



## Summer Leaf Scorch

Summer's heat, and dry soil conditions cause noticeable browning on tree and shrub leaves, especially around the leaf margins. This is called **Summer leaf scorch**. Symptoms of leaf scorch vary from plant to plant, depending on the situation.

Leaf scorch is a non-infectious, physiological condition, caused by unfavorable environmental situations. It is not usually caused by fungus, bacteria, or virus. The problem may appear on almost any plant if weather conditions are extreme, such as high temperatures, dry winds, and low soil moisture. When large amounts of water evaporate from leaf surfaces, and if the plant's roots are not able to furnish enough water to compensate for this transpiration loss, leaf tissue dies and the leaf turns brown as a result.

Young trees, or those that are already in stress due to insect infestations, diseases, or other factors, are more susceptible than those growing vigorously, and are in good condition. Although all plants can show signs of leaf scorch, some plants are more prone, such as Japanese maple, Norway maple, Sugar maple, beech, ash, oak, linden, birch, alpine currant, horse chestnut, white pine, hydrangea, rhododendron, viburnum, and flowering dogwood.



**Summer Leaf Scorch** occurs when large amounts of water evaporate from the leaf surface. Roots are sometimes unable to supply enough water back to the leaf to compensate for this loss. The only solution the plant has is to reduce its leaf surface area. It does this by sacrificing its outer leaves.



Leaf scorch is caused by prolonged dry periods accompanied by hot weather, or dry winds that create a water imbalance internally in plants. Transpiration, water evaporation from tiny openings in the leaf surface, cools and maintains leaf temperature. When water is lost faster than it can be replaced, the results are dry or dead leaves, and possibly dead branch tips.

In some cases, there may be enough water in the soil; it might just be that the plant can't replace what is lost as fast as it needed. Slow growing trees such as beech, oak and dogwood have this type of injury. Also, plants with large leaves, such as Rhododendrons, Hydrangeas, and Catalpa have this problem. A third type of plant with this problem are those with tender leaves. It may not matter how much water is available, they will still sunburn if it is too hot or too windy. Japanese Maples are at the top of this list. Use screens or a shade cloth to protect trees or plants that cannot tolerate the extreme temperatures. A shade cloth can lower the temperature up to 15 to 20 degrees.

Trees and shrubs are especially prone to leaf scorch during the first 2 to 3 years after transplanting, while their root system is establishing. Be extra mindful of these plants during periods of heat stress.

If insects, disease, or a root injury have weakened a tree, the plant will be more susceptible to leaf scorch.

Tree roots surrounded by asphalt and concrete are more likely to exhibit symp-



toms, than the same varieties planted in a lawn area. This is partially because of reflected heat from the concrete, and partially because it is hard to get water to the entire root zone under the concrete.

The problem usually is more severe on the south or southwest side of the tree, or on the side nearest the source of heat, such as a brick wall or an asphalt street.

Trees and shrubs can adapt to many changing environments with just minimal stress. However, a mature plant doesn't like it when its root system is suddenly covered with something. All of a sudden, the water the roots have depended upon is gone, and the tree starts to suffer. Adding 6 inches of soil around a tree, covering the roots with plastic or weed cloth, or pouring cement under the drip line of a tree are all hard on plants.

When leaf scorch appears, the plant may also drop some leaves. This will not usually endanger or harm the tree. Don't worry and think that the plant is dying; it's a natural process. A plant can lose 20% to 30% of its leaves without any problem. If a plant loses 40% to 50% of its leaves, then you might have a slight problem. If a plant loses 90% of its leaves, you may have to consider a new one.

There is not much that can be done to avoid the hot, leaf-scorching weather. However, if Mother Nature doesn't provide adequate rainfall, or moderate temperatures, you can thoroughly water your plants every two to three weeks.

