



Strategies to Reduce Infrastructure Damage by Tree Roots: A Symposium for Researchers and Practitioners

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Introduction

Urban forests are valued for the aesthetic, environmental, social, and economic benefits they provide. These benefits do not come without costs, however. Damage to infrastructure by tree roots is a major expense for practically every city in the United States. It is estimated that California spends \$70 million annually for street tree damage to sidewalks, curbs, and gutters. This figure does not include damage by trees located in parks, yards, or other off-street areas. In addition, it does not include damage to driveways, foundations, parking lots, sewer lines, or other infrastructure elements. Collectively, infrastructure damage by tree roots is a sizable economic problem. Other states and countries likely incur proportionally similar costs.

In addition to economic losses, significant losses to the urban forest result. Many trees have been re-

moved because of infrastructure conflicts. In fact, infrastructure damage is named by city tree managers as the second most common reason for tree removal in California.

On March 31- April 1, 2000, a two-day symposium entitled "Strategies to Reduce Infrastructure Damage by Tree Roots" was held at the University of California, Davis, to address this problem. Sponsored by the Elvenia J. Slosson Endowment Fund, University of California, UC Cooperative Extension, USDA Forest Service, and Western Chapter of the International Society of Arboriculture, the Symposium brought together nationally and internationally renowned researchers, educators, tree managers, consultants, landscape architects, infrastructure engineers and urban planners.

Objective

The overall objective of the Symposium was to initiate a process that will lead to the publication of guidelines for reducing root-infrastructure conflicts in urban areas. These guidelines would be used by cities and other public or private agencies to both prevent and mitigate problems. Important characteristics of the guidelines include:

- They should be developed by researchers and practitioners. This partnership of field experience, tree management, and research skill is essential.
- They should be broad-spectrum and multidisciplinary. They will require contributions from soil scientists, root biologists, plant physiologists, horticulturists, urban foresters, arborists, consultants, landscape architects, planners, engineers, and economists.
- They need to be proactive, not reactive. The strategies which have the highest potential for reducing damage, and which are economically feasible, need to be included in the guidelines.
- As much as possible, they are developed from research-based information.

Symposium

Work was focused in three areas: 1) an assessment of the current state of knowledge concerning root-infrastructure conflicts, 2) the identification and prioritization of research and education needs, and 3) the development of a broad-spectrum, multi-disciplinary research and education plan.

During the first day, researchers and practitioners delivered papers addressing their latest findings and experiences concerning tree and infrastructure conflicts. The second day was devoted to the identification of existing and promising new strategies to reduce

damage. Participants separated into one of three groups in the areas of Root and Soil Management Solutions, Design and Planning Solutions and Engineering Solutions (Construction and Materials). Action plans prioritizing research and educational needs were developed by each group.

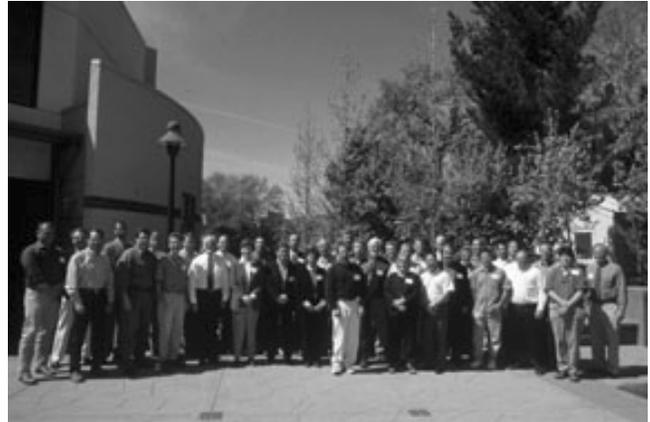
In **Root and Soil Management Solutions**, the need for continued basic research on root biology and physiology in the urban setting was emphasized. Species selection and cultivar development of trees with root architectures compatible with building materials was a priority. More information is needed regarding the long-term effects of root guidance methods (barriers, trenching, chemical control).

In **Design and Planning Solutions**, alternative designs for traditional urban elements were considered a priority. Street designs need to be reevaluated to include non-traditional tree planting locations (groves or clusters), larger easements or bigger planting holes. Sidewalks need to be redesigned, relocated or even eliminated. Of prime importance is the education of stakeholders and consumers about new design and planning options and how they will benefit the urban forest.

In **Engineering Solutions**, ideas for materials, design, site preparation, directional root growth and planning were advanced. Research and field testing of alternative pavement materials was seen as important, including stronger or flexible (rubberized) concrete and asphalt, the addition of rebar or wire mesh and inclusion of allelopathic chemicals or root toxins. The long-term effects of temporary repair methods, such as concrete jacking to level walkways and sidewalk grinding and ramping, need to be more fully determined. Planning agencies need to match the life expectancy of landscape and hardscape elements so as to get the maximum service life out of each.

After developing action plans for each of the three solution areas, Symposium participants met to prioritize collective needs and develop post-Symposium plans. Needs were listed for each solution group in the areas of research, communication (education), and further testing.

The Symposium was considered to be a first step in the long-term process of reducing infrastructure damage by tree roots. Future steps need to focus on completing the priority work identified and developing effective technology transfer methods.



Participants in Strategies to Reduce Infrastructure Damage by Tree Roots: A Symposium for Researchers and Practitioners held at UC Davis on March 31-April 1, 2000.

Proceedings

Following the Symposium, proceedings were compiled, published, and distributed to Symposium participants (Costello et al., 2000). Both formal presentations and summaries of breakout sessions were included. Copies are available from the Western Chapter, International Society of Arboriculture, 235 Hollow Oak Dr., Cohasset, CA, 95973.

Literature Cited

Costello, L.R., E.G. McPherson, D.W. Burger, L.L. Dodge. 2000. *Strategies to Reduce Infrastructure Damage by Tree Roots: Proceedings of a Symposium for Researchers and Practitioners*. **Western Chapter, International Society of Arboriculture**, Cohasset, CA.

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