Photo 1: Record, lingering snowfall and extremely low temperatures for extended periods adequately describe the winter of 2013-2014 in Michigan.

Photo 2: Many woody plants were damaged by ice and snow loads. Cleanup was delayed due to deep snow and extremely cold temperatures.

Photo 2 Insert: Jagged branches will impede healing, attracting pests and diseases; hence, clean-cut pruning is recommended for optimal healing.

Photo 3: Typical symptoms of winter injury on many woody plants such as this cherry include cambium death and inner wood discoloration.

The Plant Doctor's LANDSCAPE TIPS

By David L. Roberts, Ph.D., *Senior Academic Specialist, College of Agriculture and Natural Resources, Michigan State University*

SPRING INTO ACTION!

INTRODUCTION:

The winter of 2013-2014 has been one of the harshest in recent years if not decades (Photo 1). With record snowfall and record low temperatures for extended periods of time, questions we may be pondering is how these conditions are likely to affect our trees, lawns and landscapes during the coming year. And, there has been wild speculation in the news regarding the impact of this harsh winter on the survival of pests and diseases and their subsequent activity this coming season.

Because The Plant Doctor is receiving a variety of questions at the time of this writing in early April, it might be interesting to discuss and consider some of the issues we anticipate will affect our landscape plants.

SOME ISSUES THAT "MAY" BE OF CONCERN:

Winter Injury: Because of the record precipitation (snowfall) and the record low temperatures for extended periods, plant professionals are admittedly worried about the damage to and/or survival of trees, shrubs, turf and other landscape plants from problems summarized under a general heading of "winter injury." Perhaps a brief review of winter injury is justified. We encounter winter injury every year in various manners. The cause of winter injury is due to one or several factors in combination: absolute (low) temperature sometimes operating over time, wild fluctuations in temperature, and physical damage to plants due to ice and snow loads (Photos 2 & Insert), sometimes exacerbated by wind. And, of course, deicing salts can contribute to winter injury issues. Anatomical parts of plant that may be affected by winter injury include roots (especially on grafted plants not particularly adapted to Michigan climates), cambium tissues (Photo 3), bud tissues, and foliage (especially conifers). Different plant parts reacting to a diversity of winter injury causes will exhibit a variety of symptoms. It is important that we recognize symptoms of winter injury (also, please see the April 2009 issue of *The Landsculptor*, "Winter Injury on Landscape Plants"). While the winter of 2013-2014 was severe by most measures, so far two phenomena that we sometimes encounter in Michigan have not occurred at the time of this writing. One climatic difficulty for plants is the sudden drop in temperature in the fall before plants harden off; this sudden temperature change can kill buds and cambium tissues. Another phenomenon is significant warming trends (Indian Summers) during the winter months that sometimes lead to bud break, followed by bud (freezing) death. We still have some time before Michigan's frost-free date.

Some individuals have speculated that the frost line must also have reached

greater depths than normal. With a deep frost line, is it possible that more winter injury may have occurred? Answer, possibly. Presumably, a deep frost line would cause such plants as conifers to experience severe desiccation (Photo 4) and perhaps bud death. We must remember, however, that while bare ground areas might have developed a deeper frost line this past winter, many parts of Michigan had ample snow cover to provide a nice thick blanket of insulation. As I recall, and what made this winter somewhat unique to me is that the snowfall in late November and early December 2013, did not melt as it usually does; almost invariably most years, we receive snow in the fall followed by warming periods. However, because of the significant snowfall this winter and record deposition of deicing salts, there could be more potential for salt injury to plants. If rainfall does not leach the salt from soils, modest applications of irrigation might help. Salt dissipation in landscape soils can be monitored with a solubridge. Some individuals have initiated office betting pools as to when the huge piles of salt-laden snow banks will actually disappear (Photo 5). Until we advance into spring, it may be difficult to predict what winter injury effects we are to experience on our trees and landscape plants.