Turn a hose sprinkler on very slow, use a soaker hose, or a drip irrigation system, around the entire drip line of the tree. Soaker hoses should be left on, at a slow drip, for several hours. Drip irrigation hoses may need to be left on for an entire day. The goal is to thoroughly saturate the root zone as deep as possible. Water long enough to encourage a deep root system that will enable the plant to withstand environmental stresses.



Check soil moisture at least 12 inches deep. If it is dry, water slowly, allowing water to penetrate at least two feet. Deep-water the entire area under the canopy, and one and one-half to two times farther than the branches. 95% of the roots of most trees, including tall evergreens and large deciduous trees, are found in the top 18 to 24 inches of soil in this extended area.



Sufficient moisture will also help keep the trees and shrubs vigorous enough to withstand many pest attacks, as well as help to prevent winter injury. It is very important to deep-water trees and shrubs at least once a month during the summer weather, especially in areas where the water table is far below the soil surface or on sites exposed to wind.

Water into the fall until leaves turn autumn color. Be careful that you do not keep your plants too wet, too late in the fall; they may not start to harden off soon enough for the cold winter weather.

If the weather is dry in October or November, you may need to water some of your shallow rooted plants occasionally. Deep rooted trees and shrubs will usually have enough soil moisture until the snow starts to fall.

### Other Causes

Weather conditions causing rapid loss of water in leaves does not always produce leaf scorch. Usually, these conditions must be coupled with other unfavorable growing conditions that might prevent rapid uptake and reduce the flow of water to leaves — the most common cause of which is drought.

Less obvious conditions that could cause leaf scorch include shallow soils that overlie rocks, a hardpan, poor soil, heavy soils, or soils that do not retain water very well.

Soil compaction, restricted root space, poor drainage, girdling roots, nutrient deficiency, and high concentrations of de-icing salt, fertilizer, or chemicals may also be major causes of leaf scorch.

Damaged root systems caused by machinery, recent transplant shock, or layers of asphalt or concrete over the top of root systems (which tend to keep the soil dry), may cause heat buildup or water stress.

In some instances, leaf scorch can be attributed to an insect, fungal or bacterial problem. Any insects or diseases affecting roots can create an imbalance of water between the leaves and the roots. Wilt diseases such as oak wilt, verticillium wilt, or pine wilt, reside within the water-conducting cells in the plant. Such diseases cause a physical impairment of the xylem (water transporting cells in the plant). This results in the reduced uptake of water, and thus leads to leaf scorch.

Leaf Scorch symptoms may differ between plant species, and even between similar plants - just 2 or 3 feet apart.

Entire leaves may curl and wither when leaf scorch is severe. Scorched leaves may be abundant on the side of the plant most exposed to prevailing winds and strong sunlight.



Photo Credit WiltPrufeCo.untreated.jpg

Leaves on the same branch often show similar symptoms but an entire plant may not be uniformly affected.

Needled, or narrowed-leaved evergreens, such as arborvitae, hemlock, fir, pine, spruce, and yew, show scorch injury beginning at the needle tip progressing inward to the trunk. When severe, half or all of the needles may turn yellow or brown. Scorch injury on evergreens may also occur in winter, from cold, drying winds when the soil is still frozen.



Leaf scorch itself does not kill a plant, but it can weaken it tremendously. However, over time, other problems may enter and kill the plant, because of the leaf scorch damage.

**How much water should a full size, mature tree receive?** This is a difficult question to answer because it is affected by many variables; like soil type, tree type, size of tree, topography of the land, temperature, etc.

In general, trees need at least one inch of water each week; trees planted in sandy soils will need more.

A majority of tree roots are located in the top 12" to 24" of soil, so watering with a root feeder often places the water below where it is needed. Instead, use a small sprinkler running at a low rate, a soaker hose, or just a slowly trickling hose, and let the water run for several hours. Water the area underneath the tree's entire drip-line, not just next to the trunk.

### How Much Water is Enough?

As a rule, most older plants need 1 to 2 inches water a week. Apply 1 inch of water twice a week, perhaps a little more if the weather is hot and windy.



