

# Agencies and Organizations Interested in Trees

International Society of Arboriculture – <https://www.isa-arbor.com/>

National Arbor Day Foundation – <https://www.arborday.org/>

Virginia Cooperative Extension – <https://www.ext.vt.edu/>

Virginia Cooperative Extension Publications – <https://pubs.ext.vt.edu/>

Virginia Department of Forestry – <https://www.dof.virginia.gov/>

Virginia Native Plant Society – <https://vnps.org/index.htm>

Virginia Tech Urban Forestry Program: <https://www.urbanforestry.frec.vt.edu>

Virginia Urban Forest Council – <https://treesvirginia.org/>

U.S. Department of Agriculture Forest Service – <https://www.fs.usda.gov/>



## Glossary

**abiotic** – plant disorders caused by nonliving factors

**absorbing root** – extracts water and nutrients from the soil for structural roots to carry to rest of tree

**achene** – a small, dry one seeded fruit

**A Horizon** – organic-rich layer at the top of soil

**adaptability** – genetic ability of a plant to adjust to different environments

**acidic** – having a pH less than 7

**acclimation** – process by which organisms adapt to a different environment

**adventitious bud** – replacement for lost normal buds along stems or surface of roots; see also watersprout and sucker

**air tillage** – preparation of the soil by using an air tool without damaging large structural roots. alkaline – having a pH higher than 7

**alternate** – having one leaf per node and leaves in alternating positions on the stem

**amino acids** – organic compounds that combine to form proteins

**anatomy** – the structure and composition of the plant

**angiosperm** – plant with seeds protected by a fruit or nut

**anthocyanin** – a blue, violet or red pigment found in plants

**annual growth ring** – ring of xylem visible in cross section of tree trunk

**apical dominance** – terminal bud inhibits the growth and development of lateral buds on the same stem

**apical meristem** – undifferentiated tissue producing elongation (growth) at tips of roots or shoots

**arboriculture** – the study of trees and other plants

**asexual reproduction** – creating new plants through vegetative means such as stem cuttings, root cuttings, tissue culture and grafting

**auxins** – plant hormones that regulate many plant activities, such as growth

**B&B** – abbreviation for balled and burlapped (see below)

**balled and burlapped** – plant dug for transplant with root system and surrounding soil wrapped in burlap for moving

**bare-root** – plant dug for transplanting with soil removed from roots

**bark** – protective covering over branches and stem, created from cork cambium

**barrier zone** – new wood layer around reaction zone to prevent outward spread of damage from injury; see compartmentalization

**basal sucker** – undesirable shoot arising from the roots or root flare

**bark tracing** – remedial removal of loose bark resulting from injury

**berry** – a fleshy fruit without a stone

**binomial nomenclature** – scientific naming system that uses the genus and species epithet of the plant for identification; Latin designations

**B Horizon** – mixture of organic material from the A Horizon and soils from the underlying parent rock

**biotic agent** – living agent, such as an insect, that causes damage to plants

**branch bark ridge** – areas of a tree's crotch where the growth and development of the branch against the trunk (or another branch) pushes the bark into a ridge

**branch collar** – raised ridge surrounding the area where a branch joins another branch or trunk, created by overlapping xylem tissue

**broad leaf** – tree with flat, thin leaves rather than needles

**broad-spectrum herbicide** – general-formula herbicide that kills both grasses (monocots) and broadleaf plants (dicots)

**bud** – meristematic tissues that will become a new shoot bud scales

**buttress roots** – roots at the base of the trunk; see root flare

**cambium** – layer of meristematic cells that divide and specialize into the phloem and xylem, creating an increase in diameter of the tree

**canker** – localized dead areas in the wood surrounded by healthy tissue and/or bark, often caused by fungi

**canopy** – branches and foliage of the tree supported by the scaffold branches

**carotenoids** – a yellow, orange and/or red pigment found in plants

**cell wall** – outer covering of plant cells formed by successive layers of cellulose fibers

**cellulose** – fibers laid down around a plant's cell membrane; increasing fiber layers create a slightly rigid cell wall

**chemical factors** – contamination from herbicides, fertilizers, salts and other outside agents

**classification** – identifying plants according to their taxonomic groups

**chloroplasts** – specialized bodies within plant cells that carry chlorophyll; sites of photosynthesis

**chlorophyll** – green pigment in plant cells; absorbs light energy for photosynthesis

**chlorosis** – general yellowing of leaves because of lack of chlorophyll

**coarse-rooted system** – one of two main root systems; system of most trees in Virginia; large and small woody and nonwoody roots that branch; see fibrous root system

**catkins** – small, petal-less flowers that hang like string from some trees. The flower clusters are usually all male or all female.

