

GLOSSARY

abiotic disease. A condition caused by nonliving, nonparasitic, or noninfectious agents.

abscission. The dropping of leaves, flowers, or fruit by a plant. Can result from natural growth processes (e.g., fruit ripening) or from external factors such as temperature or chemicals.

abscission layer. Specialized cells, usually at the base of a leaf stalk or fruit stem, that trigger both the separation of the leaf or fruit and the development of scar tissue to protect the plant.

absorption. The intake of water and other materials through root or leaf cells.

accumulated heat units. Number of heat units in a growing season. Usually calculated at temperatures above 50°F, but can be calculated at other temperatures, depending on the crop. A day's heat units are calculated as

$$\frac{\text{Max temp}(\text{°F}) + \text{Min temp}(\text{°F})}{2} - 50\text{°F}$$

acid soil. Soil with pH below 7 on a pH scale of 1–14. The lower the pH, the more acid the soil. (See also pH.)

active ingredient. The chemical in a pesticide formulation that actually kills the target pest.

additive. A substance that, when added to a pesticide, reduces the surface tension between two unlike materials (e.g., spray droplets and a plant surface), thus improving adherence. Also called an adjuvant or surfactant.

adjuvant. See additive.

adventitious. Growth not ordinarily expected, usually the result of stress or injury. A plant's normal growth comes from meristematic tissue, but adventitious growth starts from nonmeristematic tissue.

adventitious bud. A bud that develops in locations where buds usually do not occur. An example would be buds found on root pieces used for propagation; roots do not have buds.

adventitious root. A root that forms at any place on the plant other than the primary root system.

aeration. The practice involving the removal of cores or turf plugs and soil to reduce compaction and improve air flow.

aerial root. An unusual type of root that develops on stems aboveground.

aerobic. Active in the presence of free oxygen.

after-ripening. The seed maturation process that must be completed before germination can occur.

aggregation. The process by which individual particles of sand, silt, and clay cluster and bind together to form soil peds.

agriculture. The study of plants in relation to field crop production.

agronomy. The science of crop management, including the study of soils.

alkaline soil. Soil with pH above 7 on a pH scale of 1–14. The higher the reading, the more alkaline the soil. (See also pH.)

allelopathy. The excretion by some plants' leaves and roots of compounds that inhibit the growth of other plants.

alternate leaf arrangement. Leaves are attached at alternating points from one side of the stem to the other.

ammonium. A plant-available form of nitrogen contained in many fertilizers and generated in the soil by the breakdown of organic matter. (See also nitrogen cycle.)

anaerobic. Active in the absence of free oxygen.

analogous. In landscaping, use of adjacent colors on the color wheel such as blue, violet, and red.

anatomy. The study of plant structure.

angiosperm. Flowering plants. Plants that have a highly evolved reproductive system. Seeds enclosed in an ovary such as a fruit, grain, or pod.

anion. Negatively charged ion, for example, chloride.

anion exchange. The interaction of anions on the surface of an active material with those in solution.

anion exchange capacity (AEC). The sum total of exchangeable anions that a soil can absorb expressed in meq/100 g (milliequivalents per 100 grams) soil.

annual. Plants that grow, mature, flower, produce seed, and die in one season.

Anoplura. A major order of insects that have two pairs of wings, or are wingless, and piercing-sucking mouthparts (sucking lice).

anther. The pollen-bearing part of a flower's male sexual organ. The filament supports the anther; together they are referred to as the stamen.

anthracnose. Plant disease characterized by black or brown dead areas on leaves, stems, or fruits.

anvil pruner. A pruning tool that cuts a branch between one sharpened blade and a flat, anvil-shaped piece of metal. Has a tendency to crush rather than make a smooth cut.

apex. The tip of a stem or root.

apical dominance. The inhibition of lateral bud growth by the presence of the hormone auxin in a plant's terminal bud. Removing the growing tip removes auxin and promotes lateral bud break and subsequent branching, usually directly below the cut.

apical meristem. Area of the plant shoot and root tips where cells actively divide to provide more cells that expand and develop into the tissues and organs of the plant. Also called shoot meristem.

arboretum. An area devoted to specimen plantings of trees and shrubs.

asexual propagation. See vegetative propagation.

aspect. Direction of exposure to sunlight.

assimilation. Building of cell matter from inorganic (minerals) and organic materials (carbohydrates and sugars).

attractant. A material that lures pests.

auxin. One of the best-known and most important plant hormones. Most abundantly produced in a plant's actively growing tips. Generally stimulates growth by cell division in the tip region and by cell elongation lower down the shoot. Growth of lateral buds is strongly inhibited by the normal concentration of auxin in the growing tip.

available water supply. Soil water that is available for plant uptake. Excludes water bound tightly to soil particles.

axil. The upper angle formed by a leaf stalk (petiole) and the internodes above it on a stem.

axillary bud. An undeveloped shoot or flower that is found at the node. Also called the lateral bud.

bacillus thuringiensis. A bacterium used as a biological control agent for many insect pests.

bacterium. A single-celled, microscopic organism that has a cell wall but no chlorophyll. Reproduces by cell division.

balled and burlapped. A plant dug with soil. The root ball is enclosed with burlap or a synthetic material.

band. To apply a pesticide or fertilizer in a strip over or along each crop row.

bare-root. A plant with little or no soil around its roots; deciduous plants and small evergreens are commonly sold bare-root.

basal. (1) At or near the base of a branch or trunk. (2) At or near a plant's crown.

basal break. New growth that develops at the base of a branch or near a plant's crown.

beneficial fungi. Fungi used in controlling organisms that attack desirable plants.

beneficial insect. An insect that helps gardening efforts. May pollinate flowers, eat harmful insects or parasitize them, or break down plant material in the soil, thereby releasing its nutrients. Some insects are both harmful and beneficial. For example, butterflies can be pollinators in their adult form but destructive in their larval (caterpillar) form.

berry. The fleshy fruit of cane fruits, bush fruits, and strawberries.

biennial. Plants that take two years, or a part of two years, to complete their life cycle.

biennial bearing. Producing fruit in alternate years.

binomial. A biological species name consisting of two names: the genus name and specific epithet.

biological insect control. The use of beneficial organisms to control pest insect populations.

biosolids. A by-product of wastewater treatment sometimes used as a fertilizer, also known as municipal sewage sludge.

blackleg. Darkening at the base of a stem.

blade. The flat thin part of a leaf.

blanch. To exclude light from plants or parts of plants to render them white or tender. Often done to cauliflower, endive, celery, and leeks. Also used to promote adventitious root formation on stems.

blight. Rapid death of leaves and other plant parts.

blotch. A blot or spot (usually superficial and irregular in shape) on leaves, shoots, or fruit.

bole. See trunk.

bolting. Producing seed or flowering prematurely, usually due to heat. For example, cool-weather crops such as lettuce bolt during summer; leaf crops are discouraged from bolting by removing flower heads. (See also deadhead.)

bonsai. One of the fine arts of horticulture; growing carefully trained, dwarfed plants in containers selected to harmonize with the plants. Branches are pruned and roots trimmed to create the desired effect.