This means watering your plants deeply enough to saturate the soil to the entire root level, once or twice a week, or whenever the soil dries too much.

Newly planted plants need watering a little more frequently than older, established plants.

Soil that drains too quickly may leave your plants struggling to survive, and may require more frequent watering. In extremely gravelly or sandy soil, this could mean watering more than once or twice a week.

#### Examples of How Much Water:

An older, low-water-need plant (one that needs 1" of water per week) with a root system that is 5' wide needs about 15 gallons of water per week.

Calculation: (5'x5' root system) = 25 square feet x (1/12' water) = 2.08 cubic feet of water = 15 gallons of water.

**1 cubic foot equals 7.48 gallons of water.**

A normal-water-need plant (one that needs 2" of water per week) - the same size - needs about 30 gallons of water per week.

**Tree Example:** A Medium Sized Tree needs about 180 gallons of water per week.

(12'x12' root system) = 144 square feet x (2/12' water) = 24 cubic feet of water = 180 gallons of water per week.

**How long does it take to water plants?**





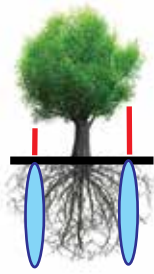
Most garden hoses give 5 to 7 gallons of water per minute, but to be exact, you can do some math.

Determine how long it takes to fill a 5 gallon bucket with your hose (make sure it is not a 4 or 4.5 gallon bucket).

Divide 5 gallons by the seconds it took to fill it - then multiply by 60 seconds. This will give you the gallons per minute going through your hose.

**Example: 40 seconds to fill the 5 gallon bucket.** (5 gallons ÷ 40 seconds x 60 seconds = 7.5 gallons per minute)

It will take 2 minutes (not 30 seconds) to give your low-water plant 15 gallons of water, or, 24 minutes (not 10 minutes) to give your tree 180 gallons of water.



### **Drip Irrigation Systems - Good or Bad?**

If A plant needs 15 gallons of water.

If One drip emitter allows 1 gallon per hour.

One emitter would take 15 hours to water the plant, or

10 emitters would take 1.5 hours to water the plant.

**Make sure you use enough emitters, and allow enough time, for your drip system to apply the correct amount of water for each plant.**

**Check the emitters occasionally to make sure they are working properly.**

**Adjust the time and schedule according to both the plant size and the weather.**

**Remember, not all plants need the same amount of water.**

**If a plant is dry - WATER WITH A HOSE, do not wait for your drip system to water it - it may take too long.**

### **Other Factors**

The amount of water your plants need changes as they grow. While small plants in 4- to 6-inch pots may require only 1 to 2 cups of water when first planted, a full-grown tomato plant may require 1 to 3 gallons of water each time you water.

The need for water also increases during periods of rapid growth. After you fertilize plants, you need to water a little more, because of the added growth.

In the fall, as the weather cools, plants need less-water: not no-water. Continue watering plants, enough to keep the soil moist, until the plants go dormant, and the weather provides adequate moisture naturally. They do not usually require a lot of water, just a consistent water schedule.

***Do Not Stop Watering Plants Just Because The Irrigation Water Is Turned Off in October. Watch the weather to determine your plant's watering needs.***

You may also need to water some plants occasionally during a dry winter.



### **Prevention and Cure**

When dry weather conditions occur over an extended period of time, plants should receive deep, supplemental watering every 10 to 14 days. Newly transplanted trees and shrubs should be watered every 7 to 10 days. A slow soaking of the soil is most effective.

Do not rely on lawn sprinklers, or automatic timers, to deep-water trees and shrubs, especially the newly planted ones.

Avoid frequent, light waterings, as well as watering only at the base of the tree trunk. Light waterings will do little more than wet the mulch.

Cool the soil and conserve soil moisture by mulching plants with a 3-4" depth of organic mulch. Because mulches absorb water from the surface, be sure to water thoroughly enough so water penetrates into the soil.