**capsule** – a membrane that encloses seeds

**CODIT** – Compartmentalization of Decay in Trees; see compartmentalization

**codominant leader** – occurs when the primary vertical branch of the tree forks or another lateral branch produces a competitive vertical; results in strongly forked trees

**columnar form** – tall, narrow and upright branches/growth habit

**compacted soil** – see soil compaction

**compartmentalization** – model of tree adaptation to wounding proposed by Dr. Alex Shigo in which trees seal off damage by constructing "walls" to prevent spread of decay

**compound leaf** – leaf composed of a number of smaller leaflets

**conifer** – cone-bearing tree

**conk** – a fibrous but sometimes fleshy fruiting body of a wood-rotting fungus

**container-grown** – nursery-produced tree that has been transplanted into a container and grown one season before transplanting

**contaminants** – chemicals or other pollutants

**cork cambium** – lateral meristem that produces cork to protect the roots and stems of a plant

**croch angle** – angle of attachment where a branch forms from the trunk or another branch

**crown** – the leaves and branches from the lowest branch to the top of the tree

**crown cleaning** – pruning to remove only dead and/or diseased limbs

**crown raising** – selective pruning to remove or reduce lower branches, often to improve clearance or visibility

**crown reduction** – selective pruning of branches to a lateral to reduce crown height or canopy spread; NOT the same as topping

**crown thinning** – selective removal of branches for health, safety, appearance or usefulness

**cultivar** – a cultivated variety of a plant which is propagated not from seed but from vegetative matter, such as plant tissue.

**cuticle** – waxy layer outside the epidermis of a leaf

**cutting** – asexual propagation method involving rooting a shoot that has been cut from a parent plant

**cytoplasm** – jelly-like living material of each cell

**damage pattern** – physical areas and time frame in which damage occurs

**decay** – obvious symptom of pathogen damage

**deciduous** – trees and shrubs that lose their leaves in the fall

**decurrent** – rounded growth habit of crown; no main vertical leader in mature tree

**defoliate** – to lose leaves

**dehiscent** – the splitting or opening of a plant structure to release seed

**dichotomous key** – identification process using either/or choices to determine the correct species based on matching traits

**dieback** – death of specific portions of the crown but not all of it

**dioecious** – plant with unisexual flowers with each sex confined to a separate plant

**directional pruning** – each pruning cut is made so that the lateral branch left below the cut will grow in an acceptable direction

**disorder** – an ailment or any other disruption of a tree's normal health and behavior

**dormant** – state of reduced physiological activity

**drainage** – rate and extent of water moving down through soil, determined by soil structure and content

**dripline** – outer boundaries of a tree's canopy

**drupe** – a fleshy fruit with a thin skin and a central stone containing the seed

**early wood cells** – larger, lighter color cells of annual growth ring

**easement** – legal right of utility, local government or other party to somehow use or cross someone else's property

**ectomycorrhizae** – beneficial fungi that colonize the outside surfaces of plant roots

**endomycorrhizae** – beneficial fungi that colonize within the tissues of plant roots

**entire** – smooth leaf margin (without serration or lobes)

**environmental factor** – light, moisture, temperature and other external factors that affect the growth of a tree

**epidermis** – top and bottom surfaces of leaf blade

**essential elements** – minerals essential to the normal growth and development of plants

**evergreens** – trees that hold their leaves more than one year

**excurrent** – crown develops with a strong leader; pyramidal growth form

**exotic** – a plant that is not native to the area in which it is growing

**exudates** – a substance secreted by a plant

**fibrous root system** – one of two main root systems; common in palms and grasses; develops dense network of fine lateral roots; see coarse-rooted system

**field capacity** – the amount of soil moisture or water content held in the soil after excess water has drained and downward movement has decreased. Also known as the available water capacity.

**field guide** – reference book with simple keys to identifying plants

**flagging** – condition in which some leaves wilt and turn brown but not all; they stay on tree

**foliage** – leaves of the tree

**follicle** – a dry, single chambered fruit that opens only on one side to release seed

**genotype** – inherited genetic traits

**genus** – taxonomic group of species having similar genetic traits

**girdling roots** – roots growing in a circular pattern resulting from limited space; if not treated, the roots will constrict the flow of water and nutrients to the tree

**grafting** – asexual propagation method involves taking dormant scion cuttings or buds from the desired tree and inserting or binding them to a chosen rootstock; often used to produce dwarf trees

**gravitropism** – growth response to gravity (shoot response negative, root response positive)

**guard cells** – pair of cells that regulate the opening and closing of stomata (leaf pore openings)

**gymnosperm** – plants that produce unprotected seeds between the scales of a cone

**habit** – normal growth form

**hardiness** – ability of a plant to survive low temperatures (may also imply ability to survive other stresses)

**hardwood** – trees whose cells are additionally stiffened by the presence of lignin in the cell walls

**heading cuts** – cutting small branches back to buds or lateral branches to direct future growth

**heart roots** – (see striker roots)

**heartwood** – inner area of the tree composed of older, nonfunctional xylem tissue

**herbarium** – a reference collection of plants

**herbicide** – chemicals formulated to kill plants

**horizon** – designated layer of materials within a soil profile

**included bark** – bark pinched between two branches or between a branch and the trunk, preventing formation of a branch bark ridge

