Effect of Container Type on the Nursery Growth of Two Palms©

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Palms have a fibrous, adventitious root system where all primary roots arise independently from one another from the base of the stem in an area called the root initiation zone. Because of the nature of this root system, palms are especially amenable to container culture. Commercial growers, collectors, and hobbyists grow palms in containers for potting up, sale, and/or placement in the landscape. Palms are typically grown in traditional, straight-sided, solid-wall containers. Several nontraditional containers with perforated side walls that allow air pruning of roots reportedly to enhance growth of shrubs and trees through development of a stronger denser root system have been introduced to the nursery trade. Fitzpatrick et al. (1994) found that mahogany [*Swietenia mahagoni* (L.) Jacq.] grown in air-root-pruning containers had lower root mass and higher shoot-to-root ratios compared to trees grown in standard black plastic containers while Marshall and Gilman (1998) found that red maple (*Acer rubrum* L.) grown in air-root-pruning containers had reduced root ball mass and fewer roots deflected by the container sidewall compared to trees grown in standard black plastic containers. Would these nontraditional container types be beneficial for nursery container production of palms? We conducted a 2-year study at Keeline Wilcox Nursery in Oxnard, California to answer this question.

In May 2008, using the nursery's standard potting soil, we potted 1-qt kentia palms [*Howea forsteriana* (F. Muell.) Becc.] and 1-gal king palms [*Archontophoenix cunninghamiana* (H. Wendl.) H. Wendl. & Drude] into seven different container types/volumes for each species (four container types, two sizes of three of the types). We used 10- and 14-in. standard nursery containers (Nursery Supplies, Inc., Orange, California), 3- and 5-gal RootBuilder® containers, 10- and 13-in. RootMaker® containers (Rootmaker Products, Co., Huntsville, Alabama), and 12-in. Accelerator® containers (Nursery Supplies, Inc., Orange, California). The study was set up as a randomized complete block with two palm species, seven treatments (container types), and 20 replications for a total of 280 palms/containers. We tagged the newest emerged leaf of each palm and set them out under 50% lath shade. At 6-month intervals we recorded stem diameter, quantity of leaves produced, and overall quality. In April 2010 we harvested the roots, dried them, and recorded their dry weight. Keeline Wilcox Nursery irrigated and managed the palms as they did for kentia palms in adjacent production bays. Because we primarily wanted to compare the container types, we controlled for initial stem caliper and container volume in data analysis.

Results showed that none of the nontraditional container types produced more leaves, greater stem diameters, more root mass, or higher quality than traditional containers. Also, no container produced lower root mass. RootMaker was equivalent to the standard nursery container for growth and quality for both palm species. RootBuilder produced significantly fewer leaves and smaller stem calipers for both species and poorer quality for kentia palms than the standard nursery container, but the same quality for king palms as the standard nursery container. Accelerator produced significantly fewer leaves, smaller stem calipers, and lower quality than the standard and RootMaker containers for both species and smaller stem calipers and lower quality than all other containers for king palms. Generally, palms in larger containers tended to produce more growth and were of higher quality than those in smaller containers. RootBuilder containers had to be assembled and their straight sides precluded stacking empty containers in nested fashion to save space.

Thus, we feel that none of the non-traditional container types were advantageous for growing palms. The generally poorer growth in the nontraditional containers might have been due to the perforated side walls allowing excessive drying out of the potting soil between irrigations, which were scheduled to optimize growth in kentia palms in adjacent production bays. Also, we found that the sidewall-slits in the Accelerator allowed potting soil to be washed out of the container and water lost at each irrigation, exposing the roots and causing excessive drying.

We thank Keeline Wilcox Nurseries for donating the kentia palms and some of the containers, allowing us to conduct this experiment at their facility, and irrigating and managing the palms in the research plot; ABC Nursery in Gardena, California, for donating the king palms; and Nursery Supplies, Inc. and Rootmaker Products Company, LLC for donating containers.

LITERATURE CITED

Fitzpatrick, G.E., R. Sackl, and **J.H. Henry.** 1994. Using air root pruning containers to enhance compost efficacy. Proc. Florida State Hort. Soc. 107:432–434.

Marshall, M.D., and **E.F. Gilman.** 1998. Effects of nursery container type on root growth and landscape establishment of *Acer rubrum* L. J. Environ. Hort. 16(1):55–59.

QUESTIONS AND ANSWERS

Douglas Justice: Were the palms clonal?

Don Hodel: No, they weren't clonal; they were grown from seeds.

Douglas Justice: How uniform were those seedlings?

Don Hodel: They were fairly uniform. There were some differences in stem caliper and the number of leaves they had at the beginning. We compensated for the initial variation when we analyzed the data.

Loren Oki: Do you think the differences might be due more to water relations rather than container architecture? Maybe more water lost through the containers with slots on the side?

Don Hodel: There weren't any significant differences in the root mass in the various containers at the end. It could have been related to the soil drying out faster, perhaps.