fall frosts come earlier, and spring frosts stay later as elevations rise. A large body of water will moderate temperature extremes. Gardens near Puget Sound, for example, are less likely to freeze late in the season. But surprisingly, these spots will remain cooler during summer months. Low valleys experience lower temperatures as cold air flows downhill like water. Fruit growers planting hillside orchards know that temperatures halfway down the slope will be more moderate

than at the bottom. In urban gardens, be aware of heat radiated from pavement and buildings. A balcony garden facing west above Pike Place Market in Seattle will have modified temperatures: afternoon heat from a sunny day will radiate out of a concrete building after dark, adding to the moderating effect of nearby Puget Sound. A north-facing garden in North Bend that lacks these influences would stay colder as a result of the exposure and higher terrain.

Large trees can have a profound influence on a microclimate, changing it slowly as young trees grow and mature, and drastically when a large tree is removed. Tall trees provide shelter from sun and wind. Humidity is greater amid groups of trees. Deciduous trees make cool shade in summer but let in warmth and light in winter. Hedges can provide windbreaks as well as shade. Prevailing soil conditions—perpetually damp or freely draining, for example—also contribute to microclimate influences.

Understanding the microclimate details in your garden will improve the success of your overall gardening efforts. It can help you choose plants best adapted to each planting spot and to water appropriately. Microclimate conditions can be used to push the edges of temperature zone realities. A tender plant in the warmest garden spot with extra winter protection or placed against a south-facing stone wall can allow survival of a zone 9 plant in zone 8.

DON'T TREAT YOUR SOIL LIKE DIRT

Soil is the foundation for plant survival. It is the reservoir for moisture and nutrients where roots anchor. It is home to insects and microorganisms that decompose organic matter and improve soil condition.

How we treat the soil determines the success of the landscape. Many gardeners automatically assume their soil will need drastic help or that "better" soil needs to be brought in. In many cases, the resident soil may just need a little amendment and the right care to be a workable growing medium. Take the time to dig in and learn what kind of soil you really have.

■ *Ferns and woodland perennials are well adapted for a damp shade microclimate.*

REGIONAL NATIVE SOIL TYPES

Soil type will depend on the geological characteristics of the region. Deep loams in the Willamette and Puyallup River Valleys drastically contrast with nearby areas that have shallow, mixed gravel, rock, and clay soils left thousands of years ago by glaciers. One gardener described her western Washington soil as "clay except for the rocks." With low rainfall east of the Cascades, soils in high desert country tend to be higher in pH (more alkaline), contain soluble salts, and have lower organic content than coastal loam soils. Urban areas are always tricky to understand because so much ground has been heavily disturbed from its native condition.

Soil texture is determined by the percentage of sand, silt, and clay particles. Knowing the texture of your soil will help guide optimal plant selection as well as amendment and irrigation practices. Pick up a small handful of damp soil. Squeeze it into a ball, and then squeeze out a "ribbon" between your thumb and forefinger. Clay soil will hold together to form a ribbon inches long and will show the imprints of your fingers. Loam soil, a balance of clay and sand, will form a short but breakable ribbon. Sandy or gravelly soil won't hold together. Another method is to do a jar test (described on page 132).

Organic matter in soil comes from decomposed plant and animal residues, familiar to us as compost. It becomes dark-colored humus when completely decomposed. Organic matter contributes to soil porosity, fertility, and moisture-holding capacity. It supports an array of organisms that in turn contribute to overall plant health. Native soils west of the Cascades have about 5 percent by weight (10 percent by volume) of organic matter content; drier zones east of the Cascades have about half that amount. Gardeners should aim to match the "native" organic matter levels for their region and climate for best overall results.

CHARACTERISTICS OF SOIL TYPES

Fine-textured clay soils keep a tight grip on water. They drain slowly and are hard to dampen again when they get really dry. They hold mineral nutrients well and are generally more fertile than sandy soils. Course-textured sandy soils readily move water and oxygen to the root zone but can also drain and dry out quickly. They are difficult to keep moist in summer and aren't able to hold onto nutrients. Loamy soils strike a nice balance between the two, draining well and having good nutrient- and moisture-holding capacity.

