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THE PURDUE LANDSCAPE REPORT

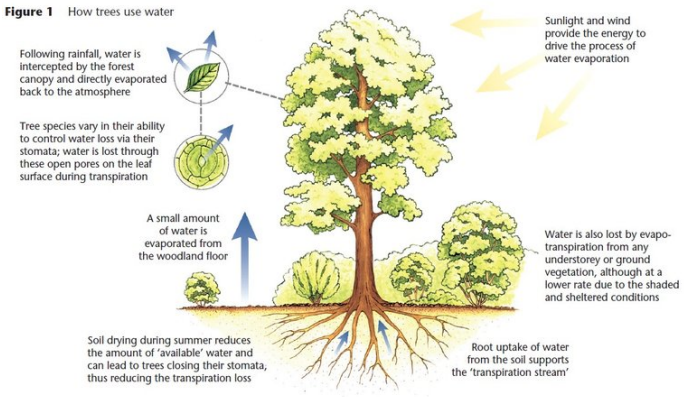
In This Issue

How do trees use water?

(Lindsey Purcell, lapurcel@purdue.edu)

Water covers approximately 71% of Earth's surface, yet only 3% of the 326 million cubic miles of water on the planet is suitable for growing crops, such as trees. It can be said that water is the single most limiting ecological factor in tree growth and survival. It is a vital "nutrient" that must be available in adequate supply or plants decline and eventually die.

Trees use or lose water by two separate processes. First, water is taken up by tree roots from the soil and evaporated through the pores or stomata on the surface of leaves. Transpiration is a physiological process responding to soil and atmospheric factors. It is a passive movement of water through the tree system which allows columns of water to move great heights. Water movement through a tree is controlled by the tug-of-war between water availability and water movement in soil versus water loss from leaves. For example, water movement in a ring porous tree like a red oak is 92 ft/hr, in a diffuse porous tree like a basswood is 11 ft/hr, and for a pine tree is 6 ft/hr. Trees can absorb between 10 and 150 gallons of water daily, yet of all the water absorbed by plants, less than 5% remains in the plant for growth. They rely on available water in the soil to "rehydrate" during the nighttime hours, replacing the water loss during the daytime hours.



How trees use water is essential to determine water needs.

Leaves intercept water to help with stormwater management and cooling.

The second process is the interception of water by the surfaces of leaves, branches and trunks during rainfall, and its following evaporation. Together, these two processes are often referred to as evapotranspiration. Both transpiration and evaporation are strongly affected by the amount of sunlight, the temperature and humidity of the air, as well as wind speed as trees turn water into mist when it releases nearly 95% of the water it absorbs.

Just why does a tree need water? Well, nearly every plant process such as photosynthesis, respiration and transpiration rely on water to function properly. Water is an essential element as important if not more than other nutrients because it is required to put all our other elements into a form usable by the plant. Almost all essential elements are ionic forms dissolved in water, giving them the ability to move to stems, branches, and leaves for energy.

The goal of proper tree management is to prevent or reduce the impacts of water loss. If adequate soil moisture is available, water loss will go unnoticed as it is replaced naturally. Typically, we experience prolonged dry periods without rain, resulting in drought. Drought conditions are the result of long periods of time without natural rainfall. During dry conditions, soil moisture content is reduced to the point where tree roots can no longer pull the water molecules from the soil. This results in responses from the plant such as wilting, early fall color, scorching and other symptoms. Anytime there is a week without significant rainfall of

at least one inch, most likely trees will need some assistance from us to supply the much-needed water for a healthy tree.

Milkweed aphids are out in force this year! Should you try to manage them?

(Elizabeth Barnes, barne175@purdue.edu)

Bright yellow or orange aphids covering a milkweed plant may look shocking, but they usually aren't a cause for concern. These aphids become more noticeable in late summer or when plants are stressed. Some may find them unsightly, but, for the most part, they cause little to no harm to plants or beneficial insects on milkweeds.

What are they?

Milkweed aphids (also known as oleander aphid; *Aphis nerii*) are a non-native insect commonly found feeding on the sap of milkweed and butterfly weed. They are bright yellow or orange with black legs (image 1). These aphids can blanket leaves, stocks, or seed pods and can reproduce quickly making it seem like they appear overnight (image 2). Plants that are stressed or over fertilized are more likely to be infested with these aphids. However, they also increase in number in the late summer as plants are naturally moving into decline as fall approaches.

