Stress Related Tree Decline and Death

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I receive numerous calls every year about trees losing leaves and dying. There can be many contributing causes. Once a significant decline is occurring the prognosis is not very promising, and there isn't a simple "spray-on" cure. I've compiled the following information to help you take steps to prevent tree problems before they occur and to alleviate problems as soon as they are detected.

Causes of Tree Loss

The causes of tree death are numerous and often interrelated. **Stresses to the root system are the primary cause of tree death.** Remember that 80-90% of a tree's root system is in the upper 12 inches of soil. Anything that damages the roots in even the upper 6-8 inches of soil may have serious consequences to tree health.

Trees exhibit root loss in several ways. Leaves may begin to dry out beginning with the leaf margins and tip. The top and outer periphery of trees are usually the first affected by the dieback associated with severe root stress, because they are the ends of the root tip to leaf pipeline, and the last to receive water and nutrients. When water is limited due to drought or root injury, they are the first to show dieback.

Construction can be devastating to trees. Physical injuries to trunks and limbs by careless equipment operators open wounds through which diseases and insects may enter. Trenches dug for utility lines sever roots. Compaction from vehicles and heavy equipment reduces soil oxygen levels and slows water infiltration, resulting in root stress and death.

Driveways, parking lots, sidewalks and home foundations smother and destroy tree roots. Raising the soil level by placing even a few inches of soil over most of the area of a tree also reduces oxygen to the existing root system, thereby smothering roots.

Building on a lot often changes the tree's environment significantly. Trees that were in a protected semi-shade location may now be in the blazing sun. Areas that were well drained may now tend to be waterlogged during rainy seasons as roof drains and changes in the surface slope redirect water runoff. Conversely, areas that were moist, providing a dependable supply of water for tree roots may now be drier and even droughty during extended dry spells. A tree's roots must adjust to these changes if it is to survive, and this takes time.

Droughts also take their toll. Trees on shallow and/or sandy soils, in crowded conditions and under other stresses lack the water reserves in the soil to withstand the extended dry spells. Grasses are strong competitors for soil water. Therefore, trees in pastures and grassy areas can suffer increased drought stress.

Stresses work to compromise a tree's natural ability to fend off insect and disease problems. Trees under stress are much more susceptible to insect and disease attack. In many tree species root rots, borers and canker diseases pose little threat until a tree becomes weakened by other stresses. Problems down the line with such pests may often be blamed on past drought, physical damage, and other stresses to the root system.

When it comes to stress related problems, not all trees are created equal. For example, post oaks are among the more susceptible to chronic, stress-related decline, while live oaks are much more resilient.

Preventing Tree Loss

Select Adapted Species

Much can be done prior to planting to prevent problems down the line. If you are planning on planting a tree in your landscape, select a species that is adapted to your area and specifically to your site. Don't waste time and money on a poorly adapted species! A species adapted to your general area of the state may not be well adapted to your site. Climate, soil type, depth and internal drainage are among the variables affecting tree growth.

Tree species vary in their growth rate and longevity. In general, a species that grows very rapidly will not be long lived. Slower growing species tend to make better, long-lived landscape trees. Proper fertilizing and watering can really "speed them up" during their early years.

Every species has its good and bad points. Know them before you make your purchase and you'll be much happier down the line.

Avoid Root Injury

Since most stresses are related to the roots, you should avoid damaging the root system whenever possible.

Trenching cut roots. Remember that 80 - 90 % of the roots are in the surface foot of soil, and most are within one- and one-half times the branch spread outward in all directions. The closer a trench runs to the tree trunk, the more roots will be lost. Route trenches as far from tree trunks as possible.

Many people design their homes to wrap around a beautiful, majestic tree on their lot. Often these trees end up dying within a few years necessitating expensive removal. Consult a qualified arborist before building around a prized tree! They can advise you on steps to take prior to building and care during the building process.

Adding soil to the surface can significantly change the aeration in the root zone resulting in root loss. Just how much can safely be applied at one time depends on the tree species, how much of the root zone is being covered and the type of soil or soil mix being added. As a rule of thumb, apply no more than 2 inches of soil over a tree's root zone. More may be applied to small areas to fill low spots. Removing soil to level the ground also can have a negative effect, as subsurface roots are exposed or cut.

Water Well During Periodic Droughts

Drought stresses roots. Although we get a moderate supply of annual rainfall, we usually experience a dry spell in the summer months. Sandy soil cannot hold much water, and reserves are quickly depleted. Soils with a layer of impervious rock near the surface are likewise unable to hold a large volume of water in the shallow root zone.

During hot summer weather, if it hasn't rained at least an inch in the past 14 days consider giving your trees a good, deep soaking. Apply a minimum of 1 inch of water to at least 6-8 inches deep to the area beneath and just beyond the branch spread of the tree, especially the outer 1/3 of this area. A Tree Hugger sprinkler is a great tool for focusing your watering on this area.

On rocky or sloped sites, it may be necessary to water for a while, turn the water off and let it soak in, and then water again. Set out a coffee can or other straight-sided container to catch sprinkler water and determine how long it takes to apply and inch or more. Repeat applications every 10-14 days in the absence of at least an inch of rain.

The standard advice for a cold is, "Get plenty of rest and drink lots of fluids." This is to make conditions optimum for your body to "heal itself" by avoiding stresses that weaken it further. The same may be said for stress-plagued trees, as many stress related problems lack an effective cure. The best remedy is to create a favorable environment for the tree (especially the roots) so it has the best chance of recovering.

If construction or other damage has already occurred, there is little you can do except wait and see, while you keep the tree(s) adequately watered, so their limited root systems do not lack what they need. Avoid applications of salt-based fertilizer during drought stress. In fact, any fertilizer is of minimal value until the tree comes out of the root/drought stresses and can use the nutrients to support growth.

Some Final Thoughts

Until the tree recovers and gets "back on its feet" it is in a very precarious position. Its chances of survival depend heavily on the species affected, the tree's general health going into the stress period, and your ability to alleviate the stress and prevent further stresses.

Landscape trees are too valuable to lose, especially when something could have been done to prevent it. An ounce of prevention is worth a pound of cure when it comes to avoiding stress and saving these valuable parts of a beautiful landscape.