TREES ROOT DEVELOPMENT IN CONTAINERS
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Trees planted in urban areas contribute to energy conservation and beautification of the environment. Unfortunately, there is a high mortality rate for trees transplanted into urban sites. Surviving trees often bring about a major long-term cost from the damage their roots inflict upon sidewalks and other paved areas. Poor tree establishment and shallow root growth after transplanting can frequently be attributed to poor root development in the original container-grown nursery stock. Recent research findings suggest that trees produced in unconventionally shaped containers or treating inner surfaces with root-inhibiting compounds may result in better quality root systems, reduced root damage to pavement, and better establishment rates.

Objectives: This study was designed to determine whether root and shoot development are influenced by container configuration (diameter x height) and volume. We will determine whether trees grown in 1-, 3-, and 5-gal. pots in tall, narrow containers will have more roots and increased shoot growth compared to plants grown in conventional containers of the same volume. The second objective will determine whether plants grown in containers that are coated with a root inhibiting compound, cupric hydroxide, will have better quality roots, less circling roots, and more biomass production than plants grown in untreated containers.

Production results in 1-gal. containers: Ficus (Ficus retusa L. ‘nitida’) and Brazilian pepper (Schinus terebinthifolius Raddi.) liners were grown for 6 months in the greenhouse in 1-gal. containers. Cupric hydroxide coating prevented matting of roots on the side of the root ball in both species and root circling at the bottom of the containers in ficus. Pepper trees grown in regular-shaped containers had a higher biomass production versus trees growing in tall containers.

Production results in 3- and 5-gal. containers: Plants were transplanted from the 1-gal. pots to 3- or 5-gal. containers with tall or regular shape and with or without cupric hydroxide coating on the inner surface of the containers. Plants were transferred from the UC Riverside greenhouse and grown in the 3- and 5-gal. containers outdoors in a nursery in Irvine, California. Pepper trees grew much faster than ficus and were evaluated after 4 months in the nursery, when they started to outgrow their containers. For pepper, cupric hydroxide coating versus no coating reduced circling and matting of roots. Trees in regular versus tall containers had increased above ground biomass, and trees in 5-gal. versus 3-gal. containers grew more medium and small-sized roots and produced more total biomass.

Ficus trees remained for 9 months at the outdoor nursery until they had completely filled the container media with roots. For ficus, the least amount of root matting was found in plants growing in tall, cupric hydroxide-treated containers. Plants in regular-shaped 3-gal. containers had fewer small roots and a lower total root dry weight than plants in tall 3-gal. containers. Small and total root mass in 5-gal. containers was higher in regular versus tall-shaped containers. Ficus trees grew taller in regular 3-gal. versus tall 3-gal. and in tall 5-gal. versus regular 5-gal. containers. Cupric hydroxide alone affected shoot and large root dry weights, with higher weights for plants in coated containers and lower weights for plants in uncoated containers. Total dry weight, including shoot and root mass, and caliper of ficus trees was not affected by any of the treatments at the end of the nursery production phase.