

Tree survival skills: Stresses during handling and transport affect tree health

May 4 2009

Consider the cumulative stresses that transplanted trees must endure from the time they are harvested until they become established in a landscape. Multiple stress factors can mean the difference between survival and death for trees. For starters, when "balled-and-burlapped" trees are dug prior to transport, the majority of the root system is often separated from the tree. After this initial stress, trees are typically taken to a loading site and placed on trucks or trailers for shipment. At each stage of the transplanting process, trees are exposed to mechanical shock and vibration that can further disrupt the root system and cause considerable injury.

As if these issues are not harmful enough, [trees](#) are not usually watered during transport. If they are not covered to limit evaporation, the trees are apt to suffer additional damage. Transplanted trees can also be subjected to rapidly changing temperatures and humidity levels as they are moved from sunny to shady sites, from low to high elevations, in and out of box trailers, and across plant hardiness zones—all of which may occur in the course of a few hours. All these stress factors can add up to significant trauma, shock, and even death for these vulnerable trees.

Although any one of these stress factors may be the sole cause of a tree's death or decline, it is more likely a combination of stress factors that leads to trees' reduced growth or death after planting. Water stress, mechanical damage, or [extreme temperatures](#) alone may be sufficient to severely damage or kill a transplanted tree; when these stressors are combined, the prospect of trees' survival in the landscape is greatly

reduced.

Andrew K. Koeser, J. Ryan Stewart, Germán A. Bollero, and Donald G. Bullock from the University of Illinois at Urbana-Champaign, and Daniel K. Struve from The Ohio State University recently published a study in *HortScience* that examines the impact of stress on balled-and-burlapped trees. "We hypothesized that stresses associated with handling and transporting nursery stock during transplanting could be directly linked to reduced tree growth and survival within the first year of establishment. Identifying the specific stress factors responsible for transplant shock and when they occur is crucial if the process is to be improved", Stewart explained.

To determine the short-term impact of transplanting on health and establishment of woody plants in the landscape, the researchers studied maple trees at three critical stages in the transplanting process (initial harvest, handling, and transport) at three sites in Illinois and Wisconsin. Norway and red maples were subjected to three distinct treatments: root-pruned, handled, and transported. "Our intent was not to look at potential treatment differences between the two maple species, but rather be able to generalize our results to transplanting events of several woody species. We then used this information to identify key stages in the transplanting process that diminish transplanted tree growth and survival", the scientists said. Effects of water stress, root severance, and root-ball disruption on twig elongation and tree survival were measured for each treatment and compared with unaltered control trees.

Harvested root balls can be extremely heavy and are relatively fragile. The researchers observed visible damage of root balls during the study. "Based on the data, it appeared the majority of this damage occurred during the handling process. Results suggest rough handling before and after transport should be minimized in an effort to maximize growth and transplant success", remarked Stewart.

The scientists advise that handling should also be minimized when trees are transplanted in order to reduce stress and establishment time. They recommend careful planning to prevent unnecessary movements of trees at both the nursery loading area and landscape site and warn that if trees are placed in mulch or composted material for an extended period of time, burlap may quickly deteriorate in warm, moist substrate.

Information from this research study can be beneficial for tree growers and end-consumers alike. The resulting recommendations can translate to fewer financial losses by offering alternative handling and planting methods that enhance the health and vitality of transplanted trees.

More information: The complete study and abstract are available on the ASHS *HortScience* electronic journal web site:
hortsci.ashspublications.org/content/abstract/44/1/53

Source: American Society for Horticultural Science

Citation: Tree survival skills: Stresses during handling and transport affect tree health (2009, May 4) retrieved 26 April 2024 from
<https://phys.org/news/2009-05-tree-survival-skills-stresses-affect.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--