- botanical insecticide.** An insecticide, such as rotenone or pyrethrum, derived from a plant. Most botanicals biodegrade quickly. Most, but not all, have low toxicity to mammals.
- botanical maturity.** In fruits, refers to a final stage of development when the fruit is still on the plant and cell enlargement and the accumulation of carbohydrates and other flavor constituents are complete.
- botany.** The science that studies all phases of plant life and growth.
- botrytis.** A fungal disease promoted by cool, moist weather. Also known as gray mold or fruit rot.
- bract.** A modified leaf, usually small, but sometimes large and brightly colored, growing at the base of a flower or on its stalk. Clearly seen on dogwoods and poinsettias.
- bramble.** A spiny cane bush with berry fruits (e.g., raspberries and blackberries).
- branch.** A subsidiary stem arising from a plant's main stem or from another branch.
- break.** (1) Any new growth coming from a bud. (2) See bud break.
- broadcast.** (1) To sow seed by scattering it over the soil surface. (2) To apply a pesticide or fertilizer uniformly to an entire, specific area by scattering or spraying it.
- broadleaf evergreen.** A non-needled evergreen.
- brown rot.** Soft rot of fruit covered by gray to brown mold.
- BTU.** British thermal unit. Amount of heat required to raise the temperature of 1 pound of water 1°F.
- bud.** A small protuberance on a stem or branch, sometimes enclosed in protective scales, containing an undeveloped shoot, leaf, or flower.
- bud break.** The resumption of growth by resting buds.
- budding.** A method of asexual plant propagation that unites one bud (attached to a small piece of bark) from the scion to the rootstock.
- bud head.** A swollen or enlarged area where a bud was grafted to a stock.
- bud scale.** A modified leaf that forms a protective covering for a bud.
- bud sport.** See mutation.
- bud stick.** A shoot or twig used as a source of buds for budding.
- bud union.** The suture line where a bud or scion was grafted to a stock. Sometimes called a graft union.
- bulb.** A belowground stem (for example, in tulip) that is surrounded by fleshy scalelike leaves that contain stored food.
- bulbil.** A small bulblike organ that sometimes forms on aerial plant parts.
- bulblet.** (1) An underground bulb formed in the leaf axis on a stem. (2) A tiny bulb produced at the base of a mother bulb.
- calcium carbonate.** A compound found in limestone, ashes, bones, and shells; the primary component of lime.
- callus.** Tissue that forms over the wounds on plants.
- calorie.** Amount of heat required to raise the temperature of 1 cubic centimeter of water 1°C.
- calyx.** The entire set of sepals on a flower.
- cambium.** A layer of meristematic tissue that produces new phloem on the outside, new xylem on the inside, and is the origin of all secondary growth in plants. The cambium layer forms the annual ring in wood.
- candelabrum.** A strong, dominant rose cane with accelerated growth that originates from a bud union and explodes with many blooms.
- candle.** On a pine tree, new terminal growth from which needles emerge.
- cane.** The externally woody, internally pithy stem of a bramble or vine.
- canker.** Sunken, discolored, dead areas on twigs or branches, usually starting from an injury, wound, or pathogen.
- canopy.** (1) The top branches and foliage of a plant. (2) The shape-producing structure of a tree or shrub.
- capillary action.** The force by which water molecules bind to the surfaces of soil particles and to each other, thus holding water in fine pores against the force of gravity.
- capitulum.** (1) A dense, short, compact cluster of sessile flowers, as in composite plants or clover. (2) A very dense grouping of flower buds, as in broccoli.
- caterpillar.** See larva.
- catfacing.** Disfigurement or malformation of a fruit. Fruits typically affected include tomatoes and strawberries. Catfacing is caused by insects or adverse weather during fruit development, as well as other unknown factors.
- cation.** Positively charged ion. Plant nutrient examples include calcium and potassium. (See also anion.)
- cation exchange capacity (CEC).** A soil's capacity to hold cations as a storehouse of reserve nutrients.
- cell.** A structural, functional unit of a plant.
- central leader.** (1) A trunk or stem extending up through the axis of a tree or shrub and clearly emerging at the top. (2) A system of pruning that uses the central leader as a basic component. (See also leader.)

- cercus.** A threadlike or sometimes forceps-like tail near the tip of an insect's abdomen (usually a pair). Plural = cerci.
- chelate.** A complex organic substance that holds micronutrients, usually iron, in a form available for absorption by plants.
- chemical insect control.** The use of chemicals or insecticide to control insect populations.
- chlorophyll.** The green pigment in plants responsible for trapping light energy for photosynthesis.
- chloroplast.** A specialized component of certain cells. Contains chlorophyll and is responsible for photosynthesis.
- chlorosis.** Yellowing or whitening of normally green tissue.
- clay.** The smallest type of soil particle (less than 0.002 mm in diameter).
- climber.** A plant that climbs on its own by twining or using gripping pads, tendrils, or some other method to attach itself to a structure or another plant. Plants that must be trained to a support are properly called trailing plants, not climbers.
- cloche.** A plastic, glass, or Plexiglas plant cover used to warm the growing environment and protect plants from frost.
- clone.** A plant group whose members have all been derived from a single individual through constant propagation by vegetative (asexual) means, e.g., by buds, bulbs, grafts, cuttings, or laboratory tissue culture.
- C:N ratio.** The ratio of carbon to nitrogen in organic materials. Materials with a high C:N ratio (high in carbon) are good bulking agents in compost piles, while those with a low C:N ratio (high in nitrogen) are good energy sources.
- cold composting.** A slow composting process that involves simply building a pile and leaving it until it decomposes. This process may take months or longer. Cold composting does not kill weed seeds or pathogens.
- cold frame.** A plastic-, glass-, or Plexiglas-covered frame or box that relies on sunlight as a source of heat to warm the growing environment for tender plants.
- cole crops.** A group of vegetables belonging to the cabbage family; plants of the genus *Brassica*, including cauliflower, broccoli, cabbage, turnips, and Brussels sprouts.
- Coleoptera.** A major order of insects that have two pairs of wings, or are wingless, and chewing mouthparts (beetles, weevils).
- collar.** A swollen area at the base of a branch where it connects to a trunk. Contains special tissue that prevents decay from moving downward from the branch into the trunk. (See also shoulder ring.)
- Collembola.** A major order of insects that are wingless and have chewing mouthparts (springtails).
- compaction.** Pressure that squeezes soil into layers that resist root penetration and water movement. Often the result of foot or machine traffic.
- companion planting.** The practice of growing two or more types of plants in combination to discourage disease and insect pests.
- compatible.** Different varieties or species that set fruit when cross-pollinated or that make a successful graft union when intergrafted. (See also pollenizer.)
- complementary.** In landscaping, use of opposite colors on the color wheel such as red and green, orange and blue, and yellow and violet.
- complete fertilizer.** A fertilizer that contains all three macronutrients (N, P, K).
- complete metamorphosis.** A type of insect development in which the insect passes through the stages of egg, larva, pupa, and adult. The larva usually is different in form from the adult. (See also simple metamorphosis.)
- compost.** The product created by the breakdown of organic waste under conditions manipulated by humans. Used to improve both the texture and fertility of garden soil. (See also humus.)
- compound bud.** More than one bud on the same side of a node. Usually, unless growth is extremely vigorous, only one of the buds develops and its branch may have a very sharp angle of attachment. If it is removed, a wider-angled shoot usually is formed from the second (accessory) bud. Ashes and walnuts are examples of plants that typically have compound buds.
- conifer.** A cone-bearing tree or shrub, usually evergreen. Pine, spruce, fir, cedar, yew, and juniper are examples.
- conk.** A fungal fruiting structure (e.g., shelf or bracket fungi) formed on rotting woody plants.
- cordon.** (1) A method of espaliering fruit trees, vines, etc., to horizontal, vertical, or angled wire or wooden supports so the maximum branch surface is exposed to the sun, resulting in maximum fruit production. (2) A branch attached to such a support.
- cork cambium.** On woody plants, the layer of cells that produces bark, or cork, located just below the bark layers.
- corm.** A belowground stem that is swollen (for example, in crocus).
- cormel.** A small, underdeveloped corm, usually attached to a larger corm.

- cornicle.** A short, blunt horn or tube (sometimes buttonlike) on the top and near the end of an aphid's abdomen. Emits a waxy liquid that helps protect against enemies.
- corolla.** Part of a flower; all of the petals together.
- cortex cells.** Found beneath the epidermis, these cells help move water from the epidermis and are active in food storage.
- corymb.** A usually flat-topped flower cluster in which the individual flower stalks grow upward from various points on the main stem to approximately the same level.
- cotyledon.** A seed leaf, the first leaf from a sprouting seed. Monocots have one cotyledon, dicots have two.
- Cover crop.** (1) A crop planted to protect the soil from erosion. (2) A crop planted to improve soil structure or organic matter content.
- crop rotation.** The practice of growing different types of crops in succession on the same land chiefly to preserve the productive capacity of the soil by easing insect, disease, and weed problems.
- cross-pollination.** The fertilization of an ovary on one plant with pollen from another plant, producing an offspring with a genetic makeup distinctly different from that of either parent. (See also pollenizer.)
- crotch angle.** The angle formed between a trunk and a main scaffold limb. The strongest angles are 45°–60°.
- crown.** (1) Collectively, the branches and foliage of a tree or shrub. (2) The thickened base of a plant's stem or trunk to which the roots are attached. (3) Compressed aboveground stems as occurs in grasses.
- crown gall.** A specific disease caused by the bacterium *Agrobacterium tumefaciens* that causes excessive, undifferentiated growth that may girdle roots, stems, or branches.
- cultivar.** Contraction of cultivated variety. Propagation of cultivars results in little or no genetic change in the offspring, which preserves desirable characteristics.
- cultural insect control.** Controlling an insect population by maintaining good plant health and by crop rotation and/or companion crops.
- curlytop.** Rolling and curling of leaves at the growing point. May be indicative of viral infection.
- cuticle.** (1) A waxy layer on the epidermis on a leaf. (2) The outer layer of an insect's body.
- cutin.** (1) A waxy substance on plant surfaces that tends to make the surface waterproof and can protect leaves from dehydration and disease. (2) A waxy substance on an insect's cuticle that protects the insect from dehydration.
- cutting.** One of several forms of asexual propagation.
- cyme.** A flower stalk on which the florets start blooming from the top of the stem and progress toward the bottom.
- cyst.** The swollen, egg-containing female body of certain nematodes. Can sometimes be seen on the outside of infected roots.
- damping-off.** Stem rot near the soil surface leading to either failed seed emergence or to the plant's falling over after emergence.
- day-neutral plant.** A cultivar or species capable of flowering without regard to day length. (See also short-day plant; long-day plant.)
- deadhead.** To remove individual, spent flowers from a plant for the purpose of preventing senescence and prolonging blooming. For effective results, the ovary behind the flower must be removed as well.
- deciduous.** A plant that sheds all of its leaves annually.
- decomposers.** The microorganisms and invertebrates that accomplish composting.
- decomposition.** The breakdown of organic materials by microorganisms.
- defoliation.** The unnatural loss of a plant's leaves, generally to the detriment of its health. Can be caused by several factors such as high wind, excessive heat, drought, frost, chemicals, insects, or disease.
- dehorning.** A drastic method of pruning a neglected tree or shrub. Entails the removal of large branches, especially high in the crown, a few at a time over several seasons.
- Dermaptera.** A major order of insects that have two pairs of wings, or are wingless, and have mouthparts (earwigs).
- desiccation.** Drying out of tissue.
- determinate.** A plant growth habit in which stems stop growing at a certain height and produce a flower cluster at the tip. Determinate tomatoes, for example, are short, early fruiting, have concentrated fruit set, and may not require staking. (See also indeterminate.)
- dethatch.** To remove thatch (a tightly intermingled layer of stems and roots, living and dead, that forms between the soil surface and green vegetation of grass).
- diatomaceous earth.** The fossilized remains of diatoms (a type of tiny algae) used to kill insect pests, snails, and slugs.
- dicot.** See dicotyledon.
- dicotyledon.** Plants with two seed leaves. Also referred to as dicot.
- dieback.** Progressive death of shoots, branches, or roots, generally starting at the tips.