Milkweed aphids are easily recognized by their bright yellow to orange color and their black legs. Photo by Joseph Berger.

Milkweed aphids can cover large surfaces of milkweed plants. They leave behind papery white specks when they molt often giving the impression of two species occurring on a plant. Photo by Cliff Sadof, Purdue University.

Why are they so brightly colored?

Like monarch butterflies, the coloration of these aphids is a warning sign to predators that they are toxic. This causes some predators to avoid them, but many like lacewings, ladybug larvae, and some parasitoids still eat them (image 3). Indeed, it is common to find hard, dry, brown aphids mixed in with the yellow ones (image 4). These aphids have been parasitized and should be left on the plant to support the population of milkweed aphid predators.

Many predators avoid milkweed aphids because of their chemical defense. However, some insects, like ladybugs, are able to eat them. Photo by Joseph Berger

Aphids that have been killed by parasitoids become brown, papery, and hard. These aphids house a growing parasitoid that will hatch and kill more aphids. Photo by David Cappaert.

Will they harm monarch butterflies or caterpillars feeding on milkweed?

Milkweed aphids do not directly harm monarchs. They don't eat monarch eggs nor do they attack the caterpillars. Although aphids may affect monarch caterpillars by weaking the milkweed and making it easier for caterpillars to eat or competing with caterpillars for milkweed, these impacts are relatively minor. Overall, it's more likely that monarchs will be harmed by efforts to remove the aphids than that they will be harmed by the aphids themselves.

Do they harm plants?

In most cases, milkweed aphids are not a problem for plant

health. Occasionally, they may cause deformities in flowers or stunt plant growth, but this is rare. Milkweed aphids also produce enough honeydew (sugary liquid excrement) to give the leaves a sticky shine and promote the growth of sooty mold. The black sticky mess on leaves is unsightly, but it does not seriously harm milkweed health.

To manage or not to manage?

Milkweed aphids can look alarming but they do little to no damage to plants and have minimal direct impact on pollinators. **In most cases, treatment is not necessary and runs the risk of injuring beneficial insects.** However, in cases where management is required, manually removing the aphids or treating them with horticultural soap is the best option provided it is done carefully and with consideration of the other insects on the plant. Check plants before treating them and if you find any other insects, remove them and either place them in a jar until you are finished or move them to a new, safe milkweed.

Cover image by William M. Ciesla, Forest Health Management International

MULCH ADO ABOUT SLIME MOLDS

(Gail E. Ruhl, ruhlg@purdue.edu)

Figure 1. Dog Vomit Slime mold

Are you noticing bright yellow, white and brown blobs on wood chip mulch? These growths are known as slime molds. Slime molds are not parasitic and therefore do not cause disease. Slime molds get their nutrients from bacteria and small bits of organic matter which is why it is common to see them growing on mulch. One particular slime mold, aptly named “dog vomit slime mold,” *Fuligo septica*, (Figure 1) which belongs in the phylum Myxomycota in the Kingdom Protista, has been the subject of primary concern.

The initial bubbling or slimy vegetative (plasmodial) stage may quickly transform into the reproductive stage, producing masses of brownish-black powdery spores within the oft-times crusty exterior.

Figure 2. Slime mold on nearby plant.

Slime molds may be noticed growing up onto nearby plants (figure 2). They do not usually cover enough of the plant’s surface to reduce the photosynthetic process necessary for growth and thus do not harm the plant.

After several days of dry weather slime molds will usually become less noticeable. Although dried masses can be removed with a shovel, slime molds will likely reappear with the return of wet weather. Managing moisture (e.g. irrigation/drainage) may help limit or discourage their emergence.

An excellent description of slime molds and other “mulch dwellers”- may be accessed at the following web addresses.:

Tom Volk’s Fungus of the Month

http://botit.botany.wisc.edu/toms_fungi/june99.html

Mushrooms, fungi and slime molds that grow in mulch or potted plants.

http://botit.botany.wisc.edu/toms_fungi/mulch.html

- Berkeley — Introduction to the slime-molds

https://ucmp.berkeley.edu/protista/slimemolds.html

What Is **Growing** in **My** Landscape **Mulch**?—Information from Penn State University on a number of different “Mulch dwellers”

Mulch Mushrooms, Slime Molds & Other Saprophytes

https://plantpathology.ca.uky.edu/files/ppfs-gen-06.pdf