Weathering the Storm, As a Tree
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Tree lore has long included a suggestion to folks caught in a storm...to not stand under an oak for shelter if lightning is part of the storm. Indeed, it's not wise to stand under anything that reaches in the direction of lightning! All trees are at risk to lightning and other kinds of storm damage, but the degree of risk varies with species and past practices.

Storm damage to trees, whether it be a result of wind, water or frozen precipitation, falls into one of 6 main categories: 1) blow-over, 2) crown twist, 3) stem failure, 4) root failure, 5) branch failure and 6) lightning. Each is a function of individual tree characteristics and weather events.

Wind is often a central component of the combination of factors resulting in damage. Trees are biologically engineered to adapt to normal wind conditions. Under normal weather conditions, trees sway. They sway with the wind under a load and release back during a calm. Wind firmness develops after several growing seasons as woody growth in the tree responds to these movements.

Blow-over and crown twist are examples of wind damage under abnormal conditions. Very strong winds such as hurricanes, down-drafts and tornadoes may physically knock an otherwise healthy tree over. Less strong winds may push over a tree already predisposed to damage because of past tree abuse or pest problems. Wind can also twist trees just like you might wring out a wet towel. The crown of a tree, simply put, is the green part (when the leaves are on). Very few, if any, crowns are perfectly symmetrical. In fact, some trees are very lopsided. Lopsided crowns will result in more wind loading on one side of the crown than the other and literally twist the main branches and trunk. This damage is usually magnified in weak areas such as old injuries.

Wind is also a player in stem, branch, or root failure but not the primary culprit. When a tree is wounded, it does not heal. Trees respond to injury by sealing. An injured tree walls off the injury and attempts to grow around it. As a result, old and new wood at an injury site is structurally weaker than normal wood. Under a wind load, an old injury site may be a weak link.

Branch failure ought to be more common than it is. I find it amazing that such a mass of wood can hold on to the trunk at all. A branch is only held to the trunk by successive layers of thin wood. This branch collar allows a branch to be flexible but disposable. If the branch becomes a liability to the rest of the tree, as may happen with insect or disease damage, the stem (trunk) can shut off the branch. Like the rest of the tree, however, branches are unprepared for sudden changes in the environment and are especially susceptible to wind damage after a coating of ice has increased the weight load.

While wood in the stem and branches gives trees their strength above ground, wood in a tree's roots anchor it in place. Some roots serve primarily to keep the tree upright while

others are mainly working to gather and transport water and nutrients. Damaging any type of root can result in root failure. Construction damage is very common and results in fewer roots trying to support the same tree. Greater physical stress on roots may result in pulled or snapped roots and a toppled tree with little more than mild weather events.

Lightning is perhaps the only type of storm damage that doesn't closely relate to wind, although the two usually perform in concert together. All trees, by virtue of their potential height, are candidates for an encounter with lightning. Some trees, however, are less likely to be damaged by lightning. During a storm smooth bark tree, such as beech and birch, are less likely to get blown apart if they are hit by lightning. This is because their bark is often wet in a continuous sheet from the top to the bottom. Water easily conducts electricity; therefore, the lightning will travel just outside the bark, in the water, to the ground. Rough bark trees, like most oaks, are only wet in patches with many dry crevasses in the bark. In this case, the lightning bolt zips along easily until it hits the end of a water slick at which time it is forced to choose its next best path. It moves inside the tree to the sap channels and because of the intense heat (50,000 degrees Fahrenheit) vaporizes the sap and explodes the tiny channels into oblivion, above and below ground.

Besides avoiding oaks in an electrical storm, now that you understand the basics of storm damage to trees… so what! Actually, there are several things homeowners can do in planning and protecting these valuable landscape elements.

1. Consider carefully what species of trees you plant. In general, the faster growing trees are more prone to breakage because of softer, weaker wood. Some species have very weak branch attachments because of branch structure and included (ingrown) bark.
2. Don't stake trees too tight or for too long after planting. Remember that trees need to move to develop wind firmness.
3. Practice proper pruning by cutting branches before they get bigger than 1" in diameter and by not damaging the branch collar, which is where the tree is best equipped to "seal" the pruning wound.
4. Give your tree TLC to promote natural health. Timely watering and proper fertilization, if necessary, will help the tree help itself.

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