differentiation. A change in the composition, structure, and function of cells and tissues during growth.

dioecious. Plants that have male and female flowers occurring on separate plants (e.g., holly).

Diptera. A major order of insects that have one pair of wings and sucking or siphoning mouthparts as adults and chewing mouthparts as larvae (mosquitoes, flies, and gnats).

disbud. The selective removal of some flower buds so remaining buds receive more of the plant's energy and produce larger, showier flowers. Roses, chrysanthemums, and camellias often are disbudded.

division. The breaking or cutting apart of a plant's crown for the purpose of producing additional plants, all genetically identical to the parent plant.

DNA. Deoxyribonucleic acid is the genetic information that dictates all cellular processes. DNA is organized into chromosomes and is responsible for all characteristics of the plant.

dormancy. The annual period when a plant's growth processes greatly slow down.

dormant. Resting or not growing. A deciduous tree is dormant in the winter.

dormant bud. A bud formed during a growing season that remains at rest during the following winter or dry season. If it does not expand during the following growing season, it is termed latent.

dormant oil. An oil applied during the dormant season to control insect pests and diseases.

double, semidouble. A flower with more than the normal number of petals, sepals, bracts, or florets. May be designated botanically by the terms *flore pleno*, *plena*, or *pleniflora*.

double worked. Grafted twice, i.e., grafted to an intermediate stock.

drainage. The ability of soil to transmit water through the surface and subsoil.

dripline. An imaginary line on the ground directly beneath the outermost tips of a plant's foliage. Rain tends to drip from leaves onto this line.

drip zone. The area from the trunk of a tree or shrub to the edge of its canopy. Most, but not all, of a plant's feeder roots are located within this area.

drupe fruit. See stone fruit.

dwarfed. Restricted plant size without loss of health and vigor.

ecology, plant. The study of the complex relationships of plants in biological communities.

economic threshold. The level at which pest damage justifies the cost of control. In home gardening, the threshold may be aesthetic rather than economic.

emasculate. To remove a flower's anthers.

embryo. The tiny plant that is formed inside a seed during fertilization. It has two growing points, the radicle (a tiny root) and the plumule (a tiny shoot).

embryo dormancy. Common in seed of woody perennial plants. A physiological condition in the embryo that prevents it from growing. This type of dormancy can be overcome by stratification.

enation. Epidermal outgrowths on leaves or stems.

endoskeleton. The internal body support found in most animals outside the insect kingdom.

endosperm. The food-storage area in a seed that feeds the embryo.

enzyme. A biological catalyst that aids in conversion of food and other chemical structures from one form to another.

epidemic. A widespread and severe outbreak of a disease.

epidermis (leaf). The outer cell layers on the top and bottom of a leaf.

epidermis (root). The cells that protect the root surface. The epidermis contains the root hairs and is responsible for the absorption of water and minerals dissolved in water.

epidermis (stem). In nonwoody plants, the outer single layer of surface cells that protects the stem. As in leaves, this layer is usually cutinized, or waxy, and on young stems it has stomata.

epinasty. An abnormal downward-curving growth or movement of a leaf, leaf part, or stem.

espalier. The training of tree or shrub to grow flat on a trellis or wall. Espalier patterns may be very precise and formal or more natural and informal.

etioliation. Long internodes and pale green color of plants growing under insufficient light or in complete darkness.

evergreen. A plant that never loses all its foliage at the same time.

excise. To remove or extract, as an embryo from a seed or ovule.

excurrent. A tree form in which the main trunk remains dominant with small, more or less horizontal branches. Fir and sweet gum are examples.

exfoliating. Peeling off in shreds or thin layers, as in bark from a tree.

exoskeleton. An insect's outer body support.

exotic. Non-native.

fallow. To keep land unplanted during one or more growing seasons.

family. A suborder in the classification of plants.

fasciation. Distortion of a plant that results in thin, flattened, and sometimes curved shoots.

- feeder roots.** Fine roots and root branches with a large absorbing area (root hairs). Responsible for taking up the majority of a plant's water and nutrients from the soil.
- fertility (soil).** The presence of minerals necessary for plant life.
- fertilization.** (1) The fusion of male and female germ cells following pollination. (2) The addition of plant nutrients to the environment around a plant.
- fertilizer.** Any substance added to the soil (or sprayed on plants) to supply those elements required in plant nutrition.
- fertilizer analysis.** The amount of nitrogen, phosphorus (as P_2O_5), and potassium (as K_2O) in a fertilizer expressed as a percentage of total fertilizer weight. Nitrogen (N) is always listed first, phosphorus (P) second, and potassium (K) third.
- fertilizer ratio.** The smallest whole number relationship among N, P_2O_5 , and K_2O .
- fibrous root.** A root system that branches in all directions, often directly from the plant's crown, rather than branching in a hierarchical fashion from a central root. (See also taproot.)
- filament.** The stalk supporting a flower's anthers.
- flagging.** Loss of turgor and drooping of plant parts, usually as a result of water stress.
- floating row covers.** Covers, usually of a clothlike material, placed over growing plants and used to protect the plants growing beneath from undesirable pests and climate.
- floricane.** Second-year growth of cane berries. Produces fruit on laterals.
- flower bud.** A type of bud that produces one or more flowers.
- foliar fertilization/feeding.** Fertilization of a plant by applying diluted soluble fertilizer, such as fish emulsion or kelp, directly to the leaves.
- force.** To bring a plant into early growth, generally by raising the temperature or transplanting it to a warmer situation. Tulips and paper whites are examples of plants that often are forced.
- form.** (1) A naturally occurring characteristic different from other plants in the same population. (2) The growth habit (shape) of a plant.
- formal.** (1) A garden that is laid out in precise symmetrical patterns. (2) A flower, such as some camellias, that consists of layers of regularly overlapping petals.
- frond.** Specifically, the foliage of ferns, but often applied to any foliage that looks fernlike, such as palm leaves.
- fruit.** The enlarged ovary that develops after fertilization occurs.
- fruiting habit.** The location and manner in which fruit is borne on woody plants.
- fumigation.** The application of a toxic gas or other volatile substance to disinfect soil or a container, such as a grain bin.
- fungicide.** A compound toxic to fungi.
- fungus.** A plant organism that lacks chlorophyll, reproduces via spores, and usually has filamentous growth. Examples are molds, yeasts, and mushrooms.
- gall.** A growth on plant stems or leaves caused by abnormal cell growth stimulated by the feeding of some insects (e.g., aphids) or by viral, fungal, or bacterial infection or genetic abnormality.
- genetically modified.** A plant or animal that has had genetic material introduced to its genome from other organisms through artificial means.
- genus.** A subdivision of family in the classification of plants. Plants of the same genus share similarities mostly in flower characteristics and genetics. Plants in one genus usually cannot breed with plants of another genus.
- geography, plant.** The study of the distribution of plants throughout the world.
- geotropism.** The turning or curving of a plant's parts in response to gravity. A root growing downward is an example. Geotropism is controlled largely by the hormone auxin.
- germination.** The processes that begin after planting a seed that lead to the growth of a new plant.
- girdling.** The damaging, cutting, removing, or clamping of cambium all the way around a trunk or branch. Sometimes, girdling is done deliberately to kill an unwanted tree, but often it results from feeding by insects or rodents. Wires and ties used to support a tree can cause girdling, as can string trimmers.
- glabrous.** Hairless, but not necessarily smooth.
- glaucous.** Covered with a grayish, bluish, or whitish waxy coating that is easily rubbed off. Blue spruce needles are an example of glaucous leaves.
- gradual metamorphosis.** See simple metamorphosis.
- graft union.** See bud union.
- grafting.** A method of asexual plant propagation that joins plant parts so they will grow as one plant.
- gravitational water.** Water in excess of a soil's capacity. Drains downward to groundwater.
- green cone.** An enclosed composting unit often used for composting food waste.
- green manure.** A herbaceous crop plowed under while green to enrich the soil.
- ground cover.** Plants used for holding soil, controlling weeds, and providing leaf texture.