Apply fertilizer in early spring. Avoid applying fertilizer during the summer when soil is dry.

If the cause of leaf scorch is from a chemical injury, recovery may just be minimal. If de-icing salt, or fertilizer burn is suspected, leaching the soil with a slow trickle of water for 24 hours may help in recovery.

Trees suffering from drought stress can be selectively pruned to reduce transpiration (the loss of water due to evaporation through the leaves). Remove suckers, sprouts and diseased areas. Do not prune heavily or you may cause more damage by exposing shaded, soft leaf tissues to the sun.

Leaf scorch often occurs in July and August, but it can happen any time of the year when the conditions are right: May; October; January; April; Anytime.

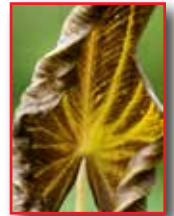
### **Leaf Scorch Prevention using Anti-transpirants -- Anti-desiccants**

Anti-transpirants are chemical compounds applied to plant leaves to reduce water loss from the plants. Anti-transpirants are used to protect plants from drying out when they are under water stress; both summer or winter.

Plants can suffer from losing too much water any time of the year. Excessive moisture loss in plants causes, stress, shock, wilting and even plant failure. It strikes during periods of drought, or when the plant roots are disturbed during transplanting. It also occurs in winter when drying winds and frozen ground deprive plants of their natural moisture intake.

Winter burn is one of the most common problems that arise anytime in the winter. Browning and scorching of the tree's leaf or needle tips, are a sign of winter burn. Winter burn is caused by lack of water, and occurs when the roots cannot keep up with the amount of water lost, so they quickly use up all the water stored in their leaves and stems. This is very damaging, particularly to evergreen trees and shrubs that don't protect themselves by dropping their leaves in winter.

During the winter months, dry winds and winter sun dry the trees out. Due to the freezing temps, water is not able to move fast enough up from the roots of the trees into the stems. Anti desiccants help to prevent the tree from



losing water and drying out; they help keep your trees looking as beautiful as ever.

Anti desiccants can also be beneficial during summer months when a tree cannot keep up with the amount of water lost.

### Prevention is better than the cure.

**Don't wait until it is too late** – your trees and shrubs may need protection early in the season to prevent damage. Once the damage has occurred, the plants need extra time to recover.



**Summer can be brutal.** Hot, dry, south winds can sap all of the water out of leaves, especially tender leaves such as Japanese Maples, or large leaves such as Catalpa or Horsechestnut trees; especially the newly planted ones.

**Winter can be harsh.** Even during the mildest winter your trees and shrubs can be devastated. The cold winds, extreme temperatures, heavy snow, and unpredictable weather affect your trees more than you would think. It is extremely important to take the steps necessary to ensure they do not endure any damage through the cold season. Anti desiccants are an easy way to help prevent damage to your trees and shrubs throughout the winter season.

**Wilt Pruf®** is a natural product derived from the resin of the pine tree. It is organic, non-hazardous and biodegradable.

- Protects plants against cold drying winds of winter, and hot drying winds of summer.
- Protects plants when roots are frozen in the winter depriving them of their normal moisture intake, as well as during periods of drought during the summer.
- Protects tender transplants while their root systems are developing.
- Protects and extends the life of Christmas trees and wreaths by reducing moisture loss which results in needle drop and browning.

Wilt-Pruf spray dries to form a clear transparent and flexible protective coating without interfering with plant growth or materially affecting respiration, osmosis or photosynthesis.

The unique film-forming-polymer produces an outside protective coating that weathers off one layer at a time, providing long lasting protection for about 2 months during hot, summer conditions, and 4 months during cold weather conditions. Simply spray on your plant's leaves as a protective coating.

Ultraviolet rays from outdoor daylight react with the film forming polymer which produces a continuous flexible film, which forms a coating similar to having numerous bed sheets on a bed. When the top sheet is removed, there are still many more sheets left.