Soil texture is not readily changed. Contrary to common belief, clay garden soil cannot be readily improved by adding sand! When you add sand, the tinier clay particles fill the spaces between the much larger sand particles, causing the resulting mix to be even denser. Gypsum, another material thought to be a cure-all, does not change soil texture either, but it can be used for correcting saline soils, a problem most common with arid soils and croplands and less common in average home gardens. Knowing your soil texture will help you choose the best types of plants and gardening practices to use.

Soil structure refers to how well soil particles stick together in clumps (called aggregates) and how much pore space is between them. Unlike texture, soil structure can be changed, for better or worse. Soil structure and porosity—the ability to drain well and also hold air—can be damaged by over tilling, over irrigation, and being handled when wet. Soil will become compacted and lose pore space—not so good for plant roots. The structure of both clay and sandy soils can be improved and maintained with modest annual applications of organic amendments and mulch. Organic matter and the associated organisms help soil particles stick together in aggregates. Organic matter helps sandy soils retain more moisture and helps increase porosity in clay soil. Soils with good porous structure will be more effective at capturing, storing, and filtering rainwater.

"Green manure" cover crops such as rye, buckwheat, or crimson clover can reduce weed invasions on bare ground and improve soil when they are later dug in to decompose in place. This practice is useful in vegetable and annual flower beds, which often lie empty between planting events.

HERE'S HOW

TO TEST FOR SOIL TEXTURE

1. Dampen about a tablespoon of soil with a few drops of water.
2. Roll it into a solid ball. It should be the consistency of putty.
3. Pinch the ball between your thumb and forefinger.
4. Gently push your thumb away from your forefinger to press the ball out into a ribbon.

   a. If it doesn't stay together in a ribbon, you have *loamy sand*.

   b. If the ribbon is less than an inch long before breaking, and when a pinch of soil is rubbed against the palm, it is:
   - gritty, you have *sandy loam*
   - smooth, you have *silty loam*
   - not very smooth and not very gritty, you have *loam*

   c. If the ribbon is 1 to 2 inches long before breaking, and when a pinch of soil is rubbed against the palm, it is:
   - gritty, you have *sandy clay loam*
   - smooth, you have *silty clay loam*
   - not very smooth and not very gritty, you have *clay loam*

   d. If the ribbon is more than 2 inches long before breaking, and when a pinch of soil is rubbed against the palm, it is:
   - gritty, you have *sandy clay*
   - smooth, you have *silty clay*
   - not very smooth and not very gritty, you have *clay*

UNRAVELING THE pH MYSTERY

Is your soil acid or alkaline? Most landscape plants grow well with a soil pH between 5.5 and 7.5 (7.0 is neutral). Native soils west of the Cascades tend to be acid, with pH between 5.0 and 6.0. Native conifers and plants such salal and rhododendron are strongly adapted to grow well at these pH levels. Soils east of the mountains are mostly alkaline, up to 7.5 or 8.0. Grasslands tend to be more alkaline. Soil pH is also affected by the amount of annual rainfall, with alkaline soils more prevalent in arid regions. Forest areas, with high organic matter content, foster more acidic conditions. Urban soils, no matter the location of the city, also tend to have higher pH, due to disturbance and contamination from gypsum and lime outwash from construction activity.

Soil pH is important because it affects the availability and absorption of mineral nutrients. Some plant species have developed fairly specific pH adaptations: a rhododendron (adapted to acidic soil) will develop yellow, chlorotic leaves in very alkaline soil; its roots are unable to absorb nutrients when pH is too high. When the pH level causes rhododendron leaves to yellow, adding fertilizer will not help. A soil test is needed to measure the pH and determine what and how much amendment may be needed to adjust it. Sulfur will lower pH; lime increases it. Get the soil test before adding amendments.

GARDEN PREPARATION: TIPS FOR SOIL HANDLING & CARE

Start with a soil test before you install a large new landscape. This information will help you choose plants that are naturally adapted to your resident soil type and determine if amendments may be needed. Properly amended resident soil is often better than imported topsoil mixes. Some soil-test kits available in garden centers can help to check soil pH and certain nutrients. However, specialized soil tests will be needed if heavy metals or other contaminants are a concern. Master Gardeners and Extension offices can often help with referrals for soil testing (see Resources).