growing season. The period between the beginning of growth in the spring and the cessation of growth in the fall.

growth regulator. A compound applied to a plant to alter its growth in a specific way. May be a natural or synthetic substance. (See also hormone.)

guard cells. Cells on either side of each stoma. They swell to open the stoma and shrink to close it.

gymnosperm. Plants that have seed not enclosed in an ovary (e.g., conifers).

halter. A small, knoblike organ (sometimes shaped like a baseball bat or bowling pin) located on the thorax of insects of the order Diptera. Takes the place of hindwings and helps balance the insect in flight.

hardening off. (1) The process of gradually exposing seedlings started indoors to outdoor conditions before transplanting. (2) The process of gradual preparation for winter weather.

hardpan. An impervious layer of soil or rock that prevents root growth and downward drainage of water.

hardy. Frost or freeze tolerant. In horticulture, this term does not mean a tough plant nor one that is resistant to insect pests or disease.

haustorium. A modified hyphal branch of a parasitic plant. Grows into a host plant's cell to absorb food and water.

head. (1) To cut off part of a shoot or limb rather than remove it completely at a branch point. (2) The part of a tree from which the main scaffold limbs originate.

heartwood. The central cylinder, often dark colored, of xylem tissue in a woody stem.

heeling in. The temporary burying of a newly dug plant's roots to prevent their drying until a new planting site is prepared. Nurseries heel in bare-root berries, trees, and shrubs.

Hemiptera. A major order of insects that have two pairs of wings and piercing-sucking mouthparts (bedbugs, stink bugs, cinch bugs).

herbaceous. A soft, pliable, usually barkless shoot or plant. Distinct from stiff, woody growth.

herbaceous perennial. A plant that dies back in the winter and regrows from the crown in the spring.

herbicide. A chemical used to kill undesirable plants.

heterozygous. Having mixed hereditary factors, not a pure line.

Homoptera. A major order of insects that have two pairs of wings, or are wingless, and piercing-sucking mouthparts (aphids, leafhoppers, scales, mealybugs).

homozygous. Having purity of type, a pure line.

honeydew. A sticky substance excreted by aphids and some other insects.

hormone. A naturally occurring compound that alters plant growth in a specific manner. (See also growth regulator.)

horticultural oil. An oil made from petroleum products, vegetable oil, or fish oil used to control insect pests and diseases. Oils work by smothering insects and their eggs and by protectively coating buds against pathogen entry.

horticulture. The science of growing fruits, vegetables, flowers, and other ornamental plants.

host. A plant on which an insect or disease completes all or part of its life cycle.

host plant. A plant that is invaded by a parasite.

host range. The various plants that may be attacked by a parasite.

hotbed. An enclosed bed for propagating or protecting plants. Has a source of heat to supplement solar energy.

hot composting. A fast composting process that produces finished compost in 4–8 weeks. High temperatures are maintained by mixing balanced volumes of energy materials and bulking agents, by keeping the pile moist, and by turning it frequently to keep it aerated.

humus. The end product of decomposing animal or vegetable matter. (See also compost.)

hybrid. The results of a cross between two different species or well-marked varieties within a species. Hybrids grown in a garden situation will not breed true to form from their own seed.

hydroponics. A method of growing plants without soil. Plants usually are suspended in water or polymers and plant nutrients are supplied in dilute solutions.

Hymenoptera. A major order of insects that have two pairs of wings, or are wingless, and chewing mouthparts (wasps, bees, ants, sawflies).

hypha. A single filament of a fungus.

hypocotyl. The seedling stem that develops below the cotyledons.

imbibition. The portion of the germination process that involves the absorption of water, causing the seed to swell, and that triggers cell enzyme activity, growth, and the bursting of the seed coat.

immobilization. The process by which soil microorganisms use available nitrogen as they break down materials with a high C:N ratio, thus reducing the amount of nitrogen available to plants.

immune. A plant that does not become diseased by a specific pathogen. (See also resistance; tolerant.)

- imperfect flower.** Flowers lacking one or more of the sexual parts.
- incompatible.** Kinds or varieties of a species that do not successfully cross-pollinate or intergraft.
- incomplete flower.** A type of flower that lacks one or more of the four parts: pistil, stamen, sepals, or petals.
- incomplete metamorphosis.** See simple metamorphosis.
- incubation.** A period of development during which a pathogen changes to a form that can penetrate or infect a new host plant.
- indeterminate.** A plant growth habit in which stems keep growing in length indefinitely. For example, indeterminate tomatoes are tall, late fruiting, and require staking for improved yield. (See also determinate.)
- infection.** The condition reached when a pathogen has invaded plant tissue and established a parasitic relationship between itself and its host.
- infiltration.** The movement of water into soil.
- inflorescence.** The arrangement of flowers on an axis or stem or a flower cluster.
- inflorescence collective.** A group of individual flowers. The grouping can take many forms, such as a spike (flowers closely packed along a vertical stem, e.g., snapdragons), an umbel or corymb (flowers forming a flattened dome, e.g., yarrow), a panicle (a complex hierarchical arrangement of flowers, e.g., hydrangeas), or a capitulum (tightly packed disc flowers, e.g., the center of a daisy).
- inoculation.** The introduction of a pathogen to a host plant's tissue.
- inoculum.** Any part of a pathogen that can cause infection.
- inorganic.** Being or composed of matter other than plant or animal.
- insectary plant.** A plant that attracts beneficial insects.
- insecticidal soap.** A specially formulated soap that is only minimally damaging to plants, but kills insects. Usually works by causing an insect's outer shell to crack, resulting in its interior organs drying out.
- insecticide.** A chemical used to control, repel, suppress, or kill insects.
- instar.** The stage of an insect's life between molts.
- integrated control.** An approach that attempts to use several or all available methods for control of a pest or disease.
- integrated insect control.** The use of a variety of insect control methods, beginning with simpler methods and progressing to include aspects from all types of control.
- integrated pest management.** A method of managing pests that combines cultural, biological, mechanical, and chemical controls, while taking into account the impact of control methods on the environment.
- intensive gardening.** The practice of maximizing use of garden space, for example by using trellises, intercropping, succession planting, and raised beds.
- intercalary meristem.** Found mostly in monocots, these cells divide and provide the growth of the leaf from the base of the plant.
- intercropping/Interplanting.** The practice of mixing plants to break up pure stands of a single crop.
- internode.** The area of the stem that is between the nodes.
- interstem, interstock.** The middle piece of a graft combination made up of more than two parts, i.e., the piece between the scion and the rootstock. Often has a dwarfing effect.
- invasive.** Growing vigorously and outcompeting other plants in the same area; difficult to control.
- ion.** An electrically charged particle. In soils, an ion refers to an electrically charged element or combination of elements resulting from the breaking up of an electrolyte in solution.
- isolation.** The separation of a pathogen from its host by culturing on a nutrient medium or on an indicator plant.
- Isoptera.** A major order of insects that have two pairs of wings, or are wingless, and chewing mouthparts (termites).
- joint.** A node; the place on a stem where a bud, leaf, or branch forms.
- juvenile stage.** (1) The early or vegetative phase of plant growth characterized by the inability to flower. (2) The first stage of an insect's life cycle after the egg, either a larva or a nymph. (3) The immature stage of an organism.
- K.** See potassium.
- key, dichotomous.** A tool for plant or animal classification and identification. Consists of a series of paired statements that move from general to specific descriptions.
- knot garden.** A formal garden in which two or more kinds of plants with different-colored foliage, often herbs, are planted and pruned so they interweave and form a knot pattern.
- larva.** The immature form of an insect that undergoes complete metamorphosis. Different from the adult in form, a caterpillar, for example.
- latent bud.** Buds that do not grow for long periods of time and can become embedded in the enlarging stem tissue. These buds grow only when conditions necessary for their growth occur, such as drastic pruning. Not all plants have latent buds.

