Recent Advances in Planting and Transplanting Palms©

Donald R. Hodel
University of California, Cooperative Extension, 700 W. Main St., Alhambra
California 91801, USA
Email: drhodel@ucanr.edu

INTRODUCTION

Palms are the iconic plant material of Hawaii, the southwestern United States and many parts of Latin America. Their unique biology, especially the manner in which all primary roots are produced independently from one another in the root initiation zone at or near the base of the trunk or stem, enables even large specimens to be successively transplanted with a relatively small root ball, resulting in instant, mature landscapes (Hodel, 2012). Here I provide a summary of the most recent advances in the planting and transplanting of ornamental palms.

PLANTING

In contrast to transplanting palms, where root disturbance and destruction is severe, planting palms from containers, where roots are little damaged or disturbed, is relatively uncomplicated. Palms can be planted from containers into the landscape at any time of year in tropical and subtropical regions, but is best done in late-spring or early summer in more temperate areas where winters are severe and/or long.

Dig a hole as deep as the root ball and twice as wide. Carefully remove the palm from the container and place it in the hole. Cutting or prying apart dense root systems is unnecessary. Next, you should backfill the hole with the same soil that was removed in making the hole and be careful to tamp it gently around the root ball to remove air pockets. Amending the backfill soil with organic matter is not recommended (Hodel et al., 2006b). Construct an irrigation berm at least the diameter of and encircling the planting hole. Apply a palm-special fertilizer (high N, K, and Mg, with all elements in controlled-release form), following label rates and frequency, and 2 in. of mulch within the irrigation basin (Downer and Hodel, 2001). Irrigate judiciously, maintaining the root ball, backfill, and surrounding site soil evenly moist. Remove the irrigation basin after one growing season if the palm will be irrigated with the surrounding landscape or by a drip system; otherwise retain it, gradually widening the diameter several feet per year for up to 5 years.

TRANSPLANTING

Transplanting palms generally requires more exacting and special procedures because the practice results in significant destruction and disturbance of the root system. Major factors to consider include time of year, root ball size, leaf removal and tie up, and sand backfill.

Time of Year

The key to successful and rapid establishment of transplanted palms is rapid regeneration of the severed and/or damaged root system. Palm root growth is most rapid during the warmer months (Broschat, 1998; Hodel et al., 2005). Thus, the optimal time to transplant palms in temperate and subtropical regions is late spring to early summer to ensure a long, sustained period of rapid root growth. Transplanting palms in the fall or winter increases the chance of failure because root growth is slow or lacking, further stressing the palm and leaving it susceptible to diseases, pests, and disorders. In tropical regions with constant year-round warmth, palms can be transplanted anytime if rain is sufficient or irrigation is present; otherwise transplant palms at the beginning of the rainy season.

Root Ball Size

Transplanted palms regenerate roots from existing roots cut during the digging process and/or grow new roots from the root initiation zone at the base of the trunk or stem. Whether existing cut roots will resprout varies by species and distance from the trunk they were cut.

Root balls extending out from the trunk for 12 in. and down for at least 12 in. are adequate for most species because this size includes a sufficient number and length of cut roots that will resprout and/or offers protection of new roots grown from the root initiation zone (Hodel et al., 2005). Deeper root balls might be advantageous to help anchor unusually tall and/or large specimens or for species that tend to develop an unusually deep, rather than wide root system, such as *Bismarckia nobilis*. For the few species, such as *Sabal* spp. (palmetto palm), where all cut roots die back to the trunk, the root ball need only be sufficiently large to protect the root initiation zone and provide weight for anchorage and stability (Hodel et al., 2009).

Leaf Removal and Tie Up

Removal of some of the oldest or lowest leaves in the canopy, typically at least half or more of the total number of leaves, and tying up of the remaining leaves are standard industry practices that primarily have been employed purportedly to reduce water loss until new roots grow. Until new roots and leaves grow the palm must rely mostly on water and carbohydrates stored in the trunk for growth. However, these practices detract aesthetically from the palm until a new canopy of leaves is grown, a process that can take several years or more. Leaf removal and tie up do reduce water loss for a few weeks in some species, but these practices become less effective over time (Hodel et al., 2012b). It is no surprise, then, that leaf removal and tie up have given mixed results in several research studies.

