The Plant Doctor's LANDSCAPE TIPS

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WINTER'S IMPACTS ON TREES (AND OTHER PLANTS)

INTRODUCTION

As I prepare this article in August for the special "Snow and Ice" edition of the Landsculptor to be distributed at the Snow and Ice Expo in September, the temperatures are ranging from the mid to upper 80s°F, with future forecasts into 90s. With these sweltering temperatures and high humidity, the last thing I'd tend to think about is winter. While perusing the photos I'd like to use in this article, at least the winter scenes provide some measure of "psychological air conditioning" (Photo 1) during the heat of summer.

Old Man Winter plays some nasty tricks on the plant world and the practitioners who manage those plants. Many of these tricks do not appear until spring or summer when trees and other landscape plants are supposed to be thriving. This article strives to convey some of those issues we experience as the result of adverse winter conditions and their impacts on our plant world.

SYMPTOMS AND TYPES OF WINTER IMPACTS

Trees and plants affected by winter conditions may include death (Photo 2), sparse foliage on branches (Photos 3 & 4), discolored foliage (Photo 5), sudden wilting of foliage (Photo 2 Inset), cracks

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Photo 2: This Ginkgo tree died from cold temperatures the first winter after transplanting to this visible location in front of this business. Trees suffering from winter-injury to their vascular system may initially leaf out (buds weren't killed by the winter) and then promptly wilt (Inset).

Photo 1: This scene typifies the winter in many northern states and Canada. I've always believed that if we must endure the frigid temperatures of winter, I'd rather have snow. However, snow and ice present many challenges to this industry's off-season work as well as to the plants we maintain in the "on-season."

Photo 3: These ornamental pears exhibit sparse foliage after a harsh winter. Both buds and cambium tissues were affected. Deicing salts also undoubtedly contributed to their decline at this site, but not at other locations where symptoms were also found.

Photo 4: This sweetgum is a somewhat marginal plant for Michigan, even with the recent climate change and hardiness zone modifications. This tree was adversely affected by the previous winter as evidenced by the sparse growth. Many sweetgums didn't survive the record setting 2014 winter in Michigan.

Photo 5: Conifer needle discoloration is common during wintery conditions. Note that even though the previous year's foliage was discolored, the new shoots are emerging just fine the following spring. Hence, this white pine will recover.

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and splits (Photos 6 & 7), other types of physical damage (Photo 8), among other ramifications. The tissues most often affected include cambium tissues (Photo 9A) and buds (Photo 9B) (meristematic tissues). It is not unusual for necrotic (nonviable, dead) cambium and buds to be found on the same plant (Photo 10). Internal wood in woody plants are likely to be discolored from cold temperature injury (Photo 11). Root tissues may also occasionally be affected, especially on grafted trees or trees not meant for a particular hardiness zone; when root tissues are damaged, the entire plant is more likely to be affected . . . and may die. Trees and plants most commonly affected by winter impacts are new transplants, stressed plants and those species not adapted to the climate into which they are installed. Following are some categories of "Winter Impacts", which many others and I often lump under the general term "Winter Injury."

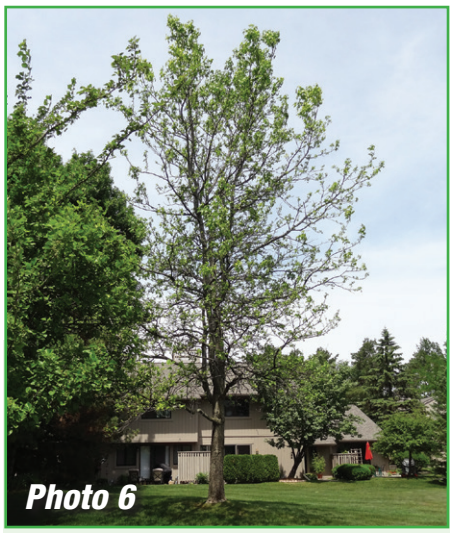

Photo 6: During subzero temperatures for many days during one winter in the early 1990's, the trunks of sycamores were know to split with a loud bang, mimicking the discharge of a gun.

Photo 8: Ice accumulation may not only affect conifer trees but also deciduous trees, particularly some species of oaks which hang onto their leaves past fall. Note gaping wound (inset). Many trees on the MSU campus exhibited broken branches during an ice storm one winter not long ago.