- lateral.** A branch attached to and subordinate to another branch or trunk.
- lateral bud.** An undeveloped shoot or flower that is found at the node. Also called the axillary bud.
- lateral meristem.** Cylinders of actively dividing cells that start just below the apical meristem and are located up and down the plant. Also called the vascular cambium.
- layering.** A method of stimulating adventitious roots to form on a stem. There are two primary methods of layering. In ground layering, a low-growing branch is bent to the ground and covered by soil. In air layering, a moist rooting medium is wrapped around a node on an aboveground stem.
- leaching.** Movement of water and soluble nutrients down through the soil profile.
- leader.** A developing stem or trunk that is longer and more vigorous than the laterals. (See also central leader.)
- leaf curl.** Rolling and curling of leaves.
- leaflet.** A single division of a compound leaf.
- leaf scar.** A visible, thickened crescent or line on a stem where a leaf was attached.
- lenticel.** A small opening on the surface of fruits, stems, and roots that allows gas exchange between internal tissues and the atmosphere.
- Lepidoptera.** A major order of insects that have two pairs of wings and sucking or siphoning mouthparts as adults and chewing mouthparts as larvae (moths, butterflies).
- lesion.** A localized area of discolored or dead tissue.
- life cycle.** The successive stages of the growth and development of an organism.
- lime.** A rock powder consisting primarily of calcium carbonate. Used to raise soil pH (decrease acidity).
- loam.** A soil with roughly equal proportions of sand, silt, and clay particles.
- lodge.** To fall over, usually due to rain or wind. Corn and tall grasses are examples of plants susceptible to lodging.
- long-day plant.** A plant requiring more than 12 hours of continuous daylight to stimulate a change in growth, e.g., a shift from the vegetative to reproductive phase. (See also short-day plant; day-neutral plant.)
- macronutrient.** Collectively, primary and secondary nutrients.
- macropore.** A large soil pore. Macropores include earthworm and root channels and control a soil's permeability and aeration.
- Mallophaga.** A major order of insects that are wingless and have chewing mouthparts (chewing lice).
- mandible.** The first pair of jaws on insects: stout and toothlike in chewing insects, needle or sword-shaped in sucking insects. The lateral (left and right), upper jaws of biting insects.
- maturity.** (1) In fruit, ripeness, usually the state of development that results in maximum quality. (2) The flowering phase of plant growth.
- mechanical insect control.** Manual removal of insects and eggs from infested plants.
- meristem.** Plant tissue in the process of formation; vegetative cells in a state of active division and growth, e.g., those at the apex of growing stems and roots and responsible for enlarging the stem diameter.
- mesophyll.** In between the epidermal layers, where photosynthesis occurs.
- metamorphosis.** The process by which an insect develops. (See also complete metamorphosis; simple metamorphosis.)
- microclimate.** Climate affected by landscape, structures, or other unique factors in a particular immediate area.
- micronutrient.** A nutrient, usually in the parts per million range, used by plants in small amounts, less than 1 part per million (boron, chlorine, copper, iron, manganese, molybdenum, zinc, and nickel).
- micropore.** A fine soil pore, typically a fraction of a millimeter in diameter. Micropores are responsible for a soil's ability to hold water.
- microscopic.** Organisms so small that they can be seen only with the aid of a microscope.
- mixed buds.** Buds that produce both shoots and flowers.
- mixed fertilizer.** A fertilizer that contains at least two of the three macronutrients (N, P, K).
- modified central leader.** A system of pruning used primarily on fruit trees. The central leader is encouraged for the first few years, then suppressed. This system allows for well-placed scaffolds and strong crotches, but keeps the tree's crown relatively close to the ground for easy harvesting.
- molt.** The shedding of exoskeleton during insect growth. The form assumed between molts is called an instar.
- monochromatic.** In landscaping, use of the various tints, shades, and hues of only one color.
- monocot.** See monocotyledon.
- monocotyledon.** Plants with one seed leaf. Also referred to as monocot.
- monoecious.** Plants that have imperfect flowers (male and female) occurring on the same plant (e.g., corn).
- morphology.** The study of the origin and function of plant parts.

- mosaic.** Nonuniform foliage coloration with a more or less distinct intermingling of normal green and light-green or yellowish patches.
- mottle.** An irregular pattern of light and dark areas.
- mulch.** Any material placed on the soil surface to conserve soil moisture, moderate soil temperature, and/or control weeds. Wood chips, bark chips, and shredded leaves are mulches that eventually add organic matter to the soil; inorganic materials such as rocks are also used.
- mutation.** A genetic change within an organism or its parts that changes its characteristics. Also called a bud sport or sport.
- mycelia.** Masses of fungal threads (hyphae) that make up the vegetative body of a fungus.
- mycology.** The study of fungi.
- mycoplasma.** See phytoplasm.
- mycorrhizae.** Beneficial fungi that infect plant roots and increase their ability to take up nutrients from the soil.
- N.** See nitrogen.
- native plant.** A plant indigenous to a specific habitat or area.
- naturalize.** (1) To design a garden with the aim of creating a natural scene. Planting generally is done randomly and space is left for plants to spread at will. (2) The process whereby plants spread and fill in naturally.
- necrosis.** Death of tissue.
- nectaries.** Cells of the petal of a flower that secrete nectar.
- nematicide.** A material that kills or protects against nematodes.
- nematode.** Microscopic roundworms that live in soil and living tissue, as well as water, and survive as eggs or cysts.
- nitrate.** A plant-available form of nitrogen contained in many fertilizers and generated in the soil by the breakdown of organic matter. Excess nitrate in soil can leach to groundwater. (See also nitrogen cycle.)
- nitrifier.** A microbe that converts ammonium to nitrate.
- nitrogen.** A primary plant nutrient, especially important for foliage and stem growth.
- nitrogen cycle.** The sequence of biochemical changes undergone by nitrogen as it moves from living organisms to decomposing organic matter, to inorganic forms, and back to living organisms.
- nitrogen fixation.** The conversion of atmospheric nitrogen into plant-available forms by rhizobia bacteria living on the roots of legumes.
- node.** The area of the stem that bears a leaf or a branch. The joint of a stem.
- nomenclature.** The assigning of names in the classification of plants.
- nonpoint source.** A relatively small, nonspecific source of pollutants that, when added to other sources, may pose a significant threat to the environment. (See also point source.)
- nonselective pesticide.** A pesticide that kills most plants or animals.
- nonviable.** Not alive; nonviable seeds may look normal but will not grow.
- noxious weed.** (1) Weeds that have been declared by law to be a species having the potential to cause injury to public health, crops, livestock, land, or other property. (2) A very invasive, difficult to control plant.
- N-P-K.** Acronym for the three major plant nutrients contained in manure, compost, and fertilizers. N stand for nitrogen, P for phosphorus, and K for potassium.
- nucleus.** The organelle within a cell that contains chromosomes and thus controls various cellular processes, including division into new cells.
- nutrient.** Any substance, especially in the soil, that is essential for and promotes plant growth. (See also macronutrient; micronutrient.)
- nymph.** The immature stage of an insect that undergoes simple metamorphosis. Usually similar in form to the adult.
- offset.** A new shoot that forms at the base of a plant or in a leaf axil.
- oil.** See horticultural oil.
- open-pollinated seed.** Seed produced from natural, random pollination so that the resulting plants are varied.
- opposite leaf arrangement.** Two leaves attached at the same point on the stem, but on opposite sides.
- organelle.** A structure within a cell, such as a chloroplast, that performs a specific function.
- organic.** (1) Relating to, derived from, or involving the use of food produced with the use of feed or fertilizer of plant or animal origin without employment of synthetically formulated fertilizers, growth stimulants, antibiotics, or pesticides. (2) Being or composed of plant or animal matter. (3) A labeling term that refers to an agricultural product produced in accordance with government standards.
- organic fertilizer.** A natural fertilizer material that has undergone little or no processing. Can include plant, animal, and/or mineral materials.
- organic matter.** Any material originating from a living organism (peat moss, plant residue, compost, ground bark, manure, etc.).
- organic pesticide.** Pesticides derived from plant or animal sources.