Washingtonia robusta (Mexican fan palm) transplanted in Borrego Springs, California, a desert with warm to hot, arid weather, did not benefit from leaf removal and tie up (Hodel et al., 2006a). Similarly, juvenile trunkless *Phoenix canariensis* (Canary Island date palm) and *Syagrus romanzoffiana* (queen palm) performed fine without leaf removal and tie up when transplanted in Irvine, California, an area of moderate temperatures and moderate to high humidity (Hodel et al., 2003). Transplanted *Phoenix roebelinii* (pygmy date palm) performed best in Florida, an area with moderate-to-warm temperatures and high humidity, when leaves were retained as long as the plants were well irrigated (Broschat, 1994). In contrast, leaf removal and tie up were beneficial when transplanting *P. dactylifera* (date palm) in extremely hot, arid conditions in Desert Center, California, with leaf removal being more effective than tie up (Hodel et al., 2010). Thus, most palms transplanted in areas with moderate temperatures and moderate to high humidity likely would not benefit from leaf removal and tie up, but those transplanted in areas with extremely hot, arid conditions would benefit from these practices. Species where all cut roots die back to the trunk, such as *Sabal* spp., would benefit from complete leaf removal (Broschat, 1991).

Leaf removal also helps aesthetically by removing some of the older, lower leaves in the canopy that often die anyway from transplant stress. Leaf removal and tie up do facilitate handling of the palm during digging, transport, and planting, but in most situations of moderate temperatures and humidity leaves can be untied immediately after the palm is planted.

Sand Backfill

Another standard industry practice is the use of washed builder's or concrete sand as the sole backfill medium when transplanting palms, purportedly to provide better drainage and more stability. However, transplanted *S. romanzoffiana* and *Trachycarpus fortunei* (windmill or Chinese windmill palm) performed fine when backfilled only with the site soil, although *Archontophoenix cunninghamiana* (king palm) did best when backfilled with sand (Hodel, 2012a). Because sand packs more easily and uniformly, it likely reduces post-plant settling and might provide better stability for large, tall specimens. If irrigation is closely monitored and judicious, drainage should not be an issue, no matter the backfill medium.

Other Considerations

In terms of plant maturity palms are best transplanted after the trunk or stem has attained its maximum diameter and has begun to elongate vertically because this stage of growth ensures

that the root initiation zone is fully developed (Broschat and Donselman, 1990). However, juvenile palms can be successfully transplanted if a sufficiently large root ball is secured and/or the cut roots have high survival rates, such as in *Cocos nucifera* (coconut palm), *P. canariensis*, *P. dactylifera*, *S. romanzoffiana*, and *W. robusta* (Broschat and Meerow, 2000; Hodel and Pittenger, 2003; Hodel et al., 2003). Root pruning and the use of plant growth regulators to stimulate root growth in palms have little or no merit (Hodel et al., 2009).

Irrigate palms thoroughly several days prior to digging to ensure optimal water status in the palm and maximum soil cohesiveness to limit crumbling of the root ball (Broschat and Meerow, 2000). Wrapping the root ball with several layers of burlap (Broschat and Meerow, 2000) or in multiple layers of self-adhesive polyethylene film (shrink-wrap) (Hodel et al., 2009) can also help to secure the root ball during transport.

Handle palms carefully and gently during the transplanting process (Hodel et al., 2009). Trunks can be easily damaged and, because they lack a mechanism for secondary growth, wounds on them never cover over, are unsightly, and can serve as entry sites for diseases and pests. The apical meristem, while deeply embedded and protected within a series of older, imbricate leaf bases, is nonetheless fragile and can be damaged by rough handling. Trunk constrictions, especially in the distal portion, are weak points and care should be taken when laying trunks down to the horizontal or picking them up from the same. In some instances a splint of securely fastened, robust timbers might be necessary to provide additional support for the trunk and even the fragile apical meristem and unopened spear leaves. During transport cover root balls and leaves with shade cloth and keep root balls moist (Hodel et al., 2009).

Despite careful tamping of the backfill material, newly transplanted palms, especially tall specimens and/or those in windy areas might need external trunk support until roots have grown sufficiently to provide adequate anchorage. Use guy cables or wood supports to buttress the trunk, being careful not to wound the trunk when attaching the support system.

Planting and post-plant care of transplanted palms is similar to that for palms planted from containers: plant at grade; apply a palm-special fertilizer and mulch; and maintain root ball, backfill, and surrounding soil evenly moist. Judicious irrigation of transplanted palms is essential; excessive irrigation can easily create problems for newly transplanted palms.

Literature Cited

Broschat, T.K. 1991. Effects of leaf removal on survival of transplanted Sabal palms. J. Arboric. 17:32-33.

