

Caring for Trees



As stewards of the earth, we are called to care for trees.¹ Our quality of life depends on trees and their care depends on us.

More than simply being pretty and providing shade, trees:

- Convert carbon dioxide to oxygen
- Sequester carbon from atmosphere
- Clean the air of other pollutants
- Curb storm water runoff
- Reduce noise pollution
- Reduce energy costs
- Raise property values
- Increase business
- Enhance community pride
- Improve mental health

On these points and more, see Jessica B. Turner-Skoff and Nicole Cavender, “The benefits of trees for livable and sustainable communities” in *Plants, People, Planet*. 2019; 1:323–335. With all their community and ecosystem services, urban trees provide a high return on investment. According to the US Forest Service, for each \$1 invested in trees, we receive nearly \$4 in benefits.

Ten “Do Nots”

1. Do not dig until sure there are no buried utilities (by calling 1-888-258-0808 for free utility marking service).
2. Do not plant a tree that will become large under power lines, for it will eventually be butchered or removed.
3. Do not prune trees or branches within 10 feet of utility lines (maintained by utility company).
4. Do not use a chainsaw while on a ladder or work from a ladder in a tree without safety precautions.
5. Do not prune trees unless you understand what you’re doing and when and how to make correct cuts.
6. Do not use mowers and string trimmers around the base of your tree.
7. Do not place string, ribbon, wire, or leashes on tree parts or nail or screw anything into trees.
8. Do not allow construction activities (digging, repaving, grading, building) within protected root zone.
9. Do not top your tree or allow anyone else to perform this injurious practice.
10. Do not plant Callery pear, Norway maple, Siberian elm, Tree-of-heaven, white mulberry or other exotics.

Trees to Replace

We have a serious problem with exotic (non-native), invasive plants. These invaders displace native plants and negatively impact biodiversity. To restore healthy ecosystems with greater biodiversity, remove these plants and replace them with native plants. Read *Bringing Nature Home: How You Can Sustain Wildlife with Native Plants* by Douglas Tallamy (Timber Press, 2009).

Especially problematic trees to replace: Callery pear (*Pyrus calleryana*), Norway maple (*Acer platanoides*), Siberian elm (*Ulmus pumila*), Tree-of-heaven (*Ailanthus altissima*) and white mulberry (*Morus alba*). For a list of shrubs, vines and other exotic, invasive plants and control methods, see Midwest Invasive Plant Network (www.mipn.org) or Indiana Wildlife Federation (www.indianawildlife.org).

¹See Genesis 2.15 for stewardship of the earth from a Judeo-Christian faith perspective. Trees are a central part of the earth, as seen in the very first and last chapters of the Bible featuring the “tree of life.”

Tree selection

It's critical to plant the right tree in the right place. Proper selection is a matter of matching a tree with a site.

Site characteristics:

- Climate: hardiness zone, rainfall/snowfall, sunlight, prevailing winds, exposure
- Soil: pH, soil texture, density/compaction, nutrient analysis, soil volume, drainage
- Site: structures, paved surfaces, future development, overhead/underground utilities, intended use
- Plantings: other trees and shrubs, groundcover, turf, allelopathy
- Maintenance: irrigation, fertilization

Tree characteristics:

- Hardiness: present climate zone, projected adaptability to climate change*
- Growth habit/form: round, vase, pyramidal, oval, weeping
- Size: height, spread, root zone requirements
- Attributes: flowers, fruit, bark, foliage, fall color
- Requirements: pH, light, salt tolerance, drought tolerance
- Resistance: insects, disease, allelopathy (e.g. juglone resistance)
- Problems: pests, poor structure, surface roots, messy flowers/fruit/leaves, thorns
- Maintenance: supplemental irrigation, nutrition, pruning
- Native status: generally, native are preferred over non-native/exotic species for biodiversity
- Wildlife value: insects, birds, mammals (native species have much greater value than exotic plants)

*See *Climate Change Atlas* from USDA and Forest Service on current and future distribution of trees and birds species (www.fs.fed.us/nrs/atlas).

Plant stock:

- Types: bare root, plug, containerized, root control bags (better than containerized due to root pruning), balled and burlap, transplanted with tree spade.
- Avoid: co-dominant stems, black or dark brown roots or roots with a foul odor, circling and girdling roots (especially with containerized plants), deeply buried root collar, insects and disease, branch attachments with included bark or narrow "V" crotches, trunk wounds, foliage concentrated at top of tree, dead or declining branches.
- Select: vigorous plants with good shoot growth, trunk taper, trunk flare at or just below surface level, new roots white or light tan in color, central leader (on most), good vertical and horizontal branch spacing, wide or "U" branch attachments, foliage evenly distributed on upper two-thirds of tree, branches preferably less than half the diameter of the parent stem.
- Caution: beware of poor tree stock and care at big box stores like Lowes and Menards

For descriptions of tree species and their characteristics, see *Indiana Community Tree Selection Guide Recommendations* by Indiana's City Foresters & IDNR, Community & Urban Forestry (free PDF online).