Photo 9A: Checking for viability of the branches after a very harsh winter may lead us to determine whether winter injury is involved. The twig on the left was killed by record low temps while the twig's cambium on the right shows a green, succulent viable cambium (vascular conducting tissues).

Photo 10: This climbing hydrangea exhibited both stem cambium and bud death after a harsh winter (center left in picture), resulting in sparse, yellow growth the following spring.

Photo 7: Southwest Canker, also known by many as Frost Crack" or "Sunscald", may occur on many species of trees, especially maple.

Photo 9B: Another technique to examine plants/trees for winter injury is to check branches for viable buds. This particular bud exhibits a black base, meaning it has been killed; a viable bud would exhibit a green succulent base where it attaches to the green succulent cambium of a viable branch.

Photo 11: Woody plants affected by winter injury often exhibit grayish-brown discolored inner wood tissue (right, compared to normal tissue left).

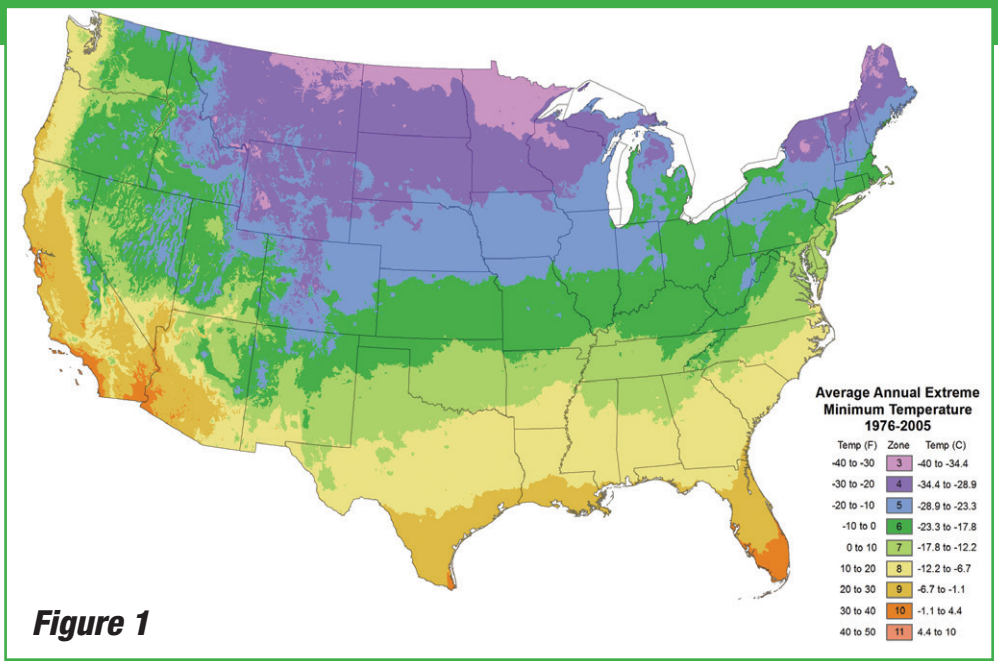

Figure 1

Cold Temperatures: Temperatures probably contribute the most serious affront to trees and landscape plants during the winter. Over the millennia of their evolution, trees have adapted to a particular climate where they are found. Problems arise most often when we take trees out of their native habitat and plant them in areas where they have little or no "provenance" (Photo 4). A tree or plant's adaptation to certain temperatures is known as its hardiness; hardiness zones are available in map-form for straightforward recommendations on what to plant where (Figure 1). Although several factors may be involved with temperature effects on plants, usually duration, absolute temperatures and sudden changes in temperatures are the major factors.

Sudden Changes in Temperature: Rapid changes in temperatures may cause severe winter injury symptoms on many plants, especially those not hardened off in the fall before cold conditions become established. For example, during the winter of 2018, many Douglas Fir trees turned red (Photo 12 & Inset), and the needles eventually were cast from the trees. Many people believed that some sort of needlecast disease was involved, but this was not the case. In my opinion, the sudden change in temperatures in the fall of 2017 instigated the problem. Many trees did not recover . . . according to arborists who were monitoring the trees.

