Understanding and Identifying Tree Defects

Tree decay symptoms. Photo: John Fech

There are no perfect trees. Trees develop defects such as decay, cracks and root plate injuries that can become troublesome in urban environments. There are seven areas of defects that are of greatest concern. Thorough inspection is required to locate and evaluate each one. Photos and descriptions are a good place to start. Following up with a certified arborist that will take the time to train your eyes to find the defects is even better.

Decay

There are over 50 species of fungi that cause heartwood decay. Just like the adaptability of various tree species, each one has a region of the country in which it is able to grow and become infectious. Decay almost always occurs in a step-by-step fashion. First, a tree is wounded by hail, a chain saw, a juvenile delinquent, a string trimmer, etc., then decay fungi take advantage of the opening and enter the tree, passing through the bark, cork cambium, cambium, sapwood and into the heartwood. Next, the internal conditions facilitate the growth and development of the disease. Once infected with wood decay fungi, they degrade the sturdiness of the heartwood, lessening its ability to provide structural support.

Often associated with decay, conks are growths that can occur on the bark. They are attached to decay organisms inside the trunk. Conks are important to note because they are outward indicators of hidden internal conditions. Actually, many are quite attractive, and if in a forest or nonthreatening location, can be an educational tool for biology/ecology/science projects at various grade levels.

Cracks

Cracks are perhaps the most critical tree defect, as they are a physical separation of the bark and sapwood. This causes a concern by itself, as the potential for splitting and failure of the trunk becomes an obvious threat, but also as a vehicle for entrance of decay organisms that will degrade the quality and integrity of heartwood over time.

Another serious outcome is the interruption of water and nutrient conductivity via the cambium and sapwood, causing stress and insufficient materials for the crown. Again, cracks are more worrisome if they develop on a tree with important objects nearby.

Cracks are one of the most potentially damaging defects. Photo: John Fech

Girdling roots

Instead of expanding laterally, some roots wrap around the main trunk, compressing the bark. This restricts the transport of water and nutrients, and creates a failure point in the lower trunk. When feasible, arrange for visual inspection of the roots, including a proper spread prior to planting. For containerized or balled-and-burlapped trees, check for and prune roots — where possible — that are in the early stages of growing adjacent to the trunk or are in circular patterns. Unfortunately, pruning tangled roots creates a wound that disease organisms can enter, but in severe cases it may be the better alternative to leaving them to cause constriction with the trunk. Each situation is a judgement call for the tree planter.

Girdling roots compress root tissues against trunk tissue. Photo: John Fech

Codominant leaders

Strong branch attachments tend to be ones that develop in a 45-degree angle to the trunk. In certain cases, narrow angles develop either as side or scaffold branches or in the crown in the form of codominant leaders. Where this occurs, weak branch attachments to the trunk are created, increasing the likelihood of limb failure. Prevent this defect by pruning early in the tree's development to eliminate the weaker of two leaders and enhance healthy adjustment to a single-leader tree. Preventative pruning is best done when problematic branches are an inch or less in diameter.

Codominant leaders are much more consequential on large trees than smaller ones, such as Japanese tree lilac, crabapple or Shantung maple. Tall, heavy limbs that develop on silver maples and sycamores have the potential to break from the rest of the tree and cause major injury. If this occurs on a 15-foot crabapple, the result is less consequential.

Codominant leaders create weak points in a tree. Photo: John Fech

Leaning

Leaning is not necessarily a defect. However, when a tree's angle of lean increases over time, the chance for failure is significant. In some situations, leaning is the result of being struck with a piece of equipment or poor placement in the planting area, and the tree has adjusted over time by growing supporting roots to compensate.

Leaning becomes a defect when roots on one side of a tree deteriorate due to compaction or root rot and loosen from the soil, allowing the tree to fall to one side or another. In any case, the best diagnostic procedure for leaning is to monitor and document the degree of lean over time. At first, this should be done on a monthly basis. If no increase in lean is observed, the time between inspections can be increased.

Leaning should be monitored over time. Photo: John Fech

Basal injury/root plate defects

Buttress roots, basal bark and sapwood tissues are critical to the overall stability of a tree. When these are damaged, the potential for trunk failure is increased due to a degradation of the root flare. Use care around the base of trees to avoid injury from lawn mowers and string trimmers. Two to 3 inches of loose, coarse wood chip mulch placed 6 inches away from the trunk and extending 5 to 7 feet into the lawn/landscape will greatly decrease the chances of basal bark or root plate injury.

Basal injury creates structural weakness. Photo: John Fech

Growing conditions

Good growing conditions aren't a true tree defect, however, they have a significant influence on whether a tree with defects can overcome them or struggle in their presence.

Compacted soils, disturbed soils, construction activity, low organic matter soils, nutrient depletion, over or under watering and heavy nitrogen applications can cause significant dieback, which will compound the effects of the defects mentioned earlier in this article. Identify and mitigate these conditions whenever possible.

Importance of target/location

Targets are objects of importance on a property that trees or tree parts could fall on. The most common targets are people, houses, sheds, power lines, cars and fences. If a target is not close to the tree with defects, its level of hazard is much less significant. For example, a tree growing in a pasture is likely to be problematic to a grazing cow, but unless you're an obsessive carnivore, it's a much less worrisome target than a location with frequent human activity nearby. When inspecting trees, the target should always be considered in any recommendations.

So, now what?

This article contains information about and photos of the common tree defects. The next step in understanding them and providing good tree care is to see them up close, to touch and encounter them in a real-life setting.

As your knowledge and experience increases, strive to incorporate regular evaluation into every tree service call. Eventually, strive to evaluate each tree on a property and charge a reasonable fee for doing so. The goal is to get paid for providing quality care, both preventative and corrective, not for the amount of an insecticide or fungicide that can be sprayed on a given tree.

In the process of evaluation, consider how many defects are present and how extensive they are. There are many ways to conduct an evaluation, most of which involve some form of rating them on a scale from 1-10. It may go like this: "Sure, there is decay in this tree, but it's only in one area, it's not very extensive, and it's an oak/walnut/Osage orange. So, not too bad in terms of number of incidences, extent of the injury and the species of tree, which will allow it to spread slowly."

The extent of the decay and the tree species will determine the monitoring frequency. If extensive decay is present in a tree species such as cottonwood or silver maple — trees that are known to decay more rapidly than many others — a good approach is to obtain a contract for regular monitoring.

Monitoring is an ongoing process in that once the tree has been inspected and the defects have been documented in terms of specifics and extent, relaying the information to the customer becomes the logical next step. Information transfer to the client is a crucial requirement and needs to be tailored to their preferences. Some would feel most comfortable with a “walk and talk” through the landscape, while others would rather that detailed notes and photos be provided so they could follow up on their own.

Either way, the goal is to gather information, make determinations, document the findings, and inform the customer of the status of the trees on their property. Once this has been done, the pathway for sitting down with them to plan out a remediation or treatment strategy has been set in place, and progress towards dealing positively with tree defects has been accomplished.