Storm Damage: Due to ice accumulation and heavy snow loads, severe limb breakage and, in some cases, whole tree failure occurred in many locations throughout Michigan (Photos 2 & 3). Due to the rather abundant snow accumulation, the removal of damaged limbs has been postponed. Many jagged wounds are currently visible; on valuable landscape plants, these wounds should be "clean pruned" to provide a wound that will heal more quickly and efficiently. Otherwise, jagged, slow healing wounds are more likely to be invaded by pest opportunists and disease agents that could initiate unwanted problems in the future. Some of the broken branches are still lodged in trees; these need to be removed for safety and liability reasons. One of the primary considerations in spring pruning is the potential for oak wilt on oak trees; for more information, visit my website www.treedoctor.anr.msu.edu.

Animal Injury: Because of the extremely low winter temperatures for long periods of time and the abundant snow accumulation in most regions of Michigan, it is expected that this past winter was very difficult for members of the animal kingdom. During such an adverse winter, deer populations as well as other animal species undoubtedly declined somewhat. Nevertheless, due to food shortages for animals, severe damage to plants by ravenous animals (Photo 6) has been evident, and further evidence can be anticipated as the snow disappears (Photos 7 and 8). The author predicts that rodent damage to plants will be one of the most startling and drastic effects on

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Photo 4: Frozen ground inhibits moisture uptake by plants, often resulting in foliage desiccation.

Photo 5: Ugly, dirty, salt laden snow banks may persist well into May. Landscape plants may be harmed by the deicing salt and long-saturated soils.

Photo 6: Due to deep snow and little exposure of food, deer and other animals were ravenous this past winter, causing extensive damage to landscape plants.

Photo 7: Believe it or not, these "sticks" poking through the snow bank are shrubs that have been buried for months. Expect extensive rodent damage to become evident as the snow disappears-see Photo 8.

Photo 8: Rabbits, mice and voles were ravenous this past winter; many preferred and non-preferred plants will likely be injured by these animals. Note bark removal by rabbits on these branches.

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plants from this past winter. Other than installing protection/deterrents/repellents in the future and encouraging those plants not mortally affected to recover, little can be done at this time.

Survival of Pests: Interestingly, there has been significant debate during the winter months about the survivability of pests during such a harsh winter. For some reason, perhaps unrestrained optimism, the survival capabilities of the Emerald Ash Borer has been an often discussed topic. Because we know that the natural range of *Agrilus planipennis* (EAB) extends into Siberia, it would be reasonable to conclude that, by and large, the EAB will survive just fine in most regions of the U.S. and Canada. In general, insect populations may decrease in very harsh winters. However, predators and parasites of those pests may also decrease in populations. Hence, it is difficult to predict whether pests will need less or more inputs this coming season. Because pest populations can increase rather quickly, it is probably prudent to assume management strategies typical for most seasons until we learn differently.

Survival of Diseases: As with pests, the populations of disease agents may decrease during harsh winters. However, the typical populations (spores, etc.) of disease agents are so "prolific" that it is virtually impossible to predict less or more disease activity, say from Apple Scab or Tar Spot. And perhaps unlike insect pests, the incidence of disease activity is primarily dependent on environmental conditions at the time of dispersal and infection. Hence, in the author's opinion, professional plant health care providers should probably assume a normal year of disease activity.

Precipitation: For quite a few years, certain regions of Michigan have experienced severe drought. Water levels in the Great Lakes have steadily decreased, creating a whole series of issues. The abundant snowfall this past winter is likely to help restore some of the water loss in the lakes and aquifers. In some areas, especially with spring rainfall, some areas are likely to flood. It is anticipated that some turf areas will need renovation and that the roots of some trees and shrubs will be injured, perhaps necessitating plant replacement in some landscapes. L

For more information, please feel free to email David Roberts at robertsd@msu.edu or contact a professional plant health care provider. The author, MSU and MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.