Broschat, T.K. 1994. Effects of leaf removal, leaf tying, and overhead irrigation on transplanted pygmy date palms. J. Arboric. 30:210-213.

Broschat, T.K. 1998. Root and shoot growth patterns in four palm species and their relationships with air and soil temperatures. HortScience 33:995-998.

Broschat, T.K., and Donselman, H. 1990. IBA, plant maturity, and regeneration of palm root systems. HortScience 25:232.

Broschat, T.K. and Meerow, A.K. 2000. Ornamental Palm Horticulture. University Press of Florida, Gainesville, Florida.

Downer, A.J. and Hodel, D.R. 2001. The effects of mulching on establishment of *Syagrus romanzoffiana* (Cham.) Becc., *Washingtonia robusta* H. Wendl. and *Archontophoenix cunninghamiana* (H. Wendl.) H. Wendl. & Drude in the landscape. Sci. Hort. 87:85-92.

Hodel, D.R. 2012. The Biology and Management of Landscape Palms. Britton Fund, Western Chapter, Intl. Soc. Arboric., Porterville, California.

Hodel, D.R., Downer, A.J. and Pittenger, D.R. 2006a. Effect of leaf removal and tie up on transplanted large Mexican fan palms (*Washingtonia robusta*). Palms 50:76-81.

Hodel, D.R., Downer, A.J. and Pittenger, D.R. 2009. Transplanting palms. HortTech. 19:686-689.

Hodel, D.R., Downer, A.J. and Pittenger, D.R. 2010. Effect of leaf removal and tie up on large, mature date palms transplanted in extremely hot conditions. HortScience 45(8):S91-92.

Hodel, D.R., Downer, A.J., Pittenger, D.R. and Beaudoin, P.J. 2006b. Effect of amended backfill soils when planting five species of palms. HortTech. 16(3):457-460.
Hodel, D.R., Mochizuki, M.J., Pittenger, D.R. and Downer, A.J. 2012a. The effect of sand backfill on transplanted palms. p.2. In: Workshop Proc. Amer. Soc. Hort. Sci. Ann. Conf., Miami, Florida, 31 July-2 Aug. 2012.
Hodel, D.R. and Pittenger, D.R. 2003. Studies on the establishment of date palm (*Phoenix dactylifera* 'Deglet Noor') offshoots. Part I: Observation on root development and leaf growth. Palms 47:191-200.
Hodel, D.R., Pittenger, D.R. and Downer, A.J. 2005. Palm root growth and implications for transplanting. J. Arbor. 31:171-181.
Hodel, D.R., Downer, A.J. and Pittenger, D.R. 2010. Effect of leaf removal and tie up on large, mature date palms transplanted in extremely hot conditions. HortScience 45(8):S91-92.
Hodel, D.R., Pittenger, D.R. and Downer, A.J. 2012b. The effect of leaf removal and tie up on water loss and estimated crop coefficients of juvenile, trunkless, containerized Canary Island date palms and queen palms. p.1-2. In: Workshop Proc. Amer. Soc. Hort. Sci. Ann. Conf., Miami, Florida, 31 July-2 Aug. 2012.
Hodel, D.R., Pittenger, D.R., Downer, A.J. and Richie, W.E. 2003. Effect of leaf removal and tie up on juvenile, transplanted Canary Island date palms (*Phoenix canariensis*) and queen palms (*Syagrus romanzoffiana*). Palms 47:177-184.

Questions and Answers

Gregg Opgenorth: What about tying up to protect new leaves?

Don Hodel: It's critical to have the leaves tied up when the tree is dug, transported, and replanted. However, once they're set in place tying up doesn't have any further benefit.

Ursula Schuch: What is your recommendation for fertilizing newly transplanted palm trees and what is your recommendation for determining the size of the root ball relative to the size of the tree?

Don Hodel: Let me answer the last question first; regardless of the size of the palm tree the root ball should be 12 in. in diameter. For very large specimens a deeper and wider root ball may be recommended to increase stability and anchorage, but for root regeneration 12 in. is adequate. Newly transplanted palm trees probably don't need to be fertilized. There aren't that many roots yet to take up the nutrients, but after about 60 days when roots have begun to grow out fertilizer should be added.

Ralph Evans: Does the width of the planting hole ever vary if you're always using a 12 in. diameter root ball?

Don Hodel: Generally, the planting hole should be twice as wide as the root ball for planting from a container. If you're planting a big palm you might want it 6 in. wider and that purportedly helps with stability.