Online tree selectors:

- Morton Arboretum: <https://www.mortonarb.org/trees-plants/tree-and-plant-advice/tree-species-list/filters>
- Cornell University: <http://woodyplants.cals.cornell.edu/plant/search>

Planting

Refer to handout *Planting, watering and mulching trees* (Tree Owner's Manual from US Forest Service).

Plant for biodiversity as well as beauty. Therefore, plant native trees and shrubs.

Water

- Water is essential to the health, growth and fruitfulness trees. Water is critical when first planted and when the ground is dry, especially when it's hot and windy. Watering varies with soil type, weather, tree species, and tree size.
- Check the root ball and surrounding soil (since they may dry at different rates) and water when the soil 1—2" deep dries out. At this time, provide sufficient water to moisten the soil to 1 foot deep. This will require 1—1.5" on light, sandy soil and 2—2.25" on heavy, clay soil. Light soils require more frequent watering, while heavy soils require less. Slowly provide on the area under the tree's crown, not just around the trunk (except for newly planted trees where irrigation bags slowly water the root ball).
- Do not over water. Water-logged soil can hurt or kill the tree by limiting oxygen and hindering gas exchange.
- Newly installed trees suffer transplant shock and require careful watering until re-established. Generally, it takes one year per caliper inch for reestablishment (in temperate climates). For example, a tree with a stem that measures 3" in diameter will take 3 years to become established and will require 3 years of watering. Due to recovering time for trees to re-establish, smaller diameter transplants can outgrow larger transplants. Consider this when selecting the size of tree along with watering requirements.
- Do not use antitranspirants—phytotoxic to some species and hinder cooling effects of transpiration.

Mulch

- Mulch around young trees the width of their crown with 2-3" of shredded leaves, bark or composted wood chips. (Green chips pull nitrogen from the soil as they decompose.)
- Deep mulch is *not* desirable, but a broad circle of mulch is. The wider the mulched, the better. Keep mulch 2" away from the tree trunk to protect tree stem from bacterial and fungal infections and rodents.
- Mulch helps retain soil moisture, reduce grass and weed competition, feed the soil, moderate soil temperature, and protect the tree from mower or trimmer damage.
- Avoid volcano mulching. Break up caked mulch that becomes hydrophobic and sheds water. Never place black plastic under mulch since this restricts movement of water and gasses. Avoid landscape fabric. Placing a few layers of newspaper beneath the mulch is ok to deaden grass and reduce weeds.

Protection

- Staking: Trees establish more quickly and develop stronger trunk and root systems if they are not staked. The stress of wind strengthens the tree. If it's necessary to stake for support or protection, stabilize trees with a two or three stake system as low as possible with broad, smooth material (not rope or wire). Remove ties and stakes after one year; otherwise, stem and roots will be weakened and ties may girdle tree parts.
- Guards: Guards help protect from deer, rabbits, other pests. Hardware cloth/mesh or plastic mesh guards are best—like A.M. Leonard rigid plastic mesh tree bark protectors. Avoid solid guards or cut plastic pipe that trap insects and don't allow air flow around the tree stem.
- Wraps: While tree wraps were often used with the thought of protecting trees, recent research indicates that such wraps can lead to fungal problems, hosting insects and increasing temperature differentials.
- Repellants: Of various rabbit and deer repellants, I prefer scented soap bars and Plantskydd.

Tree Health Care

Trees may suffer from many factors in their environment. To effectively treat a tree problem, its disorder must first be correctly diagnosed. This is often difficult, as many biotic (living agents) and abiotic (nonliving factors) are possible. With so many potential factors involved with tree health, diagnosis often requires the knowledge, experience, and skill of an arborist, and sometimes involves lab tests (as with oak wilt).

Abiotic factors: soil and site problems, construction damage to roots, girdling roots, mechanical injuries to trunk, weather-related problems (temperature and moisture extremes; snow, ice or wind damage), allelopathy (especially with walnut, sugar maple, black locust and tall fescue), competition, pollution damage, chemical injury, and water availability.