Check soil drainage well before planting time. Look at the surface grade and areas with persistent standing water. A simple percolation test will reveal if the soil is porous enough to drain well. Subsurface drain pipe, surface grading, or simply good cultivation to break up compacted ground are measures that can improve problems. Building a berm to create a mounded, raised planting bed is another option, especially if soil does not drain well.

■ *You can use a home soil test kit to check soil pH. A laboratory soil test will provide the most accurate measure.*

Cultivate when soil is damp to dry. "Not too wet, not too dry" is the rule when handling soil. Cultivating soggy soil will cause compaction; clay soil that is too dry can be nearly impossible to dig.

Amend in moderation. Beware of mixing too much compost into your soil at once. This can lead to future problems with drainage, compaction, and plants settling below grade (with harmful results for trees and shrubs) as the compost decomposes and the soil settles.

Create a transition zone when adding new soil. Imported soil is likely to have a different texture than your native soil. If the two materials are stacked like a layer cake, drainage will be poor between them. To prevent this, lightly cultivate the existing grade and incorporate 1 to 2 inches of the new material before adding the full depth of imported soil. Water, air, and roots will be able to move through both soil types when this is done.

Keep bare ground covered. Left exposed to the elements and foot traffic, bare soil can quickly become compacted. Mulch freshly prepared soil 3 to 4 inches deep to protect it. It will also be easier to move the mulch out of the way at planting time than to apply mulch after planting.

Don't disturb the soil if you don't have to. An effective, no-till method to prepare a new landscape bed is to apply 6 to 8 inches of very coarse organic matter over the area weeks to months in advance of planting. It will need periodic irrigation or rainfall to stay moist. Coarse compost, shredded leaves, and wood-chip mulch are ideal materials. The soil will be softened and conditioned as these materials decompose. Just rake the excess material away to expose the nicely prepared ground when it is time to plant. If old turf or perennial weeds are present, cover them over with overlapping layers of newspaper and dampen before applying mulch. Apply mulch a little deeper if weeds start peeking through.

USING FERTILIZER: EVERYTHING IN MODERATION

While we casually call fertilizer "plant food," it is really more "soil food." Photosynthesis makes the food plants use. Nutrients from the soil are important to help plants produce carbohydrates and other compounds using energy from the sun. So we apply fertilizer to supply nutrients lacking in the soil.

Fertilizers come in different forms, from organic (derived from previously living sources) to synthetic (manufactured, generally from nonliving sources). Both types provide the same nutrient elements. However, organic fertilizers also support vital soil microorganisms. Some products contain both organic sources (such as cottonseed meal) and inorganic sources (ammonium nitrate).

Your garden may already be getting enough essential nutrients if you regularly use compost and organic mulch. Be sure fertilizer is really needed and to apply the right amount of the right nutrients. The way plants grow and their leaf color may be indicators of nutrient problems.

FERTILIZER IS NOT A CURE-ALL

Resist the urge to add fertilizer just because you suspect a plant problem. Fertilizer cannot fix poor soil or bad drainage that may be limiting plants. Nor can it help if plants are installed in the wrong light conditions—a shade-loving *Skimmia* turning yellow from too much sun won't green up with a fertilizer application. Nutrients cannot be absorbed when root rot or waterlogged soils are present. In fact, fertilizers should generally be avoided on severely declining or diseased plants. For best plant health, use fertilizers sparingly. Disease and insect difficulties can intensify on plants receiving too much nitrogen; aphids and powdery mildew are examples. Overfertilized plants will also require more water, difficult to supply in dry summer conditions. And in more arid regions, excess fertilization can lead to a harmful buildup of dissolved salts in the soil.

If plants have normal color and produce good bloom, leaves, and new shoots each year, then fertilizer is not needed. This is especially the case for most trees, shrubs, and other woody plants. Herbaceous perennials may need an annual boost with a moderate nitrogen formula such as a 4-2-2 broadcast on top of the soil and watered in when spring growth begins. Annuals and perennials grown in containers should receive a liquid form of complete fertilizer (with trace elements) twice per month until frost to keep them growing well. Hybrid tea roses and others grown for exhibition typically require monthly fertilization.