The same phenomenon is true with Wilt-Pruf . As the outside layer wears off with the sun, wind and rain, another layer forms. This process continues until all the layers have worn off, which takes three to four months depending on climatic conditions.

Wilt-Pruf is the only horticulture anti-transpirant that has the ability to provide this long-lasting protection. Other anti-transpirants provide a single coating only, and when that coating cracks and falls off or wears off with the weather (perhaps as soon as two or three weeks) there is no protection left.

It can be used both under hot summer conditions and in cold weather conditions.

Warning: Wilt-Pruf will turn Blue Spruce green temporarily. It won't hurt the tree, it will just take a while



before the tree turns blue again.

**Bonide Wilt Stop®** -This natural, non-toxic product, derived from the resin of pine trees, has the unique ability to form a soft, clear flexible film on treated plants. This film protects plants from drying out, drought, wind burn, sunscald, winter kill, transplant shock and salt damage. This product will allow your plants to grow naturally, and for effective results, you only apply it once a season. It is great for use year around on deciduous trees, evergreens, shrubs, roses, transplants, vegetables, and fruit trees.

Wilt Stop Spray can extend the freshness of Christmas trees and cut flowers; just simply spray before bringing them indoors. For seasonal transplanting, water plant thoroughly and spray with Wilt Stop. Apply to houseplants to reduce water requirements, or spray on outdoor plant foliage to protect them from dehydration. If you dip or spray your bulbs and tubers using Wilt Stop Spray, they will not dry out during storage.

### Application Times and Tips

**Pick a Nice Day:** Anti-desiccants are best applied when temperatures are in the 40s-50s in winter, (70s-80s in summer) with no rain forecast for a few days. Foliage needs to be dry when applied, and the spray needs time to dry afterward, before it rains or freezes.



Photo Credit WiltPrufCo.Sprays.jpg

**Spray Thoroughly:** Plants lose water from both the tops and bottoms of the leaves. Be sure to spray the plant completely!

**For Summer:** Don't wait too long. Spray before the damage occurs; before the temperatures reach the 90s-100s.

**For Winter:** Don't Spray too Early. Wait until the plants are dormant. Arborvitae, cypress, juniper, and cedar must be completely dormant (which involves moving water down to the roots) before applying, or else the spray will trap water in the leaves that may freeze and burst the plant cells later; if early, severe-freezing weather should occur.

It is also great for Christmas trees, wreaths, and greens. In all cases, anti desiccants must dry outdoors, in sunlight.

Sprayers should be cleaned after each use by rinsing with water immediately after each use. Surfaces sprayed inadvertently may be washed immediately with warm water and a mild detergent. Dried film can be dissolved without difficulty using kerosene or mineral spirits. Over-spraying on cars, terraces, windows, etc. should be avoided.

Always follow instruction on label carefully.

**As you can see, there are many factors that you need to take into consideration as you determine how much water each plant in your yard requires.**

**There is not one set method to determine how much to water all plants, all year long. Adjust your watering schedule as often as the conditions change: Daily; Weekly; Monthly.**

**Plants can be forgiving, but they do have their limits, and there is a point where they cannot recover from either too much, too little, or too late watering.**

### More Resources

[http://www.extension.purdue.edu/extmedia/BP/BP\\_25\\_W.pdf](http://www.extension.purdue.edu/extmedia/BP/BP_25_W.pdf)

<http://www.ext.colostate.edu/pubs/garden/02911.html>

<http://web.extension.illinois.edu/state/newsdetail.cfm?NewsID=7068>

<http://plantclinic.cornell.edu/factsheets/physiologicalleafscorch.pdf>

<http://diagnostics.montana.edu/PlantDisease/topics/diseasetreesshrubs.htm#Leaf%20Scorch>

<http://www.wiltpruf.com/Home/Properties.aspx>

<http://www.wiltpruf.com/Home/Properties.aspx>