- organic production.** The production of food using accepted naturally occurring materials.
- organism.** A living being.
- ornamental plant.** A plant grown for beautification, screening, accent, specimen, color, or other aesthetic reasons.
- Orthoptera.** A major order of insects that have two pairs of wings, or are wingless, and chewing mouthparts (grasshoppers, crickets, and cockroaches).
- osmosis.** Passage of materials through a membrane from an area of high concentration to an area of lower concentration.
- outer seed coat.** The protective outer shell of a seed.
- ovary.** The part of a flower containing ovules that develop into seeds upon fertilization. Along with the style and stigma, it makes up the pistil (female sexual organ).
- ovule.** Within the ovary, a tissue/structure that develops into a seed after fertilization.
- oxidative respiration.** The chemical process by which sugars and starches are converted to energy. In plants, known as respiration.
- P.** See phosphorus.
- palisade mesophyll.** The cells just beneath a leaf's upper epidermis that contain most of the leaf's chlorophyll and that are responsible for most photosynthesis.
- palmate.** (1) A leaf whose veins radiate outward from a single point somewhat like the fingers of a hand. (2) A form of espalier training.
- parasite.** An organism that lives in or on another organism (host) and derives its food from the latter.
- parasitic seed plant.** A plant that lives parasitically on other seed plants. An example is mistletoe.
- parterre.** A formal garden in which shrubs, flowers, and paths form a geometric pattern of matched pairs.
- parthenocarpic.** Development of fruit without fertilization.
- pathogen.** Any organism that causes disease.
- pathology.** The study of plant disease.
- ped.** A cluster of individual soil particles.
- pedicel.** The stem of an individual flower.
- peduncle.** The main stem supporting a cluster of flowers (as opposed to a pedicel, which is the stem of an individual flower).
- pendulous.** More or less hanging or declined.
- perennial.** A plant that lives more than two years and produces new foliage, flowers, and seeds each growing season.
- perfect flower.** A type of flower with both stamens and pistils.
- perianth.** Collectively, sepals and petals form the perianth.
- permanent wilting point.** The point at which a wilted plant can no longer recover.
- permeability.** The rate at which water moves through a soil.
- persistent.** (1) Adhering to a position instead of falling, whether dead or alive, e.g., flowers or leaves. (2) A pesticide that retains its chemical properties in the soil for a long time.
- petals.** Part of a flower, the floral structure inside the sepals, often brightly colored.
- petiole.** The stalk of a leaf.
- pH.** The acidity or alkalinity of a solution on a scale of 0–14, with a value of 7 signifying neutral, values below 7 signifying acidic, and values above 7 signifying alkaline. Relates to the concentrations of hydrogen (H⁺) ions in the soil. pH values are logarithmic.
- phenological stage.** Crop development stage.
- pheromone.** A vapor or liquid emitted by an insect that causes a specific response from a receiving insect. Some pheromones are used to find a mate. Synthetic pheromones are used as attractants in insect traps.
- ploem.** The principle nutrient-conducting structure of vascular plants.
- phosphate.** The form of phosphorus listed in most fertilizer analyses.
- phosphorus (P).** A primary plant nutrient, especially important for flower production. In fertilizer, usually expressed as phosphate.
- photoperiod.** The amount of time a plant is exposed to light.
- photosynthate.** A food product (sugar or starch) created through photosynthesis.
- photosynthesis.** Formation of carbohydrates from carbon dioxide and a source of hydrogen (as water) in the chlorophyll-containing tissues of plants exposed to light.
- phototropism.** The phenomenon of plants growing toward the direction of a light source.
- physiology.** The study dealing with the functioning of plants, their mechanisms of response, and their physical and biochemical processes.
- phytoplasm.** Microscopic, single-celled organisms that lack distinct cell walls and that cause destructive diseases in plants.
- phytotoxic.** Toxic to a plant.
- picotee.** A pattern of flower petal coloration in which the edges of the petal are in a color that contrasts with the flower body.

- pinch.** To remove a growing tip from a stem, thus causing axillary shoots or buds to develop. (See also deadhead; shear.)
- pistil.** The female component of the flower. It is in the center of the flower and has three parts, the stigma, the style, and the ovary.
- pistillate.** Female flowers; flowers with no stamens (pistils only), also called imperfect because they lack the stamen.
- plant classification.** The scientific grouping and naming of plants by characteristics.
- plant disease.** Any lasting change in a plant's normal structure or function that deviates from its healthy state.
- plant growth regulator.** See growth regulator.
- plant nutrition.** A plant's need for and use of basic chemical elements. (See also macronutrient; micronutrient.)
- plant pathology.** The study of diseases in plants: what causes them, what factors influence their development and spread, and how to prevent or control them.
- plant tissue culture.** Plant material grown *in vitro* under sterile conditions in an artificial medium. A primary means of rapidly increasing the number of plants from a single mother plant.
- pleach.** To intertwine branches of trees, vines, or shrubs to form an arbor or hedge.
- pleniflora.** A term used in botanical names to indicate a double-flowered cultivar. (See also double.)
- plumule.** The shoot portion of an embryo.
- point source.** A single, identifiable source of pollutants such as a factory or municipal sewage system. (See also nonpoint source.)
- pollard.** A method of tree pruning that involves heading back severely to main branches each year so as to produce a thick, close growth of young branches.
- pollen.** A plant's male sex cells, which are held on the anther for transfer to a stigma by insects, wind, or some other mechanism.
- pollenizer.** A plant whose pollen sets fruit on another plant. (See also cross-pollination.)
- pollen tube.** A slender tube growing from the pollen grain that carries the male gametes and delivers them to the ovary.
- pollination.** The first step in fertilization; the transfer of pollen from anther to a stigma.
- pollinator.** An agent such as an insect that transfers pollen from a male anther to a female stigma.
- polychromatic.** In landscaping, use of all the colors and their tints, shades, and tones.
- pome fruit.** A fruit having a core, such as an apple, pear, or quince.
- pomology.** The science of fruits and the art of fruit culture, especially tree fruits.
- postemergent.** A product applied after crops or weeds emerge from the soil.
- potash.** The form of potassium listed in most fertilizer analyses.
- potassium (K).** A primary plant nutrient, especially important for developing strong roots and stems. In fertilizers, usually expressed as potash.
- powdery mildew.** Fine, white to gray, powdery fungal coating on leaves, stems, and flowers.
- predator.** An animal that eats another animal.
- preemergent.** A product applied before crops or weeds emerge from the soil.
- preharvest interval.** The amount of time that must elapse (legally) after application of a pesticide before harvest takes place.
- preplant.** A product applied before a crop is planted.
- prickle.** A rigid, straight, or hooked outgrowth of bark or stems. Often called a thorn, but technically different. Roses are examples of plants with prickles. (See also thorn.)
- primary nutrient.** A nutrient required by plants in a relatively large amount (nitrogen, phosphorus, and potassium).
- primocane.** First-year growth, usually vegetative, on caneberrries. Only fall-bearing raspberries produce fruit on primocanes in late summer.
- processed fertilizer.** A fertilizer that is manufactured or refined from natural ingredients to be more concentrated and more available to plants.
- propagate.** To start new plants by seeding, budding, grafting, dividing, etc.
- prune.** To remove plant parts to improve a plant's health, appearance, or productivity.
- pseudobulb.** A thickened, aboveground, modified stem that serves as a storage organ. Found in some orchids.
- Psocoptera.** A major order of insects that have two pairs of wings, or are wingless, and chewing mouthparts (barklice, booklice).
- pubescent.** Hairy.
- pupa.** The stage between larva and adult in insects that go through complete metamorphosis.
- quarantine.** A regulation forbidding sale or shipment of plants or plant parts, usually to prevent disease, insect, nematode, or weed invasion in an area.
- quick-release fertilizer.** A fertilizer that contains nutrients in plant-available forms such as ammonium and nitrate. Fertilizer is readily soluble in water.