**indehiscent** – seeds do not open at maturity; rely on predation or decomposition to release seeds

**inner bark** – short-lived phloem through which food travels from leaves to the rest of the tree; eventually becomes part of outer bark

**internode** – area of stem between (not including) two successive nodes

**invasive exotics or invasive non-natives** – introduced plant species that have the capacity to overrun areas where they are established

**lateral meristem** – designated the cambium

**layer lateral bud** – vegetative bud on the side of a stem

**lateral root** – side-branching root that grows horizontally

**late wood cells** – smaller, darker cells of annual growth ring

**layering** – gently bending shoots to the ground and covering with soil until they root; not normally used to propagate trees

**leaching** – tendency of elements to wash down through the soil

**leader** – primary terminal shoot or trunk of a tree

**leaf blade** – large flattened surface that absorbs sunlight

**leaf necrosis** – parts of leaf die; causes vary

**leaf scar** – mark left on twig after leaf falls

**lenticels** – openings in bark to allow exchange of gases

**lesion** – abnormality on bark or branch; visible symptom of a wound or injury

**lignin** – materials accumulated in the cell walls of some trees that lend additional stiffening to the cells

**macropores** – larger spaces between soil particles

**marcescence** – is the retention of dead plant organs such as leaves that normally are shed

**mechanical injury** – physical damage from impact, wind or other nonliving factors

**mechanical tillage** – preparation of soil by mechanical agitation of various types, such as digging, stirring, and overturning.

**meristems** – areas of undifferentiated tissues where cell division (growth) takes place

**microclimate** – areas where the overall climate is altered by landforms, buildings or other factors that affect the temperature, drainage or other parts of the environment

**micropores** – smaller spaces between soil particles

**monoculture** – consisting of one variety or species; vulnerable to disease or pests

**monoecious** – having both sexes on the same plant

**morphology** – form or shape

**mycorrhizae** – fungi that form a symbiotic association with plant roots

**native** – a plant that grows naturally in an area, not cultivated or introduced from another region

**natural target pruning** – pruning method that follows the natural protective methods of the tree; limbs are removed without damage to the branch collar

**natural variation** – differences in plant morphology or growth habit that arise from naturally occurring genetic differences

**node** – slightly enlarged portion of a stem where leaves and buds arise

**nodule** – swelling on a root of a plant that contains bacteria

**nut** – a fruit composed of a hard shell with a seed inside

**opposite** – leaves situated two at each node, positioned across from each other on the stem

**organic acids** – assist in the metabolism of plant materials

**osmosis** – diffusion of water through a semi-permeable membrane (cell to cell) from a region of higher water potential to a region of lower water potential

**outer bark** – external layer of dead cells full of wax that protect the tree from various environmental hazards; eventually cracks and sloughs off as new layers develop underneath it; thickness varies by species

**pathogens** – disease-causing agents

**pathological** – related to disease

**pests** – living agents, such as insects, that carry diseases or cause other damage to trees

**petiole** – stalk of a leaf

**pH** – measure of acidity or alkalinity

**phenolic** – compounds produced by the plant in response to stress

**pith** – core of smaller branches

**phenotype** – physical traits

**phloem** – food-conducting tissues of the tree

**photoperiod** – length of daylight required for certain developmental processes of plants such as growth and flowering to occur

**photosynthate** – carbohydrate (compound containing carbon and water) created during photosynthesis

**photosynthesis** – chemical process used by chlorophyll-carrying plants in which light energy is used to form organic compounds from water and carbon dioxide

**phototropism** – growth response of plants toward light

**pod** – a case that holds the seeds of a plant

**pome** – fleshy fruit that contains a central core holding seeds

**pore** – air space between particles in soil

**porosity** – total pore space in a soil

**primary growth** – elongation of shoots and roots resulting from cell division at apical meristems

**primary meristem** – apical meristem occurring at the tip of shoots or roots

**protected site** – site blocked from wind or severe weather by the presence of other trees, buildings or other formations

**protoplasm** – the living material within cells

**pruning saw** – saws designated specifically for use in removing tree limbs; saw shapes and tooth configurations vary according to intended use