UNDERSTANDING NPK

Nitrogen, phosphorus, and potassium (NPK) are the nutrients found in complete fertilizers, with formula numbers indicating the percentage weight of each element per 100 pounds. Nitrogen is the most limiting element to plant growth, and its availability varies at different times of year. Nitrogen moves rapidly through the soil away from root zones during rainy weather, especially if soils are sandy or gravelly. Phosphorus and potassium are less likely to be lacking in landscape soils and don't need to be applied as often. Indeed, excess phosphorus applications add to runoff pollution and also suppress the beneficial mycorrhizal fungi, which aid roots in moisture and nitrogen uptake. Apply fertilizers only as needed, choose materials with lower P and K, and avoid times when heavy irrigation or rainfall can wash nitrogen away.

NPK is slowly released from organic products such as fish emulsion, cottonseed meal, manures, and compost through decomposition by soil fungi and bacteria when the soil is warm and moist. For synthetic slow-release products such as Nutricote or Osmocote, release rate depends on the coating type, temperature, and moisture levels. With all fertilizer applications, soil must be moist for nutrients to be available to roots. Don't apply granular fertilizer to dry soil; it will be ineffective and may burn roots. In drought conditions, use less fertilizer. The plant will grow more slowly and need less water.

APPLICATION RATES

Actively growing plants, such as trees and shrubs, can benefit from moderate late-spring applications during the first years of establishment. Once established for three to five years, trees and shrubs need little or no fertilizer if they are growing well.

HERE'S HOW

TO CALCULATE FERTILIZER AMOUNTS

It pays to calculate the proper amount of material based on amount of the actual nutrient element needed per application area. To apply one pound of actual nitrogen per 1,000 square feet with a 21-0-0 NPK product, divide 1 pound by the percentage of nitrogen in the product:

1 pound nitrogen ÷ 21 × 100 = 4.75 pounds of 21-0-0 fertilizer

This is also a helpful way to calculate the relative cost of different products. To apply 1 pound of nitrogen per 1,000 square feet with 10 percent N, you would need 10 pounds of fertilizer—about twice as much as the 21-percent N formulation.

Liquid fertilizers have label directions for mixing at different concentrations for different plant types. They are commonly used for containers, vegetables, and annual flowers. Start with the lower mixing rates and increase to the higher listed rates, if needed.

■ *This 12-0-0 feather meal is a nitrogen-only organic fertilizer.*

Plants with higher nutrient requirements, such as annuals, vegetables, turf, and containerized plants, will benefit from periodic fertilization during the growing season.

Both organic and synthetic fertilizer packages list NPK content on their labels. Some products include other trace nutrient elements such as sulfur and magnesium. Be sure to read the label directions and start with the lowest application rates. Too little nitrogen will result in poor growth. Too much will encourage leafy shoots and keep the plant from flowering.

COMPOSTING AT HOME

The garden trimmings and old leaves you may call "yard waste" may in fact be a gold mine for your garden. Composting—nutrient recycling through decomposition of plant debris created in the garden—is an age-old process. Properly done, it sustains native plant ecosystems and provides nutrients for the garden.

Composting doesn't need to be complicated. Small-sized plant debris can be left on the ground to compost in place. Allow leaves to fall naturally in autumn, raking them off lawns but letting a 2- to 3-inch layer build up under plants. "Mulch mowing" is a great way to allow lawn clippings and minced trees leaves to decompose in place.

Or make a pile and let nature to do its work. With time and moisture, all the leaves, twigs, and stems will break down into a crumbly compost material. Chopping up woody stems and shredding leaves will speed things up, as will periodic turning. Keep piles in a damp, shady location for best results. A variety of bins that hold more material within a smaller footprint can be made or purchased.

Keep your cleanest greens for composting. Heavily diseased plant parts, seedheads of weeds, and roots from persistent weeds such as morning glory or buttercup should go to a municipal composting facility (where these problems are destroyed in high-heat compost systems) or be separated out to a pile that will not go back into garden beds.