Ice and Snow Accumulation: Ice and wet, heavy snow weigh a lot. Conifers are especially susceptible to snow loads that may bend and/or break branches (Photo 13). Even deciduous species may suffer from ice damage (Photos 8 & 14).

Cracks/Splits in Bark: Cold temperatures may cause a variety of issues on woody plants. Many years ago, during periods of extreme cold (many days below zero°F), sycamore trees were literally splitting with a loud crack, much like a shot gun going off. Another phenomenon is what I call Southwest

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Photo 12: Douglas firs around Michigan were extremely affected during the winter of 2018, likely from the sudden drop in temperature during the fall of 2017. The foliage turned a brilliant red (Inset). Many did not recover.

Photo 13: Snow and ice loads may not always lead to limb breakage. Nevertheless, such bending can damage internal tissues.

Photo 14: Relaxing with a glass of wine under a friend's large oak tree one hot August day did not foretell the disaster that was to occur one subsequent winter. During an ice storm, the tree toppled without warning, barely missing the house (Inset). The tree's roots had been compromised with Armillaria root rot.

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Canker, also known as "Frost Crack" or "Sun Scald" by many arborists. Southwest Canker occurs when the sun in the winter warms the south facing side of trees; as the sun drops below the horizon, the outer portions of the trunk, especially the bark cools much faster than the inner wood . . . causing a split to develop (Photo 7).

Winter Burn: I would ascribe "winter burn" to the symptoms we typically see with conifers where the foliage turns from green to tan or reddish in coloration. The public, nursery persons, landscapers and arborists have been known to misdiagnose this problem as needlecast diseases and/or death (Photo 15). In most cases, afflicted trees recover just fine, with time (Photo 5). Some do not, however (Photo 12).

Frost Injury: The Frost-Free Date in Michigan generally ranges from the last week in May in the Lower Peninsula to well into June for many parts of Michigan's Upper Peninsula. Nevertheless, with climate change as well as "normal" variations in temperatures, we can usually expect frost damage on plants such as early planted tomatoes or succulents, newly emerged foliage on trees and shrubs (Photo 16). Perhaps not technically considered winter injury, late spring frosts can harm trees and many other plants. When frost strike trees, the foliage often wilts and shrivels up. Trees have obviously adapted to this phenomenon and will usually survive by the emergence foliage from "secondary buds."

Photo 15: "Winter Burn" may occur in the nursery or landscape. These potted spruce trees were initially misdiagnosed with a needlecast disease; the nursery began dumping the pots before I was able to convince them that the plants would recover.

Photo 16: It is not unusual for many plants in Michigan to experience "Frost Injury" in the spring as tender, succulent shoots are emerging. In this case, spruce trees are affected.

Winter Injury in Summer: Because internal tissues of woody plants may be harmed during the winter, the symptoms of that winter injury may not be manifested until the stressful periods of a hot summer. The foliage may not only be sparse but may suddenly wilt or drop.

Deicing Salts: Many professionals in our industry are engaged in snow removal and deicing driveways, parking lots and walkways to create a safe environment for auto and pedestrian traffic. Unfortunately, deicing salts may cause severe stress on trees and shrubs (Photos 3 & 17).

WINTER'S IMPACTS MANAGEMENT

There are a variety of precautions we can take to minimize the impacts of Old Man Winter. For example, it is best to NOT fertilize and push growth late in the fall, which prevents trees and shrubs from hardening off before winter arrives, especially in those seasons when there is an early unexpected cold snap (which we cannot predict). To prevent deicing salt damage, there are alternatives to sodium chloride, which is probably the most economical deicer but also the most toxic to plant life. To prevent Southwest Canker, barriers can be installed in front of the trunks of susceptible species or trunks can be wrapped or painted white to reflect the heat. For more information on this subject material, please feel free to contact me or the fine MGIA administration to obtain past publications on the various topics reviewed in this article. For example, I published an article on Deicing Salts for the 2018 special Ice and Snow issue of the Landsculptor.

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Photo 17: In the spring of 2019, it was initially feared that these boxwoods had the newly introduced, dreaded "Boxwood Blight," a fungal disease. Diagnostic investigations disclosed that the main problem was deicing salts applied to the adjacent sidewalk.