**pyramidal form** – wider at the bottom, becoming narrower and tapering to a point at the top

**range** – geographic area where a plant occurs naturally

**ray cells** – tissues that extend radially across the xylem and phloem of a tree

**reaction wood** – reaction of tree tissue to contain the damage from a wound or injury; see compartmentalization

**respiration** – energy-releasing process in which carbohydrates are combined with oxygen

**restoration pruning** – used to repair mechanical or storm damage

**root apex** – small tip of the root where growth and development starts

**root cap** – protective tissue at the tip of a root

**root flare** – widened area where the tree trunk spreads out into the root system; sometimes also called root collar

**root hair** – microscopic outgrowths from main root that aid in absorbing water and nutrients

**rounded form** – growth in a cylindrical shape

**rhizosphere** – small region surrounding the roots that act as a microbiome; important for nutrient uptake

**samara** – type of dry fruit with a seed surrounded by a papery tissue

**sapwood** – outer wood that actively transports water and minerals

**scaffold branches/limbs** – major branches shaping the canopy

**scarification** – scratching or otherwise wearing through a tough seed coat so growth can begin

**secondary growth** – growth in cambium that increases diameter

**selective herbicide** – chemical formulation that kills a specific group of plants such as grasses (monocots) or broadleaf plants (dicots)

**senescence** – the process of aging brought on by shorter day length and low temperatures

**signs** – evidence of an agent causing damage to a tree, such as spores or mushrooms; see also symptom

**simple leaf** – single leaf

**sink** – plant part that uses more energy than it produces

**sinker roots** – grow downward from primary, secondary and tertiary roots as root anchors; do not contribute to or form their own branch hierarchy

**site clearance** – distance away from utility rights-of-way, roads and other obstructions

**site plan** – a sketch showing the conditions, environment and factors of a specific site

**soil analysis** – laboratory analysis to determine pH and mineral composition of soil

**soil compaction** – reduction of total pore space in a soil, resulting in restricted plant root growth, poor drainage and reduced available oxygen

**soil profile** – vertical section through a soil, showing depth of horizons

**soil structure** – arrangement of soil particles

**soil texture** – particle size of soil

**source** – plant part that produces photosynthates (carbohydrates)

**species** – groups of related organisms that can produce offspring

**spreading form** – open, irregular shape that may be wider than it is tall

**staking** – practice of externally supporting a newly planted tree; controversial and best used where strong winds are a factor

**stomata or stomates** – small pores on leaves and stems through which gases are exchanged

**stratification** – refrigerating seeds to simulate a natural cold cycle and allow growth to begin

**striker roots** – primary roots radiate from the root plate (buttress roots) and form branches of their own; also called heart roots

**structural pruning** – species-specific pruning of young trees to develop strong branch arrangement

**structural roots** – support the tree, transport water and nutrients, and store starches during dormancy

**structural soil** – rock and soil mixed in specific ratios to allow street tree roots to grow outward but also allow the soil to support pavement

**subordinate** – to remove lateral branches or the terminal portion of the parent branch to slow growth of the parent branch

**sucker** – undesirable shoot arising from the roots or root flare

**surface area** – encompasses the total outermost layer of something

**symptom** – changes in a plant's growth, function or appearance caused by a damaging agent; see also signs

**taper** – reduced thickness towards one end

**taproot** – central vertical root present in some young trees; growth is generally checked by development of other roots

**taxonomy** – classification and naming of organisms

**terminal bud** – primary growing point at the tip of a stem or branch

**tree physiology** – the study of how trees grow

**thinning** – selective removal of unwanted branches and limbs to provide air penetration into the crown of a tree and to lighten weight of branches

**tolerance** – adaptability to environmental conditions and other stresses

**topping** – reducing tree size by cutting back to stubs or laterals, resulting in heavy growth of undersized shoots

**topsoil** – uppermost layers of soil; A Horizon and B Horizon combined

**tracheids** – cells in the xylem that transport water throughout the plant

**transpiration** – loss of water as vapor through leaf openings

**transpirational pull** – the process by which water is pulled from the roots up the tree as a result of loss of water vapor through the leaves

**transplanting** – planting in a new location

**tree pit** – an open space in a sidewalk suitable for planting a tree

**trenching** – construction activity that damages tree roots

**tropism** – a response to a stimulus; see geotropism, phototropism

**variety** – members of a plant species that show a distinct difference and that will breed true to that difference

**vascular tissue** – tissue that conducts water and/or nutrients; xylem and phloem

**vase-shaped form** – trees with upright branches arching shape that is widest at the top

**venation** – pattern of veins in a leaf

**water holding capacity** – amount of water that a given soil can hold

**watersprout** – secondary upright shoot arising from the trunk, branches or roots; such shoots forming from roots are also called basal suckers

**whorled** – leaves form at several points on a node and surround the stem

**wilting** – loss of turgidity and subsequent drooping of leaves and stems

**wilting point** – defined as the minimum amount of water in the soil that the plant requires not to wilt

**xylem** – water-conducting tissue