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Transplanting Palms [1]

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Palms have a deserved reputation for ease of transplanting relative to similarly sized broad leaved trees (see cover plate). The common sight of tractor trailer loads of 20-foot tall or larger palms are testimonial to this fact. Nonetheless, transplant failure is not unknown, and replacement percentages can rise as high as 30 percent or more on an installation. Such failures can be greatly minimized with improved understanding of how palm root systems regenerate after digging from a field nursery, a landscape site, or the wild, and by paying greater attention to the care received by the palms in the first critical months after installation. The purpose of this circular is to describe and discuss these factors, and suggest optimum conditions for successfully transplanting specimen-sized palms.

cover plate .

Harvesting Palms for Installation

Developmental Age and Transplant Success

Palms, unlike broad-leaved woody trees, complete stem caliper growth before beginning substantial height increase. During this "establishment phase" (Tomlinson 1990), the root initiation zone at the base of the stem is not yet developed to its fullest potential. Consequently, palms are not very tolerant of the extreme root disturbance that accompanies digging from a site of previous growth until visible trunk development has taken place (Broschat and Donselman 1990a). This is most critical for species that characteristically complete a great deal of stem development below ground (for example, *Bismarckia noblilis, Latania* spp ., *Sabal* spp.). Even if the palms are not killed by premature transplanting, growth setbacks and possibly less than optimum caliper development may occur. Young palms (that is, without visible trunk development) should thus be transplanted only from containers.

1. This document is Circular 1047, Department of Environmental Horticulture, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Printed April 1992. Reviewed: June 1997. Please visit the FAIRS Website at http://hammock.ifas.ufl.edu.

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Time of Year and Transplant Success

Palms establish most quickly if transplanted during the spring and early summer when soils temperatures are on the increase. Many tropical palms exhibit reduced root function at soils temperatures below 65°F. An additional advantage is the higher rainfall normally experienced during this time in Florida, thereby reducing the need for supplementary irrigation during the critical months of establishment. In south Florida, time of year is not as critical from the perspective of temperature, though mid-winter planting should be avoided if possible.

Patterns of Palm Root System Regeneration and Root Ball Size

Research has determined that palms vary in their root regeneration response when dug (Broschat and Donselman 1984a, 1984b, 1990b; Table 1). For queen palm (*Syagrus romanzofflana*), royal palm (*Roystonea regia*), Mexican fan palm (*Washingtonia robusta*) and Senegal date palm (*Phoenix reclinata*) the percentage of cut roots that branch and continue growing is directly proportional to the length of the remaining stub. This would argue for including the largest root ball possible for these species when digging, at least from the perspective of root survival in the landscape. A one foot minimum radius (from the trunk) is recommended for these palms. While a larger root ball may well increase transplant success, the additional weight and costs involved in transportation may not justify the slight gains in post transplantsurvival. It should also be kept in mind that the vertical length of the root ball is often larger than the horizontal radius on palms dug from a field or landscape site, thus vertically oriented root stubs will likely be longer than these minimum recommendations.

Queen palms will likely survive with a root ball of 6 inch radius, but a larger root ball will increase root survival at the landscape site. Root branching in coconut palms (*Cocos nucifera*) does not appear to be dependent on the size of the root ball. In sabal palms (*Sabal palmetto*), virtually all of which are dug from native stands rather than nursery grown, negligible root branching occurs, and new roots must be initiated from the trunk. For these two species, smaller root balls are acceptable. For palms that must regenerate new roots from the trunk, root pruning 2-3 months before digging will provide adequate time for new root growth within the ball.

From the list of palms whose root regeneration patterns have been studied (Table 1), it appears that the most common response is 1) some degree of branching of cut roots, the percentage increasing with the length of the stub (up to a point) accompanied by 2) some variable degree of new root initiation from the trunk base (Plate 1). In general, for single stemmed palms less than fifteen feet in height, a root ball of shovel-width radius from the trunk is a common industry average for size and should provide for adequate root survival in those species exhibiting that response (Plate 2). For clustering or larger solitaryspecimens, an incrementally larger root ball may be advisable to insure successful establishment under siteconditions that may be less than ideal. An obvious concern for the field grower is to minimize loss of soil from the field.

