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THE PURDUE LANDSCAPE REPORT

In This Issue

Will my Trees Recover After Losing Their Leaves?

(Cliff Sadof, csadof@purdue.edu)

Damage caused by defoliating insects can be quite shocking. An effective response to this sort of defoliation should be based on your understanding of how losing leaves affects plant health.

Leaves are little power plants that turn sunlight, carbon dioxide and water into sugar. Some of the sugar is used by the plant to fuel the production of new leaves, stems and roots, flowers and fruits. The rest of the sugar is stored as starch for use in spring to help spur new growth. Deciduous trees like oaks and maples lose their leaves each fall. Most of the starch is stored in the stem, trunk and roots. Evergreens, like pines, hollies and boxwoods, store a substantial part of these reserves in leaves.

Defoliation by caterpillars and sawflies will often kill evergreen plants, because losing leaves robs plants of both their energy factories and the reserves they need to product new plants. Deciduous plants can draw on their reserves to put out new leaves and replace their energy making factories. The ability of a deciduous tree to survive defoliation depends on the amount of leaves that have been removed, when defoliation occurs and the health of the tree prior to defoliation.

How much defoliation can be tolerated by a deciduous tree?

Healthy trees that have lost less than half of their leaves will usually survive. Healthy trees losing more than half the leaves can survive defoliation 2-3 years in a row. If trees are stressed by drought or excessive heat from city pavement or poor site conditions they are less likely to survive repeated defoliation.

Early season defoliators, like gypsy moths, and eastern tent caterpillars that remove leaves within 6 weeks after bud break will allow a tree to put on a second flush of growth that can help it survive the next year. **Mid-season defoliators**, like bagworm and Japanese beetles can give trees less time to recover if they put on a second flush of leaves. Also the new growth may not have enough time to harden off before the winter. **Late season defoliators** like fall webworm, and second generation mimosa webworm are less of a problem to trees because they are removing leaves just a few weeks before normal leaf drop.

When is the best time to control a defoliator and how should it be controlled?

Adult defoliators like Japanese beetles can be controlled with insecticides early in their flight period and as needed to reduce damage (See PLR 18-10 https://www.purduelandscapereport.org/article/japanese-beetles-are-baack/)

Caterpillars and sawflies with only one generation per year can often be controlled by a single application of pesticide before larvae become one inch long. It is better to control them with selective products like spinosad or Acelepryn, because they conserve natural enemies that protect the plants from having problems with scale insects and spider mites.

For more information about the susceptibility of deciduous trees to defoliation, see this original article by Philip Wargo http://horticulture.oregonstate.edu/system/files/onn030213.pdf

For information on other defoliators, please see these links.

Gypsy moth in Indiana
https://extension.entm.purdue.edu/GM/index.php?page=management

Fall Webworm
https://extension.entm.purdue.edu/publications/E-255/E-255.html

Bagworm
https://extension.entm.purdue.edu/publications/E-27/E-27.html

Mimosa webworm
https://extension.entm.purdue.edu/publications/E-11/E-11.html

Poison Ivy

(Rosie Lerner, rosie@purdue.edu)

Most landscape professionals and gardeners have heard of the wise advice “leaves of three, let it be” referring to the pest plant poison ivy. While not quite as catchy, the saying really should be “leaflets of three, let it be.”

Poison ivy has a compound leaf made of three leaflets. The terminal leaflet has a long stalk.
Photo credit: Rosie Lerner

Poison ivy leaves are compound rather than simple – a single leaf is divided into three separate portions, called leaflets. Plants with three leaflets are often referred to as being trifoliate. Another key identifying characteristic is that one side of a leaflet may have an irregularly toothed margin, while the opposite edge may be smooth or barely toothed.

Poison ivy is typically a vine that can climb quite high by means of aerial rootlets. But older poison ivy plants, especially those that have been cut back repeatedly, can take the form of a shrub.

Poison ivy flowers are rather inconspicuous and usually not noticed by gardeners. The subsequent fruits are greenish white, smooth berries in clusters about the size of currants. Birds and other wildlife eat the berries and then spread the seed in their droppings. So poison ivy can show just about anywhere.

There are a few look-alike plants that gardeners could mistake for poison ivy. Boston ivy is a common landscape vine that is trifoliate, but only the very young foliage. In Boston ivy, each leaflet is attached by a stalk. In poison ivy, generally only the terminal leaflet is attached by a stalk. Mature Boston ivy leaves are three-lobed, but not separated into separate leaflets.

Fragrant sumac, a small shrub, is also trifoliate, but none of the leaflets have stalks. Their fruit are red and slightly fuzzy.

