New Albany Country Club Communities

2023 Tree Health Update

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INTRODUCTION

Ahlum & Arbor Tree Preservation has been responsible for managing the New Albany Country Club Community (NACCC) trees for more than 10 years. In that time, the NACCC and its urban forest have both grown substantially. More than 9,300 trees are currently part of the inventory and management plan. The ongoing goal has been to maintain and improve the health and vigor of the trees to provide a long-term, sustainable urban forest resource that can continue to grow. This goal is achieved through a combination of a comprehensive plant health care program, root health program, pruning, and GIS-based inventory tracking.

Throughout the management process, we provide periodic updates on various aspects of the plan. Current and future threats, updated methods or treatments, status of current pest levels, and ongoing maintenance work are all evaluated as part of these updates. This update will focus on five major topics of significant importance: Oak wilt, chlorosis, root health, weather factors, and the increasing interaction of large trees and infrastructure. The report will conclude with a summary of the current focus of maintenance work as well as an update on work completed since the last tree health update.

OBSERVATIONS AND DISCUSSION

Oak Wilt

Oak wilt is a fungal infection to oak trees (*Quercus spp.*) that has gained significant notoriety in recent years. It is certainly the most devastating disease of oak in Central Ohio. All oak trees are susceptible, though members of the red oak group (pin oak, red oak, black oak, etc.) tend to be more heavily impacted and may die within as little as a few months from the time of infection. White oaks (white oak, swamp white oak, chinkapin oak, etc.) are generally more tolerant of the infection and may last several years. There are no curative treatments once an oak has been diagnosed with oak wilt.

Oak wilt is transmitted between trees in two ways, root grafts between trees and by beetles. Overland spread, via beetles, is the main concern initially, as this is how the disease spreads over longer distances. Fortunately, oak wilt has not been observed in any oak trees within the NACCC. Although there are preventative chemical applications that can be done, these applications are costly and only last for two years. Chemical control is entirely unnecessary if there is not a confirmed case of oak wilt in the surrounding area. The best management practice is achieved by preventing conditions favorable for disease development, primarily by only pruning oak trees during low-risk times of the year (between September 1 and April 15).

Sap flow can occur through any wound to the tree, not just pruning cuts. We routinely monitor the oak trees within the NACCC for signs of oak wilt. If a tree is suspected of oak wilt, samples will be taken to confirm diagnosis. In the event that oak wilt does arrive in the NACCC, we are able to take appropriate measures to protect the remaining oak population.

Chlorosis

Chlorosis is a symptom of an underlying plant stress and is expressed as a yellowing of the foliage. The yellowing is the result of a lack of chlorophyll in the plant's leaves. Chlorophyll captures sunlight energy to drive photosynthesis. Without sufficient chlorophyll to capture light energy, plants are unable to produce sufficient energy for themselves and begin to decline. This has been a significant problem on red maples (Acer rubrum) and to some extent, various oaks throughout the NACCC.

In central Ohio, the most common reason for red maples to become chlorotic is due to a manganese (Mn) deficiency. Though most soils contain sufficient amounts of manganese, the micro-nutrient is often limited in plant availability due to elevated soil pH (alkaline soil, pH greater than 7).

Similarly, the most common cause of chlorosis in oaks is iron (Fe) deficiency. Again, while most soils contain sufficient quantities of iron, soil pH may limit availability to plants. Certain oaks, like pin oak (*Quercus palustris*) are more susceptible to iron deficiency due to alkaline soil, while others, like swamp white oak (*Quercus bicolor*) are more tolerant of alkaline soil and generally do not experience the iron deficiency and subsequent chlorosis.

Over the past 10 years a variety of approaches have been employed to correct the chlorosis in the red maples, including foliar Mn applications, soil applied Mn applications, trunk injection with Mn, and root enhancements (soil amendments). Unlike oak trees, which respond predictably well to trunk injections, red maples often exhibit mixed results. Some trees respond quite well, while others show little to no improvement. For this reason, red maples have been treated, primarily, via root enhancements and foliar/soil applications of Mn.

Root Health

An often overlooked but critical component to plant health is root health. Roots provide structural anchoring, access to water and nutrients, and serve as energy storage and transport. Trees that have healthier, stronger root systems typically live longer and require less maintenance. Stem girdling roots and soil compaction are two of the most common root health concerns.