Plate 1 .

Plate 2 .

Specimen-sized palms that are containerized after harvest for the interiorscape market and smaller, containerized mass-market palms usually have the root ball trimmed further before containerization. Such palms are moved into shade structures for acclimatization where growing conditions are optimal for root system regeneration.

Root pruning. Root pruning has generally not been considered necessary for palms, with the exception of Bismarck palm (*Bismarckia nobilis*) and a few others. However, all of the species so far

examined also produce new roots from the trunk base (Table 1), in addition to any root branching, when dug. This would strongly suggest that all palms would benefit from root pruning four to eight weeks before digging from the harvest site to encourage new root initiation. Of course, this would add a substantial labor cost for either the grower or installer. However, if the species is a particularly high value palm for which replacement costs would be expensive, the extra labor may well be cost effective.

Digging the Palm

Palms can be dug by hand, with gasoline powered tree spades, or spades mounted on small tractors. Soils that cling to the root ball are the most amenable to mechanized harvest. Palms grown in very sandy soils, which may fall away from the roots, might require hand digging. Prior to digging, the soil around the root system should be thoroughly wetted to help keep the root ball together. Palms grown on sandy soils will usually need to have their root balls burlapped after digging, while palms grown on soils with greater structural integrity may not require burlapping. If the dug palms will be held in storage in the field for some time before shipment, burlapping may also be necessary, regardless of the soil type. In such situations, the root ball as well as the trunk and foliage should be periodically moistened.

Preparation for Transport

When moving palms out of the field, they should be well-supported to prevent injury to the tender heart. Some palms (for example, King Alexander, *Archontophoenix alexandrae*) are much more sensitive to heart injury due to rough handling than others, and require extra care in transport. For certain species with slender trunks (for example, Senegal date, *Phoenix reclinata* ; Paurotis palm, *Acoelorrhaphe wrightii*), a supporting splint should be tied to each trunk and should extend into the foliage to protect the bud. Palms with very heavy crowns (for example, Canary Island date palm, *Phoenix canariensis*) should be braced similarly to prevent the weight of the crown from snapping the bud. Stems of clustering palms should also be tied together for additional support.

A tree crane is usually required to lift large palms out of the field, and the trunk should be protected with burlap or other material wherever ropes, cables, chains or straps will be attached (Plate 3).

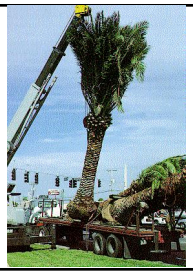

Plate 3 .

Leaf removal. The greatest loss of water in newly dug palms occurs from transpiration through the leaves. To minimize this, one half or more of the older leaves should be removed at the time of digging. The remaining leaves should be tied together in a bundle around the bud with a biodegradable twine. The best method of insuring survival after transplanting to the landscape may be to remove ALL leaves on species like sabal palms that must regenerate all new roots from the trunk (see below, Special Cases). Complete leaf removal may also be advisable during installation of any species where normal post-transplant irrigation is impossible. However, many buyers will object to this practice for aesthetic reasons. Where practical, misting or irrigation of the foliage may reduce waterloss during the transplant process, though there is an accompanying risk of increasing disease problems in the canopy.

Site Preparation

It is always best to install newly dug specimen palms immediately to minimize stress and possible loss of the palm. If delivered palms cannot be planted immediately upon arrival at the installation site, the palms should be placed out of direct sun and the trunk, root ball and canopy kept moist. Temporarily "heeling in" the root balls under a layer of mulch is advisable, especially if other no means of keeping the roots from drying out is available (Plate 4).