Young Boston ivy also has a compound leaf made of three leaflets. Each leaflet is attached by a short stalk. Photo Credit: Rosie Lerner

Fragrant sumac also has a compound leaf made of three leaflets. The whole leaf has a stalk, but Individual leaflets are without stalks. Photo Credit: Purdue Arboretum

All parts of the poison ivy plant, including the stem and roots, contain and secrete a nonvolatile oil that affects the skin. This oil is insoluble in water. That means if you simply wash with water alone after coming into contact with poison ivy, you may spread the oil to other areas and increase the discomfort.

Once established, the woodiness of the poison ivy plant makes it difficult to control. Repeatedly cutting the plant back to the ground may eventually starve the plant; however, each time you cut it you expose yourself to the oil. You can dig up and discard small plants, but if you leave behind any portion of the root system the plant will likely re-sprout.

Several herbicides are available for poison ivy control. Keep in mind, however, that any herbicide that will kill poison ivy will also kill any desirable plants. So if the poison ivy is growing among shrubs and trees, you must apply chemical controls directly to the poison ivy plant and not to any of the other plants. If the poison ivy growth is severe enough, it may be worth sacrificing some desirable plants to eliminate the poison

ivy. Always read and follow the label directions before using any pesticide product.

For more information on Poison Ivy, see Purdue Extension Bulletin HO-218-W, https://www.extension.purdue.edu/extmedia/HO/HO-218-W.pdf.

Homeowner Tree Care Accidents

(Lindsey Purcell, lapurcel@purdue.edu)

TCIA TREE CARE INDUSTRY ASSOCIATION
VOICE OF TREE CARE
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The Tree Care Industry Association (TCIA) conducted an analysis of 62 civilian tree care-related accidents reported by the media from January 2017 to June 2018. TCIA is a trade association that promotes professional tree care and discourages homeowners from taking unnecessary risks caring for their trees themselves.
While these numbers are not representative of all – or even most – tree care accidents involving non-professionals, they provide insight into the types of hazards homeowners are likely to encounter while attempting tree work.
The findings were grim: Forty-one of the accidents (66 percent) were fatal.
"Homeowners may not realize how dangerous tree work can be, and how much they're risking by taking the 'do-it-yourself' approach," says Peter Gerstenberger, senior advisor for safety, standards and compliance for TCIA. "Lack of training, equipment or situational awareness undoubtedly contributed to these incidents, which could have been avoided by hiring a professional tree care company."

CHART A

Exposure Type - All Accidents	
Struck by tree	46
Struck by chain saw	3
Fall from tree/ladder	9
Electrocution	1
Lost limb in chipper	1

The median age of the victim was 43, and the oldest victim was 85. The youngest reported victim was a 2-year-old toddler who was 50 feet away when the tree his father was cutting fell the wrong way, tragically, striking and killing the child. Four of the 41 victims, including the 2-year-old, were uninvolved bystanders.
Most homeowners were struck by a tree while attempting to fell it, or were hit by limbs, wires or chain saws. Others fell or were electrocuted. Chart A provides more details on the accidents.

In two-thirds of all cases where it could be determined, the victims undertook hazardous tree work with nobody to spot them, nobody to assist them and nobody to advise them when it might have been prudent to stop and seek out an expert.
What can you do?
Find a professional.
A professional arborist can assess your landscape and work with you to determine the best course of action to care for and maintain the trees and shrubs in your landscape. Contact the Tree Care Industry Association, a public and professional resource on trees and arboriculture since 1938. TCIA has more than 2,400 member tree care firms and affiliated companies. All member tree care companies recognize stringent safety and performance standards and are required to carry liability insurance and workers' compensation insurance, where applicable.
TCIA has the nation's only Accreditation program that helps consumers find tree care companies that have been inspected and accredited based on: adherence to industry standards for quality and safety; maintenance of trained, professional staff; and dedication to ethics and quality in business practices. An easy way to find a tree care service provider in your area is to use the "Find A Tree Care Company" program. You can use this service by calling 1-800-733-2622 or by doing a ZIP Code search on www.treecaretips.org.
Editors: If you would like additional information or digital photos, please contact TCIA via 1-800-733-2622 or marketing@tcia.org.
TCIA arborists, safety and business professionals are also available as sources for tree-related articles and issues: 1-800-733-2622 or tandersen@tcia.org.
| 1-800-733-2622 | www.tcia.org

Common Abiotic Problems of Ornamentals: Transplant Shock

(Kyle Daniel, daniel38@purdue.edu)

An abiotic stress in plants is a stress due to a non-living factor, such as temperature, moisture, herbicides, etc. Biotic stress includes a living organism, such as a fungi, insect, etc. This series will explore some of the most common types of abiotic stress you may find in landscapes and nurseries.

We've all experienced the problem. Sometimes it's barely noticeable, and other times it results in death. Even if you don't notice, it most likely still occurred. Environmental conditions can be helpful, or quite the opposite.

Figure 1. Dieback and leaf drop are common symptoms of transplant shock.

Of course, we are speaking of transplant shock.

