

# ISA Research Trust - Greening Our Future

Greg McPherson and John Lichter

**T**he purpose of this article is to highlight research funded by the ISA Research Trust that is especially relevant to Western Chapter members. A brief synopsis of the research is presented, and the application of the research findings to different aspects of the arboriculture profession are discussed. We hope that this information will generate interest in current research, and we welcome your letters.

**Article:** Tree Root Response to Circling Root Barriers

**Authors:** L.R. Costello, C. L. Elmore, S. Steinmaus

**Citation:** Journal of Arboriculture, Nov., 1997, Vol. 23(6), p. 211-218.

**Grant Program:** Duling Grant, 1993, \$2,500.

**Other Funding Sources:** U.C. Cooperative Extension, Reemay, Inc.

## Synopsis

Although root barriers are widely used to reduce damage to sidewalks and curbs from tree roots, relatively little is known about root response to barriers. Studies indicate that barriers can effectively deflect roots downward, but the extent to which this retards their movement upward and subsequent infrastructure damage is unclear. The purpose of this study was to quantify the effects of four circling barrier products on root growth and distribution.

Root numbers, diameter, and depth below ground were measured for Raywood ash (*Fraxinus oxycarpa* 'Raywood') and Lombardy poplar (*Populus nigra* 'Itatica') three years after the trees were planted with and without circling root barriers. The primary effect of the barriers

was to reduce the number of tree roots compared to control trees with no barriers. Theoretically, fewer roots should mean less damage to sidewalks and curbs. However, one large root in the wrong place can wreak more damage than many small roots. Thus, fewer roots do not necessarily mean less infrastructure damage, Root diameter and depth also can contribute to damage.

The study found little difference in root diameters and depths for trees with and without barriers. Generally, roots of all treatments and the controls became smaller in diameter and shallower in depth from 30 to 150 cm away from the outside of barriers. Also, differences in root response among the barrier types was relatively minor.

An important finding of this study is that subsurface soil cultivation resulted in significantly deeper roots compared to roots from trees in uncultivated soil. Cultivation resulted in lower soil bulk densities, presumably accounting for a greater number of surface roots in the uncultivated plots.

This study indicates that after roots grow under barriers their distribution is largely controlled by plant genetics and the soil environment. Deep cultivation of soil may reduce damage caused by shallow roots, especially in otherwise compacted soils.



Selecting tree species with slower, smaller growing root systems may delay conflicts between roots and paving. The authors conclude by noting that further work is needed to link sidewalk damage with root system size, distribution, and rate of development. Long term studies of root barrier effects on tree health and structural stability are needed as well.

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## Practitioner's Perspective

The results of this study indicate that under similar conditions, the use of root barriers only significantly affects one of three factors (the number of roots) which influence the likelihood of root damage to infrastructure. This information underscores the need for a multi-faceted approach to reducing hardscape damage from tree roots. Dan Condon, City Arborist of Santa Barbara says his department is using a combination of approaches including root barriers (at planting and following root pruning), tree replacement, appropriate species selection, larger planting areas and innovative sidewalk design.

Condon pointed out that the results of this study suggest that

**deeper soil cultivation prior to planting may help to reduce the likelihood of root damage by encouraging deeper roots (the study also revealed significantly greater growth rates from cultivation).**

While this may be possible on certain sites, Condon was quick to point out that for street trees, the results of cultivation (lower soil bulk densities) are contrary to the needs of the engineers and contractors building the sidewalk who desire high soil densities under hardscape to avoid soil settling.

Similar to the researchers, both Condon and Chris Boza, Urban Forester, City of Chico have observed that roots grow toward the soil surface after being deflected by root barriers. Therefore, the possibility of hardscape damage from these roots exists. However, as Boza points out, trees planted with root barriers have deeper buttress roots which reduces the likelihood of damage from these larger roots.

As the authors point out, arborists would benefit from further research in this area.

For now, the results of this and a few other studies coupled with our experience will have to suffice. After utilizing root barriers for twenty years, Condon concludes

that "root barriers buy time." We'll see. John Lichter, M.S. Tree Associates Winters, CA

# News You Can Use!!!

## Your International Representative Reports!!!

The international Board held its winter meeting at the Stakis Birmingham Metropole Hotel.

## 1998 Conference

The Annual Conference will be held at the National Exhibition Center (NEC) in Birmingham. The NEC is directly adjacent to the Stakis Metropole Hotel. Both are directly accessible (10 minutes shuttle ride) to the Birmingham International airport and train station. All are some distance from downtown Birmingham (15 minutes train ride).

Although the final program is still being developed, I was impressed with the overall quality of the educational program. I'd like to encourage your attendance at this meeting! It looks to be a great one.

## Certification

John Hendricksen and Derek Vannice reported on the activities of the Certification program including completion of surveys of both Certified Arborists and consumers by Communication Research Associates. Both groups responded very favorably to Certification!

## European Office

The Society has established an office in Europe, headquarters in England. Russell Ball, former Executive Director of the National Tree Officers Association, has assumed the position of European Senior Executive.

## New Chapters

The Board Approved Sweden, the Czech Republic and Spain as the 34<sup>th</sup>, 35<sup>th</sup> and 36<sup>th</sup> chapter of the ISA.

## Nominations

The Board approved the following candidates for the position of International vice-president:

John Hendricksen

Norm Easey

If you have any questions, comments or concerns about the ISA, please feel free to contact me: HortScience, Inc. PO Box 754 Pleasanton, CA 94566. 510-484-0211  
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Respectfully submitted,

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International Representative.