Installation site conditions also contribute to the establishment success of transplanted palms. A well drained location is essential; standing water should not appear at the bottom of the planting hole. If

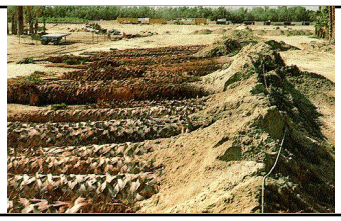

Plate 4 .

drainage is a problem at the site, a berm should be constructed to raise the root ball above the level of water. Though some palm species may adjust to less than optimal drainage after establishment, standing water around a newly dug root ball will have adverse effects on root regeneration.

The planting hole should be wide enough to easily accept the root ball and provide at least several inches of new growth from the ball. It need only be deep enough to situate the palm at the same depth at which it previously grew. The amending of backfill soil from the planting hole is not recommended. If the backfill soil differs greatly in structure and texture from the surrounding site soil, new roots will have a tendency to remain within the backfill. If amending the backfill soil is demanded by the customer, the volume of amendment should not exceed twenty-five percent of the soil removed from the hole.

Planting and Support

Planting depth. It is imperative that palms not be transplanted any deeper than they were originally grown (Plate 5). The root initiation zone at the base of the trunk is extremely sensitive in this regard, and planting too deeply will cause root suffocation, nutritional deficiencies, root rot disease and frequently loss of the palm. Unfortunately, it is still a common practice for installers to situate specimen-sized palms at various depths in order to create a planting of uniform height. The decline of deeply planted palms may take several years to become apparent, especially on very well-drained soils, but it can only be reversed by removing the backfill from the suffocated root initiation zone or replanting the palm.

All air pockets should be tamped out of the backfill as the planting hole is filled. A berm should be mounded up at the periphery of the root ball to retain water during irrigation. The initial irrigation

Plate 5 .

should be deep and thorough. Filling the planting hole with water up to the berm will be necessary two to three times to fully wet and settle the soil.

Support. Larger palms will require some form of bracing to maintain stability during the first six to eight months after installation. The proper method of support is illustrated in Plate 6 . Short lengths of 2 x 4' lumber should be banded or strapped to the trunk (a foundation of burlap or asphalt paper can be placed around the trunk under these), and support braces (also 2" x 4", or 4" x 4" on very large specimens) are then nailed into them. Under no circumstances should nails be driven directly into a palm trunk. Such damage is permanent, and provides entryway for pathogens and possibly insect pests as well.

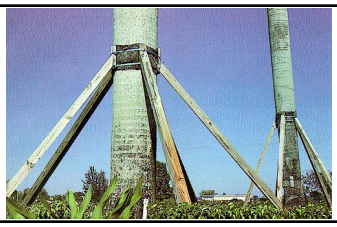

Plate 6 .

Establishment Care

The root ball and surrounding backfill should remain evenly moist, but never saturated during the first four to six months after installation. Supplementary irrigation is necessary unless adequate rainfall is received during this time period. Newly transplanted specimen-sized palms should not be expected to produce a great deal of new top growth during the first year after transplanting; much of the palm's energy reserves will (and should) be channeled into root growth. Drenching the root zone two to four times during the first few months with a fungicide labeled for landscape use on soil borne root fungal pathogens is recommended for high value

palms. A light surface application of a slow-release "palm special" granular fertilizer can be banded at the margins of the root ball three to four months after transplanting. A foliar spray of soluble micronutrients may be beneficial during this period, since root absorption activity is limited. Foliar fertilization is an inefficient way to supply macronutrients such as potassium and magnesium because the relatively high amounts required by the palms. When the appearance of new leaves indicates that establishment has been successful, a regular fertilization program (three to four times per year optimally) can begin (see "Palm Nutrition Guide," Extension Circular SS-ORH-02).

Special Cases

Cabbage or Sabal Palms

Sabal palms are the most widely planted of all palms in the southeastern United States. Virtually all are dug as mature specimens from natural stands because their slow growth rate makes nursery production uneconomical. Survival rates for transplanted sabal palms are often low. In sabal palm (*Sabal palmetto*) virtually no cut roots survive, regardless of length. Thus, transplanted sabal palms have no functional root system for the eight month period required for the production of new adventitious roots from the root initiation zone at the base of the trunk (Broschat and Donselman 1984a).