■ *There are a variety of good options for composting garden trimmings.*

Explore options for home composting to find a method that best suits your situation. More information is available from Master Gardeners and Cooperative Extension offices (see Resources).

MULCH MATTERS

Mulch matters—you will see this advice throughout this book. Most simply, mulch is a material used to cover and protect the soil. Mulch can be put down any time, except under very wet or saturated conditions. Apply mulch to cover bare ground after weeds are pulled, to reduce moisture stress around new plants, to protect plants from frost heaving in colder climates, and to suppress winter weeds and improve soil in regions with winter rain. As mulch decays, soil nutrients and organic matter are replenished. Over time, coarse mulch can even help improve compacted soil.

Mulch should be no more than a total of 3 to 4 inches deep for most landscape plantings. Never bury the trunks of trees or shrubs in mulch—it's an invitation to basal rots and plant stress. It's best to let mulch break down far enough for the soil to start to show through before new mulch is added.

Maintaining organic matter for established plantings is best done with a surface application of amendments and/or organic mulch. Soil texture and nutrient content will be preserved, and the population of decomposers—insects, earthworms, fungi, and microbes—will thrive. Use a thin layer (about 1 inch) of fine, screened compost to top-dress lawns and groundcovers. Coarse, textured organic mulch can be applied 2 to 4 inches deep over open soil areas.

WHAT MAKES GOOD MULCH?

For maximum weed suppression and soil moisture benefits, mulch should be coarser in texture than the soil it sits on. When buying mulch in bags or bulk, look for products that contain a mixture of materials and plant parts. Composts with fine soil-like texture are best used as an amendment that is mixed into the soil or as topdressing that is less than 1 inch deep. Avoid fine bark, as its waxy fibers tend to crust into tight layers that exclude moisture and air from the soil. Very coarse bark is slow to decompose and may be most suitable for landscape beds with highly organic soil.

Wood chips from tree services have become a popular (and usually free) source of mulch. Find out how large the loads are before having a service deliver wood chips; you may want to share with

■ *Use a coarse organic mulch to suppress weeds, retain moisture, and maintain soil organic matter.*

HOW MUCH MULCH DO YOU NEED TO GET?

Begin by measuring the square feet of garden space to be covered. Remember some of the space is occupied by plant trunks and stems.

AMOUNT OF MULCH	SQUARE FEET COVERED (AT A 3- TO 4-INCH DEPTH)
1.5-cubic-foot bag	5 square feet or a 2.5-foot diameter circle
2-cubic-foot bag	8 square feet or a 3-foot diameter circle
3-cubic-foot bag	12 square feet or a 4-foot diameter circle
27 cubic feet	100 square foot area

0.25 foot depth (3 inches) × square foot area to cover = cubic feet of mulch required

a neighbor. Let fresh wood chips age for a couple weeks or more before use. The chips will have a darker, fairly uniform color when they are ready. Don't store mulch under or against large trees, especially if the pile will be stored for a while; the weight and heat of the pile can be damaging.

MAKING YOUR OWN MULCH

Leaf mold (partially composted leaves) is one of the best sources of coarse organic mulch for the garden. Garden compost with bits of leaves and twigs visible also works well. It can be screened, with the coarse pieces saved for mulch and the finer material used to top-dress lawns and groundcovers.

THRIFTY WATERING TECHNIQUES FOR HEALTHY PLANTS

The majority of our ground-penetrating rainfall occurs during the winter months, when plant growth is least active. Making the most of the garden while conserving water depends upon choosing the right plants, taking good care of the soil, and using the right irrigation equipment and techniques. Dry summer conditions don't always have to result in a desiccated landscape.

Remember that water is taken in through the roots, not the leaves. Speedy sprinkling over plants on a sunny day won't reach the roots. Quick rains from brief summer showers do not benefit roots either.

Plants lose water through their leaves during transpiration, a normal and necessary process. Plants wilt when soil is too dry or the weather gets too hot for roots to keep up with the demand. Overcast days with misty rain may not provide much measurable rainfall, but they do reduce plant water loss.