Stem girdling roots are roots that have encircled the lower trunk of a tree. As these roots grow, they begin to reduce vascular function, strangling the tree. This is a chronic condition that, if left uncorrected, continues to get worse with time. Symptoms typically start in the upper canopy of the tree and include stunted leaves and twig growth, canopy thinning, and early fall color. In addition to causing significant biological health complications, stem girdling roots can negatively impact a tree's structure, resulting in an increased chance of a lower trunk failure.

There are many reasons for why girdling roots occur including nursery practices, cultural practices after planting, soil type, and plant species. Maple trees (*Acer spp*.) are especially prone to girdling roots and make up approximately 37 percent of the total NACCC tree population. For this reason, girdling roots have consistently been one of the main factors influencing tree health within the NACCC.

Since 2014, Ahlum & Arbor has been conducting root inspections of trees known or suspected to have girdling roots. Root inspections involve the use of compressed air to remove soil to allow visual examination of the root system, so that girdling roots can be severed or removed. The efficacy of girdling root removal is best on young trees, 12 inches in diameter or less. In the last four years, we have performed this service on a variety of species but have focused on younger trees due to due to the better effectiveness and lower cost per tree.

Soil compaction occurs most often in urban environments, especially around construction. Compaction involves the compression of the soil resulting in the breakdown of soil aggregates, ultimately making the soil more difficult for roots to grow through, reducing available pore space for oxygen and water, and altering soil hydrology. Typically, soil compaction will generally be greatest when heavy equipment is used in the when the soil is at or exceeds the point of saturation. Equipment access, material storage, and high-volume traffic associated with construction of new houses often results in tree lawns (the area between the sidewalk and the road) with very compact soils.

Typically, tree lawns are not ideal locations for trees. Construction stress and compaction, poor quality fill soil, limited root space, and unnatural soil composition are all factors. The best method for mitigating these myriad problems is to plant hardier species more suited to the available space. Tilling or plowing the soil after compaction but before planting can help alleviate soil compaction issues. Whenever possible, native soil should be left undisturbed, and trees should be planted in native soil rather than using fill soils.

Weather and Pest Pressure

One factor that varies year to year is the weather, which affects a wide variety of plant and tree-related topics. The most obvious factor that weather has is precipitation and the availability of water. Other factors that can be affected by weather conditions year-to-year are pest pressure and disease transmissibility. As the weather conditions vary, different pests will thrive and cause different pressures.

Aphids are a common landscape pest that infest a wide range of host plants. The family *Aphididae* has more than 4,000 species attributed to it worldwide. Aphids have piercing/sucking mouthparts, and feed by sucking sap from the leaves of the host plant. Due to the low nutrient density in sap, aphids consume large quantities of sap to filter out the nutrients. The excess sap is then excreted as a sugary liquid, often called “honeydew.” This sticky liquid will drip onto anything below the affected portions of the tree, like lower branches, sidewalks, or parked cars, where it will attract ants, flies, and bees. The damage caused to the plant by large numbers of aphids can quickly cause major aesthetic damage.

Many aphids have the ability to reproduce very quickly, so populations can quickly grow out of control if left alone. While there are a variety of ways to control aphids, normal weather conditions typically keep the populations at levels that do not require significant attention. Typically, Ohio springs are characterized by frequent rain, which will knock aphids off of the branches and leaves they are feeding on, slowing the feeding process and population growth. In years like this one, with unusually dry spring weather, aphid populations will explode to extremely high numbers and cause significantly more damage than normal.

Other factors affected by annual weather conditions include many fungal diseases like apple scab (*Venturia inaequalis*) and many forms of anthracnose. As fungal diseases prefer wet conditions, this year had relatively low fungal disease pressure, while years with more frequent rain will provide better conditions for fungal diseases to grow and spread.

Ahlum & Arbor monitors the various pests and diseases that affect trees and shrubs in the central Ohio region on an annual basis. This allows us to target the specific pests that are more active each year due to specific environmental conditions. Due to the dry conditions this spring, fungal issues this year are less than normal, though still present. Aphid treatments were a priority this spring and summer to combat the irregularly high populations, and some damage may still be visible.