The standard procedure for transplanting field-grown sabal palms has been to remove the lower two-thirds of the leaves and tie the remaining leaves into a tight bundle around the bud to reduce transpiration. The remaining leaves typically become desiccated and die within one to two months and the palms may appear to be dead. If the palm survives, new green leaves will eventually emerge from within the canopy of dead foliage.

Broschat (1991) monitored an installation of several hundred sabal palms with trunks from ten to twenty feet long in a street median landscape in Miami, Florida. Approximately half were transplanted using the standard practice of removing all but the top one-third of the leaves and tying these remaining leaves up with biodegradable twine. The other half had all leaves removed prior to transplanting. All palms received soil irrigation as needed during the eight month evaluation period. The survival rate for palms transplanted without leaves was ninety-five percent, compared to sixty-four percent for those transplanted with one-third of their leaves remaining. Among the surviving palms, canopy size was slightly smaller for palms transplanted with leaves. In addition to the lower survival rate for palms transplanted with leaves, the fact that all the original leaves died and had to be later removed by hand makes this practice costly in terms of labor requirements.

Complete leaf removal appears to be the best method for transplanting sabal palms, which lose all their roots in the transplant operation.

Palms Susceptible to Palmetto Weevil Infestation

Palmetto weevils (*Rynchophorus cruentatus*) are large beetles that are drawn to stressed palms. They most frequently attack cabbage palms (*Sabal palmetto*) and Canary Island date palms (*Phoenix canariensis*), but have been reported on Mexican fan palms (*Washingtonia robusta*), Bismarck palms (*Bismarckia nobilis*) and latan palms (*Latania* spp.) Adult females lay eggs in the leaf bases of the crown, and the large larvae quickly tunnel into the heart, destroying the palm (Plate 7). All efforts should be made to reduce transplant stress on susceptible species. A preventative spray of either Lindane or Dursban, applied at and again several weeks after installation, has shown some success in keeping palms free of infestation (Giblin-Davis and Howard 1988).

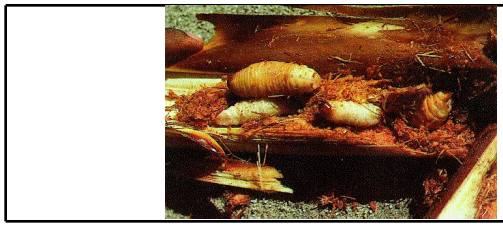

Plate 7 .

Acclimatization of Interior Specimens

It is absolutely essential that palms intended for the low-light conditions of the interiorscape be subjected to an acclimatization period of at least one

year under shade (Broschat et al. 1989) after transplanting from full sun conditions. Leaves produced in full sun will not survive under low-light conditions and must be replaced by new leaves produced in shade. The amount of time necessary for complete replacement will vary with species, but one leaf every two months is a reasonable average across a broad spectrum of palm species.

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Table 1.

Table 1. Root system responses of selected palm species to digging after approximately five months[1].

Species	Branching	New root initiation
Cocos nucifera (Coconut)	50% cut roots branch regardless of stub length	Low (20 or less)
Phoenix reclinata (Senegal date)	33% cut roots branch if stubs are at least 2' long.	Moderate (about 60)
Roystonea regia (Cuban royal)	24% cut roots branch if stubs are 1-2' long; 36% if 2-3' long.	High (about 100)
Sabal palmetto (Cabbage palm)	Negligible	Very high (about 200)
Syagrus romanzoffiana[2] (Queen palm)	41% cut roots branch if stubs are 6"-1' long	Low (13)
Washingtonia robusta (Mexican fan)	31% cut roots branch if stubs are 1-2' long; 58%if stubs are 2-3' long	Very high (about 150)

[1] All data from Broschat and Donselman 1984a and b, 1990b.

[2] Redug after 18 weeks of growth.