Keep track of how much rain is reaching your garden by using a rain gauge. What you may have thought was a big downpour could show up at a quarter inch or less in the gauge—not enough to replenish the soil. Another's day rain might add up to ½ inch or more and may be enough to replace an irrigation cycle. Keeping your own rainfall observations leads to better irrigation practices.

Use a rain gauge to help guide irrigation needs.

SOME IMPORTANT WATER-SAVING TACTICS

- When preparing soil for new landscapes, strive for a coarse, open texture 12 or more inches deep.
- Use coarse mulch to help retain soil moisture and improve water infiltration.
- Select plants adapted to manage dry times in your climate zone.
- Group and locate plants according to their water needs and cultural adaptations.
- Populate naturally damp garden zones with moisture-loving plants.
- Use a garden rain gauge. Probe the soil to check dampness and guide irrigation.
- Watch your water pressure: large, heavy drops are more effective than mist.
- Water for long, deep drinks, not sips.

Soil type and texture determine how much water a soil will hold and how quickly it can absorb that water. One inch of water applied to a sandy soil will readily penetrate to 12 inches deep. An inch of water will move anywhere from 6 to 10 inches into a good loam soil, but in clay soil the application may percolate down only 4 to 5 inches. Adjust the delivery rate to match how quickly the soil can take it in: if water is sheeting off the surface, it needs to be applied more slowly.

TARGET THE ROOT ZONE

To maintain a deeply rooted, drought-resistant garden, water deeply and infrequently. Use a trowel or shovel after watering to see how far down the water really went. Whether you use an irrigation system, a soaker hose, or hand water, the objective is the same: water deeply! The shallower the root zone, the more quickly it will dry out and the more often it will require water. New plants (even drought-tolerant species) require good, deep watering their first two to three summers while their roots are expanding into planting soil. Be sure to run drip systems long enough to reach the depth of the rootballs. The worst thing you can do is to water a little bit every day; it leads to shallow roots with no buffer against hot dry spells.

Soaker hoses and solid irrigation tubing with pressure-compensating emitters are an easily installed, efficient means of supplying water. Soaker hoses perform best in short runs (less than 100 feet) on level ground, while pressure-compensating emitter tubing can deliver water evenly over slopes and longer runs. Both soaker hoses and irrigation tubing can be covered with mulch for better appearance and water conservation. Bubbler heads used for manual or automatic systems are another method of getting more water to the roots with less evaporative loss. Some irrigation companies have begun installing soaker hose below sod with great results in turf health and water savings. Zippered, slow-release watering bags, which are filled from a hose, are a great tool for watering new trees.

The overriding benefits of all these methods are avoiding water loss from evaporation or run-off across pavement, promotion of deeper rooting and drought resilience, and reducing some leaf blights by keeping leaves dry.

■ *Water deeply to promote a deep root zone.*

WEEDS

Pulling weeds can be the bane of leisure gardening. Or it can become a satisfying routine that immerses you into the life of your garden. Tips to keep weed control manageable include:

- Use well-adapted plants that compete and crowd weeds out.
- Use coarse organic mulch. There will be fewer weeds and those that do crop up will be easier to pull.
- Eliminate weeds before they have time to flower and go to seed.

A spading fork and the hori-hori soil knife are two of a gardener's best tools for getting weeds out, roots and all.

Fabric or plastic weed barriers are often seen as a quick fix for weed control, but they can cause more problems than they solve. Some weeds, such as horsetail, are known to punch through these landscape fabrics, while morning glory vines easily find their way under the fabric and emerge through small gaps and edges. Other weeds end up growing in mulch or organic debris on top of the fabric. One of the biggest disadvantages is that weed barrier fabrics prevent replenishment of organic matter into the soil and disrupt the life of beneficial soil organisms and insects.

A better option for reclaiming beds overrun by weeds or for establishing a new bed is sheet mulching with newspaper or cardboard (materials that will decompose once their work is done) covered with about 4 inches of mulch. Four-ply layers of newspaper are easier to work with around established plants. Make sure mulch completely buries the paper or cardboard and to wet it all down at installation.