Large trees, Infrastructure, and a Maturing Urban Forest

Many of the street trees throughout the community are beginning to reach more mature sizes. As tree size increases, the benefits and drawbacks both increase as well. Common benefits include more shade, better aesthetics, and higher property values. Common drawbacks are often infrastructure conflicts of varying types, with root conflicts among the most common. Management of large trees in an urban setting should focus on mitigating conflicts without compromising the benefits or health of the tree.

Roots and Infrastructure

As tree roots grow, they do not alter their relative position within the soil. They do, however, continue to increase in girth in the same manner as the trunk. This can cause a variety of problems. One of the most common root/infrastructure problems is caused when roots grow shallowly beneath sidewalks. As the small roots increase in size, the root can place a tremendous amount of directional force on the concrete. This becomes apparent as sidewalks begin to crack, lift, and sink. Depending on the severity of damage to the sidewalk, this can be either a minor aesthetic problem or significant safety concern.

Once damage becomes apparent, it will slowly get worse as roots continue to expand. Initially, it may be possible to shave down lifted sections of concrete or lift sunken sections to alleviate tripping hazards and cracks may be filled. These are short-term solutions. At some point, the sidewalk would need replaced and the afflicting root(s) removed.

Following root loss, damaged trees will have fewer fine, fibrous roots to absorb water and nutrients. This often results in trees that begin to decline within just a few years of the roots being removed. We routinely monitor trees that have been root pruned to gauge their response to this stress. When necessary, we apply a soil injected, liquid fertilizer to reduce stress and make sure the tree has sufficient nutrients. Additional applications, to suppress secondary pest insects, such as borers and scales, are often added as well. In some cases, if tree stability is significantly impacted or when the damage is too severe for the tree to recover, removal is recommended.

Similarly, a crack in a building foundation, drainage pipe, or other subterranean infrastructure can provide an advantageous place for a root to grow. As that root increases in size, the damage to the foundation or other infrastructure can be greatly multiplied by the force exerted by the increasing size of the root. As with sidewalk repairs, the offending root must be removed, and the damage repaired. While of a similar nature to the process to fix heaved sidewalks, this process typically does not result in as drastic an impact to a tree's root system. This is simply due to the limited extent of the root system that is typically involved and the typical proximity of the tree to the conflict.

Large Tree Canopies

While many people consider the canopy of a tree to be beneficial, there are infrastructure conflicts and other drawbacks that can be associated with increasing canopy sizes of large trees. While obstructing sightlines is a common use of trees, it can also be a negative aspect when sightlines are important. As most trees managed by the NACCC are planted along streets, it is important to maintain the safety and visibility of roadways. Branches can block sightlines of road signs, driveways, and intersections, causing traffic hazards. Regular maintenance pruning is one of the services that is performed. In addition to pruning to maintain the health of the tree, clearing signs and roadways is included in this service.

One of the primary benefits of large trees is shade. Tree-provided shade increases aesthetics, lowers utility costs, and moderates local temperatures. The most readily apparent of these is the increased aesthetics. The aesthetic of a tree-lined street with large arching branches shading the entire street is often the primary goal in establishing street trees. NACCC has several streets, for example, Landon Lane, that fit this description.

This aesthetic also carries with it management concerns. As trees expand their canopy, branches inevitably come in conflict with surrounding landscape features. Branches growing towards houses may sway in wind, impacting and damaging gutters, roofs, or siding and dead branches may fail and cause damage. The spreading canopy of a healthy tree may even crowd out another tree. Management of large trees, therefore, should focus on maintaining healthy trees while also mitigating interference and risk. Removing dead branches before they fail, providing clearance of buildings and other trees where necessary, and promoting good branch structure are common objectives.

CONCLUSION

As the urban forest resource continues to grow and mature, the focus of management should be on maintaining the health of the urban forest while mitigating hazards and infrastructure conflict. The NACCC urban forest is currently in good overall health, with a strong management plan. While oak wilt is a looming threat, it is a manageable threat, and preventative measures are already being implemented. Chlorosis and root health remain chronic, but manageable factors in any urban forest, with continuing work to maintain and improve the overall state of NACCC's urban forest. Weather and pest pressure cycles are continually reevaluated to allow for the most current management plans. As the urban forest continues to mature, more focus will be placed on the specific concerns that accompany mature trees while still maintaining proper care for new areas and trees.