- raceme.** A flower stalk on which the florets start blooming from the bottom of the stem and progress toward the top.
- radial spacing.** The horizontal spacing of branches around a trunk.
- radicle.** The root portion of an embryo.
- region of maturation.** The area of the root where the enlarged root cells turn into the various root tissues.
- regulatory insect.** Term used to describe insects that have an unknown impact in a new environment to which they may be moved.
- relative humidity.** The ratio of water vapor in the air to the amount of water the air could hold at the current temperature and pressure.
- resistance.** The ability of a host plant to prevent or reduce disease development by retarding multiplication of the pathogen within the host.
- respiration.** The process by which carbohydrates are converted into energy. This energy builds new tissues, maintains the chemical processes, and allows growth within the plant.
- reversion growth.** A stem that originates from and has the characteristics of the plant's rootstock. (See also sucker.)
- rhizobia bacteria.** Bacteria that live in association with roots of legumes and convert atmospheric nitrogen to plant-available forms, a process known as nitrogen fixation.
- rhizome.** A stem that forms the main axis of the plant. Can form at or just below the ground (for example, in bearded iris).
- rhizosphere.** The thin layer of soil immediately surrounding plant roots.
- rogue.** To uproot or destroy diseased or atypical plants.
- root and stem rot.** Soft and disintegrated roots and lower portions of the stem; sometimes results in the death of the plant.
- root bound.** A condition in which a plant's roots have completely filled its container. Typically, the roots begin to encircle the pot's outer edge. Further growth is prevented until the plant is removed from the container.
- root cap.** The cells that protect the root tip as it pushes through the soil. These cells slough off and are replaced by others as the roots grow downward.
- root cutting.** An asexual method of propagation that involves removing a section of root from a 2–3-year-old plant during the dormant season and placing it into growing medium.
- root hair.** Thin hair-like structure that grows from the epidermis of the region of maturation of the root. This structure absorbs water and nutrients from the soil.
- root knots.** Swelling and deformation of roots.
- root meristem.** A type of apical meristem located at the tips of roots. Provides for elongation of the roots and produces the cells that will become the epidermis, cortex, xylem, cambium, and phloem of the mature root.
- root pruning.** The cutting or removal of some of a plant's roots.
- rootstock.** The portion of a plant used to provide the root system and sometimes the lower part of the stem for a grafted plant.
- root sucker.** See sucker.
- rosette.** A small cluster of leaves radially arranged in an overlapping pattern.
- rot.** Decomposition and destruction of tissue.
- rotation.** The practice of growing different plants in different locations each year to prevent the buildup of soilborne diseases and insect pests.
- row cover.** A sheet of synthetic material used to cover plants in order to retain heat and exclude insect pests.
- rugose.** Wrinkled.
- runner.** See stolon.
- russet.** Yellowish-brown or reddish-brown scar tissue on the surface of a fruit. Also naturally occurring tissue on potato tubers.
- rust.** Raised pustules on leaves, stems, and fruits; contain yellow-orange or rust-colored spore masses.
- sand.** The coarsest type of soil particle.
- sanitation.** The removal and disposal of infected plant parts; decontamination of tools, equipment, hands, etc.
- saprophyte.** An organism that can subsist on nonliving matter.
- scab.** Slightly raised, rough areas on fruits, tubers, leaves, or stems.
- scaffold branches.** The principal branches of a tree or shrub arising from the trunk or another main branch to form the plant's framework.
- scale.** (1) A modified leaf that protects a bud. (2) A type of insect pest.
- scarification.** Artificial methods to soften the seed coat, including scratching or rupturing the seed coat with sandpaper, nicking it with a knife, or degrading it with concentrated acid.
- scion.** The portion of a plant or cultivar that is grafted onto a separate rootstock, consisting of a piece

- of shoot with dormant buds that will produce the stem and branches.
- secondary nutrient.** A nutrient needed by plants in a moderate amount: calcium, magnesium, and sulfur. (See also macronutrient; primary nutrient.)
- secondary root.** A type of root system that forms after the primary root emerges from a seed and branches outward.
- seed.** Matured ovule that occurs as, or in, mature fruits.
- seed coat.** The outer layer of a seed that provides protection for the enclosed embryo.
- seed coat impermeability.** Caused by a hard seed coat that is impermeable to water, preventing the seed from germinating.
- seed dormancy.** An adaptive feature of some plants to keep the seeds from germinating until conditions exist that favor seedling survival.
- seed leaf.** See cotyledon.
- seed scarification.** Involves breaking, scratching, or softening the seed coat so that water can enter and begin the germination process.
- selective pesticide.** A pesticide that kills only certain kinds of plants or animals; for example, 2,4-D kills broadleaf lawn weeds but leaves grass largely unharmed.
- self-fertile.** A plant that produces seed with its own pollen.
- self-fruitful.** A plant that bears fruit through self-pollination.
- self-pollination.** Pollination that can occur when the anther and stigma are in the same flower or if the anther and stigma are in different flowers on the same plant or in different flowers on different plants of the same species, variety, or cultivar.
- self-sterile.** A plant that needs pollen from another species, variety, or cultivar (e.g., cross-pollination).
- self-unfruitful.** A plant that requires another variety for pollination. (See also pollenizer.)
- senescence.** The aging process. Also used to describe a plant that is in the process of going dormant for the season, although technically only the parts that are dying (the leaves) are becoming senescent.
- sepal.** The outer covering of the flower when it is in the bud stage. They are leaflike in structure and usually green; however, they can be colored and look like petals, as in tulips. They may fold back as in roses or remain upright as with carnations. Together, all the sepals form the calyx.
- separation.** A term applied to a form of propagation by which plants that produce bulbs or corms multiply.
- sessile.** Stalkless and attached directly at the base, as in sessile leaves.
- shear.** To cut back a plant (as opposed to selective pruning or deadheading). Often used to regenerate plants with many small stems, where deadheading would be too time consuming.
- shoot.** One season's branch growth. The bud scale scars (ring of small ridges) on a branch mark the start of a season's growth.
- shoot meristem.** The apex of a shoot where cells actively divide to provide more cells that will expand and develop into the tissues and organs of the plant. Also called apical meristem.
- short-day plant.** A plant requiring more than 12 hours of continuous darkness to stimulate a change in growth, e.g., a shift from the vegetative to reproductive phase. (See also long-day plant; day-neutral plant.)
- shot hole.** Roughly circular holes in leaves resulting from the dropping out of the central dead areas of spots.
- shoulder ring.** One of the ridges around the base of a branch where it attaches to a trunk or to another branch. (See also collar.)
- shrub.** A woody plant that grows to a height of 3–12 feet. May have one or several stems with foliage extending nearly to the ground.
- side-dress.** To apply fertilizer to the soil around a growing plant.
- sign.** The part of a pathogen seen on a host plant.
- signal word.** An indication of toxicity on pesticide labels. Pesticides labeled “caution” are the least toxic, those labeled “warning” are more so, and those labeled “danger” are the most toxic.
- silt.** A type of soil particle that is intermediate in size between sand and clay.
- simple metamorphosis.** A type of insect development involving three stages: egg, nymph, and adult. The nymph usually resembles the adult. (See also complete metamorphosis.)
- Siphonaptera.** A major order of insects that have two pairs of wings, or are wingless, and piercing-sucking mouthparts as adults and chewing mouthparts as larvae (fleas).
- slow-release fertilizer.** A fertilizer material that must be converted into a plant-available form by soil microorganisms.
- smut.** Black masses of spores produced by fungi that may form on stems, ears, etc.
- soft pinch.** To remove only the succulent tip of a shoot, usually with the fingertips.
- soil.** A natural, biologically active mixture of weathered rock fragments and organic matter at the earth's surface.

- soiless mix.** A potting medium consisting of ingredients such as sphagnum peat moss and vermiculite but no soil.
- soil salinity.** A measure of the total soluble salts in a soil.
- soil solution.** The solution of water and dissolved minerals found in soil pores.
- soil structure.** The arrangement of soil particles or their aggregates.
- soil texture.** How coarse or fine a soil is. Texture is determined by the proportions of sand, silt, and clay in the soil.
- solitary flower.** A plant that forms a stalk that bears a single flower, such as a tulip.
- soluble salt.** A mineral (salt) often remaining in soil from irrigation water, fertilizer, compost, or manure applications.
- sonic repeller.** A sonic wave-emitting unit said to disrupt the activities of small mammals or insects but not proven to be effective.
- species.** A group of individual plants interbreeding freely and having many (or all) characteristics in common.
- specific epithet.** The second word in a Latin binomial. Sometimes called trivial name.
- specimen.** An individual plant with outstanding characteristics (leaves, flowers, or bark), generally used as a focal point in a landscape.
- split complementary.** In landscaping, use of a pure color and a color from either side of its complementary counterpart.
- spongy parenchyma.** The lower layer of cells in the mesophyll.
- spore.** (1) The reproductive body of a fungus or other lower plant, containing one or more cells. (2) A bacterial cell modified to survive in an adverse environment. (3) The reproductive unit of ferns.
- sport.** See mutation.
- spot treatment.** To apply a pesticide to a small section or area of a crop.
- spur.** Short, stubby stems common on fruit trees such as apples and pears. These spurs produce the flower buds.
- stamen.** The male, pollen-producing part of a flower consisting of the anther and its supporting filament.
- staminate.** Male flowers; flowers with no pistil (stamens only), also called imperfect because they lack the pistil.
- standard.** A plant pruned so that it consists of a single bare vertical stem, atop which a shaped mass of foliage, usually globular, is maintained.
- stem cutting.** A section of a stem prepared for vegetative propagation; forms adventitious roots on the stem.
- sterile.** (1) Material that is free of disease organisms (pathogens), as in a potting medium. (2) A plant that is unable to produce viable seeds.
- stigma.** The receptive surface on a pistil that receives pollen.
- stipules.** A pair of appendages found on many leaves where the petiole meets the stem.
- stock.** See rootstock.
- stolon.** A horizontal stem, either fleshy or semiwoody, that runs along a soil surface.
- stomate, stomata (plural).** An opening into a leaf that is formed by specialized epidermal cells on the underside (and sometimes upper sides) of the leaf.
- stone fruit.** A fleshy fruit, such as a peach, plum, or cherry, usually having a single hard stone that encloses a seed. Also called a drupe.
- strain.** A variation within a cultivar or variety.
- stratification.** Chilling seed under moist conditions. This method mimics the conditions a seed might endure after it falls to the ground in the autumn and goes through a cold winter on the ground.
- style.** On a pistil, a tube connecting the stigma and the ovary.
- stylet.** A nematode's lancetlike or needlelike mouthpart. Used to puncture and feed from plant cells.
- subapical meristem.** Aids in formation of shoots and flowering stalks.
- subspecies.** A major division of a species, more general in classification than a cultivar or variety.
- succession.** The progression of a plant community to a stable mixture of plants.
- succession planting.** (1) The practice of planting new crops in areas vacated by harvested crops. (2) Several smaller plantings made at timed intervals.
- sucker.** A shoot or stem that originates underground from a plant's roots or trunk or from a rootstock below the graft union. (See also reversion growth.)
- summer annual.** Annual plant in which the seed germinates in the spring and the plant develops, matures, and produces seed by the end of the growing season.
- summer oil.** A light refined horticultural oil used during the growing season to control insect pests and diseases.
- sunscald.** Winter or summer injury to the trunk of a woody plant caused by hot sun and fluctuating temperatures. Typically, sunscalded bark splits and separates from the trunk.