HANDLING MONSTER WEEDS

Special tactics may be needed to subdue very dense weed growth or particularly persistent weed types. Information on identification and control methods for difficult weed species can be obtained through regional noxious weed boards as well as Cooperative Extension offices (see Resources). Control of some noxious species that pose serious economic and/or environmental threat is required by law. Tansy ragwort on rangelands is one example. Purple loosestrife and Japanese knotweed are problem weeds that threaten wetland native plants and riparian areas.

PLANTING TECHNIQUES: TREES & SHRUBS

For larger installations, it's best to prepare the entire planting bed in advance. You may have heard old advice to add organic amendments only to the planting hole, but research has found roots tend to stay confined to that small, improved area, impairing good establishment. If the soil is not already soft and loose, prepare the entire plant bed to fracture existing soil at least 8 to 12 inches deep, remove larger rocks, and incorporate organic amendment (if needed). Cover the unplanted soil with coarse mulch and water in or allow rain to help settle it for a week or so before planting.

PREPARING & INSTALLING THE ROOTBALL

Proper planting means caring for the roots and planting at the proper height. Two common mistakes that lead to plant failure are leaving tight rootballs undisturbed and planting too deep. Score the rootball and loosen root ends before planting. Do not bury the crown or trunks with soil or mulch. Take great care to get trees and shrubs installed at or slightly above grade. Planting holes are best prepared shallow and wide.

All types of nursery stock need some gentle root disturbance with tools and hands to stimulate new growth and to put the roots in direct contact with garden soil. Left in the shape of their containers, rootballs can remain like a ball in a socket, with roots never getting a good grip into the surrounding ground.

Plants are sold in containers, balled and burlapped (B&B), or dormant bare root. Give new plants a good watering the day before planting. Keep exposed roots covered with damp burlap or mulch to keep them from drying out during the planting process.

Gently loosen the rootball to spread roots out in the planting hole. Prune circling roots.

Check container stock for matted or circling roots that follow the outline of the pot. Gently rinsing off of some of the container soil can help expose problem roots. Prune any circling or tightly matted roots, so new growth will extend horizontally from the cut ends. Remove any excess soil that may cover the base of the stems. Balled-and-burlapped plants come with fabric and twine wrapped around the rootball. Carefully remove all wrapping. There is a common misconception that these materials can be left buried in the planting hole—don't do it! Root growth can be hampered by buried materials that are slow to break down or don't decompose at all. Remove any excess soil covering the trunk or stems, down to the flare at the base where the top lateral roots start. Now you will have the actual height of the rootball and know how deep to dig the hole. Once the rootball is set in the hole, remove all wrapping and ties from the top and sides of the rootball. Before filling the hole, use a hand cultivator to loosen the sides of the soil ball (especially slick clay often found with B&B) so root ends will be in direct contact with the backfill.

Trees sometimes come in grow bags made of synthetic fabric that must be completely removed. Don't worry about any roots that may be poking through the fabric. The resulting root pruning will stimulate new growth.

Dormant bare-root plants are available in early spring. They come with their roots covered in damp sawdust. It is important to protect the roots from drying or frost before they are planted. Soak the roots for a few hours before planting. Prune any dry or broken root ends. Fill the hole gradually, holding the plant with one hand, keeping the roots spread and placing soil carefully around roots. Gently water as you add soil to eliminate air pockets. Make sure to plant at the correct height, with the soil covering the roots but not the flared base of the trunk. The root collar boundary is usually visible by a change in bark texture where root structure begins.

WHAT ABOUT STAKING?

Trees that are wobbly in the ground will need staking at planting, especially bare-root trees. The goal is to anchor the rootball (not the trunk). Drive stakes into undisturbed ground outside the planting hole and attach ties at the lowest position on the trunk that will hold the tree upright. Young trees need some trunk movement with the wind to stimulate strong wood and support roots. Use soft, pliable ties and avoid wires that can easily dig into the trunk. Healthy, well-planted trees should not normally need staking past the first season. Stakes and ties left in place too long can kill or severely deform the tree by girdling the growing trunk.

Bare root

Container

Balled and burlapped