Transplant shock occurs when plants become stressed due to poor root establishment, often mimicking drought stress. The severity of transplant shock is dependent on many factors, which include plant species, soil type/quality, moisture, temperature, growth stage of the plant, root loss from the nursery, as well as many other factors.

If transpiration rate (loss of water from the leaves) in the plant is high, transplant shock will increase. When humidity is low, temperature is high, and the wind is significant, transpiration rates are the highest. This is typically why we try to avoid transplanting in the summer months.

Figure 2. Browning of leaves, leading to necrotic tissue is a common symptom of transplant shock.

A few of the symptoms of transplant shock include:

- Deciduous Plants
  - Leaf wilt
- Drought-like symptoms occur when plants

experience transplant shock.

- A cupping or rolling leaf can also occur, depending on species. (Fig. 3)

Figure 3. Rolled leaves on some species, such as this azalea, is a common symptom of transplant shock.

- Leaf drop
    - Some species will drop leaves when transplant shock occurs. The plant can develop an abscission layer at the base of the petiole, leading to leaf drop. This occurs to conserve water within the plant by decreasing leaf surface area (where the stomata are located and, thus, transpiration occurs.
- Leaf scorch
    - Leaf scorch begins with a yellowing to the leaves, quickly followed by brown, dried leaves. The leaf veins remain intact, leaving a 'skeletonized' appearance.
- Abnormally small leaves
    - New flushes of growth can be 25-50% the size of other leaves when transplant shock occurs. This is a response by the plant to reduce leaf surface area, but continuing to photosynthesize.
- Shortened internodes
    - Since growth is reduced from the stress, internode length will be much less compared to previous years' growth.
- Evergreen Plants
    - Yellowing to browning of needles
        - Transplant shock is much more difficult to diagnose and treat, because by the time that needles are brown, it's often too late to treat.
        - Evergreen plants will hold their color for many weeks with no signs of stress (think of a cut Christmas tree keeping the color through the holiday season). Unlike deciduous plants, there are no accessory buds to 'grow out' of the problem.

Transplant shock can be limited through several cultural practices:

- Irrigation
    - Irrigation is the most important factor in limiting transplant shock. Too much water is just as deleterious as too little water. On trees, water 5 gallons, plus 5 gallons per caliper inch each week on newly transplanted species. This can be reduced or increased based on local weather and soil conditions.
- Proper Planting
    - Planting at the proper depth, at the trunk flare, or just a little above in heavy soils, will allow a reduction in plant stress. A plant that is too deep can be susceptible to pathogens at the trunk and can receive too much water by the 'bathtub effect'.
- Humidity
    - Planting during dry periods will increase transpiration, thus increasing transplant shock. To remedy this, increase irrigation frequency.
- Root Loss
    - Root loss, primarily on balled in burlap material, can be significant when moved from the nursery. By increasing water and planting at the proper time (spring or fall), transplant shock can be reduced. In the nursery, defoliation or antitranspirant sprays will aide in reducing transpiration, allowing the root to shoot ratio to increase.

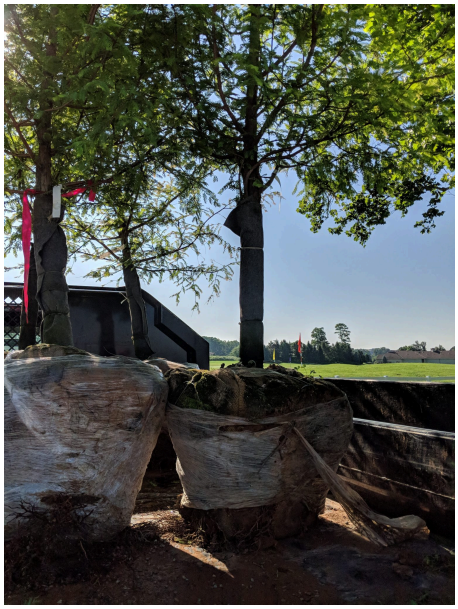

Figure 4. Balled in burlap trees can be at risk for transplant shock due to the number of roots removed at digging.

- Poor Soil
  - In many locations, we are planting in non-ideal soil conditions. Soil remediation can be performed by adding organic material, which can be utilized in most landscapes. DO NOT remediate each planting hole. If you only amend the planting hole, you will create a zone that water can't penetrate and roots will only grow in the hole. Instead, amend the entire landscape bed.
- Planting Time
  - Plant prior to bud break in the spring or after leaf fall in the fall. This will allow root growth and water channeling to occur prior to leaf break in the spring.

Many times we can't control the planting time, humidity, or even poor soil conditions. When working on a job, the customer wants the plants installed now, not when it's the 'correct time'. In these cases, make sure you are visiting the plants once per week and water as needed. Trusting the customer to keep plants watered will provide very mixed results. In those cases, it may be useful to set up an automatic email that goes to the customers once per week as a 'gentle reminder'. Be sure to mention that on many species, too much water is just as bad as too little water.

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