- surfactant.** See additive.
- susceptibility.** The condition of a plant in which it is prone to the damaging effects of a pathogen or other factor.
- sustainable gardening.** Gardening practices that allow plants to thrive with minimal inputs of labor, water, fertilizer, and pesticides.
- symbiotic.** Mutually beneficial.
- symptom.** Visible reaction of a plant to disease such as wilting, necrosis, abnormal coloration, defoliation, fruit drop, abnormal cellular growth, or stunting.
- synthetic fertilizer.** Chemically formulated fertilizers, mainly from inorganic sources.
- synthetic pesticide.** Chemically formulated pesticide, mainly from inorganic sources.
- systemic.** Spreading internally throughout the plant.
- systemic pesticide.** A pesticide that moves throughout a target organism's system to cause its death.
- taproot.** A type of root system that grows straight down with few lateral roots.
- taxonomy.** Classification or naming of plants or animals.
- temporary branch.** (1) A small shoot or branch left on a young tree's trunk for protection and nourishment. (2) A low lateral allowed to remain until a tree is tall enough to have scaffolds at the desired height.
- tender.** Not tolerant of frost and cold temperatures. In horticulture, tender does not mean weak or one that is susceptible to insect pests or diseases.
- tendrils.** A slender projection used for clinging, usually a modified leaf. Easily seen on vines such as grapes and clematis.
- terminal.** The tip (apex), usually of a branch or shoot.
- terminal bud.** The bud that is found at the tip of shoots.
- thatch.** A brown, fibrous, spongy layer located between the soil and the grass blades.
- thermoperiod.** The change in temperature from day to night.
- thermophilic.** Growing at high temperatures, as in microorganisms that break down organic matter in a hot compost pile.
- thin.** (1) To remove an entire shoot or limb where it originates. (2) To selectively remove plants or fruits to allow remaining plants or fruits to develop.
- thorn.** A hard, sharp-pointed, leafless branch. Hawthorn is an example of a plant that produces thorns. (See also prickly.)
- Thysanoptera.** A major order of insects that have two pairs of wings, or are wingless, and have rasping-sucking mouthparts (thrips).
- Thysanura.** A major order of insects that are wingless and have chewing mouthparts (silverfish, firebrats).
- tiller.** A shoot that arises from a plant's crown. Generally associated with grass species.
- tilth.** The state of aggregation of a soil, especially, in relation to its suitability for crop growth.
- tissue culture.** The process of generating new plants by placing small pieces of plant material onto a sterile medium.
- tolerant.** A plant that will produce a normal yield even if infested by a disease or insect pest. (See also immune; resistance.)
- top-dressing.** The practice of spreading a thin layer (¼ inch) of soil, compost, humus, or a sand and peat mix over the turf or soil.
- topiary.** A tree or shrub shaped and sheared into an ornamental, unnatural form, usually a geometric shape or the shape of an animal.
- totipotency.** The ability of any cell to develop into an entire plant.
- trace element.** See micronutrient.
- transpiration.** The loss of water through the leaf stomata. The transpired water comes from the photosynthetic process and also from water in the cells.
- tree.** A woody plant that typically grows more than 12 feet tall and has only one main stem or trunk.
- triadic.** In landscaping, use of three colors that are at equal distances from each other on the color wheel.
- trichomes.** The "hairs" that are extensions of the epidermal cells on a leaf.
- tropism.** The tendency of a plant part to turn in response to an external stimulus, either by attraction or repulsion, as a leaf turns toward light. (See also geotropism; phototropism.)
- trunk.** The main stem of a tree. Also called a bole.
- truss.** A flower cluster, usually growing at the terminal of a stem or branch.
- tuber.** A belowground stem used for food storage (e.g., potato).
- tuberous root.** An underground storage organ made up of root tissue. Sprouts only from the point at which it was attached to the stem of the parent plant. Dahlias are an example.
- tuberous stem.** A belowground stem consisting of a swollen hypocotyl, lower epicotyl, and upper primary root (for example, in tuberous begonias).

turgor. Cellular water pressure; responsible for keeping cells firm.

twig. A young stem (1-year-old or less) that is in the dormant winter stage (has no leaves).

umbel. A group of flowers growing from a common point on a stem.

understock. See rootstock.

USDA zones. Areas derived by the USDA that indicate average-low winter temperatures. Used as a plant hardiness indicator. Other plant hardiness zones developed by other entities use different numbering systems.

vaporization. The evaporation of the active ingredient in a pesticide during or after application.

variety. In the wild, a plant growing within a species that is different in some particular characteristic from other members of that species. When grown from seed, a variety will maintain all of its particular characteristics. Also called a botanical variety.

vascular pathogen. A disease-causing organism that invades primarily the conductive tissues (xylem or phloem) of the plant.

vascular system. The internal structure of the stem that transports water, minerals, and sugars throughout the plant.

vascular tissue. Water, nutrient, and photosynthate-conducting tissue. (See also xylem; phloem.)

vector. A living organism that is able to transmit or spread a pathogen.

vegetative bud. A type of bud that develops into shoots.

vegetative propagation. The increase of plants by asexual means using vegetative parts. Normally results in a population of identical individuals. Can occur by either natural means (e.g., bulblets, cormels, offsets, plantlets, or runners) or artificial means (e.g., cuttings, division, budding, grafting, or layering).

venation. The pattern of veins in leaves.

vernation. The arrangement of new leaves within an older leaf sheath (e.g., on a grass plant).

vertical spacing. The vertical space between branches on a tree.

viability. A seed's ability to germinate.

viable. Alive; seeds must be alive in order to germinate.

virulent. Capable of causing severe disease.

virus. An infectious agent composed of DNA or RNA, too small to see with a compound microscope. Multiplies only in living cells.

water-holding capacity (WHC). The ability of a soil's micropores to hold water for plant use.

water-soaking. Lesions that appear wet and dark and usually are sunken and or translucent. Often a symptom of bacterial disease.

water sprout. A vigorous shoot originating above the ground on a plant's trunk, older wood, or bud union. Usually breaks from a latent bud. Often the result of heavy pruning.

weed-and-feed. A combination fertilizer and herbicide sometimes used on lawns.

whorled leaf arrangement. Three or more leaves attached at the same point on a stem.

wilt. Drooping and drying plant parts due to interference with the plant's ability to take up water and nutrients.

wilting point. Point at which the water content within plant cells is low enough that cellular turgor is lost and the plant wilts.

winter annual. Annual plant in which the seed germinates in the fall, producing a plant that overwinters, matures, and produces seed the following growing season.

witches' broom. Abnormal brushlike development of many weak shoots.

woody perennial. A plant that goes dormant in winter and begins growth in spring from aboveground stems.

xeric. A plant or landscape that conserves water. Most xeric plants need minimal supplemental water after an establishment period (18–24 months after planting) unless there is extreme drought.

xylem. The principal water-conducting tissue of vascular plants.

zone of elongation. The area of the root where the cells expand.

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