

ELVENIA J. SLOSSON ENDOWMENT FUND
PROGRESS REPORT for 2001-2005

Project Title: Selection and propagation of deep-rooted ornamental trees for urban environments

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The overall objective of this research project was to identify, select and propagate appropriate urban tree species with vertically oriented root systems that won't displace sidewalks and curbs. Phase 1 involved a survey of northern California cities to identify species for study. That resulted in the selection of *Fraxinus uhdei*, *Pistacia chinensis* and *Zelkova serrata* as test species. Phase 2 focused on the field planting, identification and quantification of individuals in each of the three species having root systems that were either shallow-rooted or deep-rooted. Phase 3 determined whether vegetatively propagated individuals from trees with known root architecture characteristics will maintain that trait.

Materials and Methods

Fifty, seed-propagated liners each of *Fraxinus uhdei*, *Pistacia chinensis* and *Zelkova serrata* were planted in field plots in Davis. In late 1998, the root systems of half the trees of each species were exposed using a newly developed supersonic air technique (Gross, personal communication). Each root system was marked and photographed from 3-4 angles. The photographs were scanned and imported into PhotoModeler Pro 3.0 (Eos Systems, Inc.) computer software for the creation of three-dimensional models. The 3-D models were used to determine the vertical orientation angles of each tree's major roots. Those individual trees having the largest (shallow-rooted) and smallest (deep-rooted) mean vertical angle from the soil surface were selected for vegetative propagation by cuttings and subsequent field trial in Phase 3.

Results and Discussion

Successful propagation of four clones of *Fraxinus* selections (2 shallow-rooted and 2 deep-rooted selections) and two clones of *Zelkova* (1 shallow-rooted and 1 deep-rooted selection) was accomplished in July, 2001. In August, 2001, ten rooted cuttings of each genotype were planted in the field on the UC Davis campus. Since then the trees have gotten luxurious amounts of water and have been fertilized once each year. In February, 2005, a pneumatic air soil excavation device was used to expose the root systems of the *Fraxinus* trees. Three-dimensional models of those trees are in the process of being constructed. In February, 2006, the remaining *Zelkova* trees will be excavated and all models for all trees will be completed. Immediately after that all results from this project will be summarized and published. I've let the trees grow in the field for a longer period of time than originally planned to be sure the root systems we measure accurately reflects the trees' true root architecture.