Biotic disorders: insects, mites, nematodes, animals, and diseases.

Plant health care involves a holistic, comprehensive approach to managing the health, structure and appearance of plants in the landscape. An integrated approach to tree care includes several management strategies:

- Cultural control: proper plant selection, supplemental watering, mulching, pruning, supplemental nutrition, weeding to reduce competing vegetation
- Biological control: employing natural predators, parasites and pathogens
- Chemical control: insecticides, miticides, fungicides, bactericides and herbicides; alternative pesticides include insecticidal soaps, horticultural oils, microbial pesticides
- Mechanical control: hand removal of pests, physical barriers, and pruning

Some Diseases and Insects

While there are many pests that can become problems, here are a few to be familiar with:

- Emerald ash borer
- Asian longhorned beetle
- Gypsy moth
- Bagworm
- Cedar rust
- Scale
- Oak wilt

The “Tree Doctor” App developed by Purdue University is a handy tool for your phone.

Steve Thomas, ISA Certified Arborist, IN-3538A

SteveT@MennoniteMen.org / 574.202.0048

Select Resources

Tree Descriptions

- Dirr, Michael. *Manual of Woody Landscape Plants* (Stipes, 1998)
- Gilman, Edward. *Trees for Urban and Suburban Landscapes* (Delmar, 1997).
- Morton Arboretum website: www.mortonarb.org/trees-plants.
- Sternburg, Guy and Wilson, Jim. *Landscaping with Native Trees* (Chapters, 1996).
- Sternburg, Guy and Wilson, Jim. *Native Trees for North American Landscapes* (Timber Press, 2004).
- Weeks, Harmon and Weeks, Sally. *Native Trees of the Midwest: Identification, Wildlife Value, and Landscaping* (Purdue, 2011).
- Weeks, Harmon and Weeks, Sally. *Shrubs and Woody Vines of Indiana and the Midwest: Identification, Wildlife Values, and Landscaping Use* (Purdue, 2012).
- Timber Press in Oregon for other excellent resources.

Tree Care

- Harris, Richard, Clark, James and Matheny, Nelda. *Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines*, 4th edition (Prentice Hall, 2004).
- Hirons, Andrew and Thomas, Peter. *Applied Tree Biology* (Wiley-Blackwell, 2018).
- Indiana's City Foresters & IDNR, Community & Urban Forestry. *Indiana Community Tree Selection Guide Recommendations* by (free PDF online).
- International Society of Arboriculture. *Arborists' Certification Study Guide* (ISA, 2010).
- International Society of Arboriculture. *Plant Health Care for Woody Ornamentals* (ISA, 1997).
- International Society of Arboriculture brochure series at www.treesaregood.org
- Morton Arboretum website: www.mortonarb.org/trees-plants/tree-and-plant-advice.
- Purdue Extension. *Urban Tree Care* series (mdc.itap.purdue.edu/newsearch.asp?subCatID=323%20&CatID=14).
- Purdue Extension. *Purdue Landscape Report* (www.purduelandscape.org).
- Purdue University. "Tree Doctor" App.
- United States Department of Agriculture and U.S. Forest Service. *Tree Owner's Manual for the Northeastern and Midwestern United States*. PDF available at www.treeownersmanual.info

Tree Pruning

- Gilman, Edward. *An Illustrated Guide to Pruning*, 3rd edition by (Delmar, 2012).
- Gilman, Edward, Kempf, Brian, Matheny, Nelda, and Clark, Jim. *Structural Pruning* (Urban Tree Foundation, 2013)
- International Society of Arboriculture. *Best Management Practices: Tree Pruning* (ISA, 2008).
- Luley, Christopher and Pleninger, Andrew. *The ABCs Field Guide to Young and Small Tree Pruning* (Urban Forestry, 2012).

Woodland Management

- Beattie, Mollie, Thompson, Charles and Levine, Lynn. *Working with Your Woodland: A Landowner's Guide* (University Press of New England, 1993).
- Department of Forestry and Natural Resources. *Forest Improvement Handbook* (www.extension.purdue.edu/extmedia/FNR/FNR-IDNR-414.pdf).
- Department of Forestry and Natural Resources. *The Indiana Woodlot Owner Series* (www.in.gov/dnr/forestry/5023.htm).
- Larkin Hanson, Ann, Severson, Mike, and Waterman, Dennis. *A Landowner's Guide to Managing Your Woods* (Storey Publishing, 2011).
- Vanbrakle, Josh. *Backyard Woodland: How to Maintain and Sustain Your Trees, Water and Wildlife* (Countryman Press, 2016).