

Propagation of Palms*

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Plants in general can be propagated by a number of different methods such as cuttings, layering, budding, grafting, root suckers, etc., as well as by seeds. Some palms can be multiplied by divisions and suckers, but seeds are the only means of propagating most, as the majority of palms usually remain single-stemmed plants with one terminal bud. Also, like most other monocots, they cannot be grafted or budded or the stems rooted as cuttings. Without true bark and a cambium layer which will heal over with a callous to form new tissue it is impossible to cut off a trunk of a palm and expect it to re-establish itself as a new plant. Palms usually have only a single terminal bud at the tip of the stem with no axillary buds. If the bud is injured or becomes diseased in any way, the plant will die unless, of course, it is a type that might develop suckers from the base.

Propagation by seeds is more convenient than any other means, but sometimes seeds are unobtainable for a specific palm. In the case of a suckering palm, such as *Phoenix dactylifera*, vegetative propagation is the only way to ensure the maintenance of a particular strain or variety of date, since seedlings would be very likely to produce a strain slightly different from the parent plant.

Vegetative Propagation

Some genera of palms normally have a clumping type of growth; that is, over a period of time they develop several stems which are joined at the base in the ground. A partial list of palm genera that sometimes develop clumps or suckers are: *Arenga*, *Astrocaryum*, *Bactris*, *Calamus*, *Caryota*, *Chrysalidocar-*

pus, *Chamaerops*, *Chamaedorea*, *Desmoncus*, *Guilielma*, *Licuala*, *Oncosperma*, *Paurotis*, *Rhapis*, *Phoenix*, and the *Actinophloeus* group of *Ptychosperma*. Sometimes clumps are compact as in the *Actinophloeus* group of *Ptychosperma* and with most of the *Chrysalidocarpus* species, where the bases of the stems are crowded tightly together. Another group of cluster-forming palms such as *Rhapis*, *Bactris*, and some species of *Chamaedorea*, develop a "runner" or underground rhizome that may grow out as much as several feet from the parent plant before the upright stems are formed.

Theoretically, any palm that will develop suckers or off-shoots with roots can be divided and a new plant created. Actually, however, it is practical to make divisions of palms in only a very few instances. Seeds are usually comparatively easy to obtain and to ship from one place to another, while propagations from suckers or offsets are time-consuming and difficult to make and are often bulky and unwieldy to transport. Newly separated divisions also tend to be very delicate immediately after they are detached and before they are established with a permanent root system in a new location.

Sometimes viable seeds of a particularly rare or desirable suckering palm, such as *Rhapis*, are very difficult or impossible to obtain. In such a case, the extra work and time needed to take off a sucker or to divide the plant is justifiable, but only after careful consideration. Cutting off a major section of a palm is a severe shock to both parts, and unless the person doing the work is careful, either part of the plant, or both parts, could easily be lost.

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The technique of dividing a palm consists mainly of the following:

1. After making certain that the risk to the parent plant is justified, carefully dig down about the offshoot or stem to be taken off and check to see if it has already developed roots of its own.
2. If it has no roots of its own, the general practice is to cut partially through the stem that joins the division to the parent plant and then to replace any soil removed. This serves to cut off part of the food supply of the offset and thus encourages it to begin new roots of its own. A plentiful supply of fertilizer and water during this time will help to form new roots quickly.
3. When the portion to be removed has its own roots, a sharp spade or pruning shears can be used to sever any remaining connection and the division can then be carefully dug out. Meanwhile, be careful to keep with it the largest possible ball of undisturbed earth and roots.
4. After the division is potted or placed in its new location, it is best to remove from one-half to three-quarters of the leaf area, depending upon the amount of roots which were transferred with it. The new plant should be tied to a stake and watered regularly to prevent drying out. A temporary shade and applications of liquid fertilizer will also help in the successful establishment of the new plant. A fungicide, such as one of the copper compounds, can be used to treat the exposed stem surface which has been cut as a means of discouraging fungus infections, particularly of the parent plant.

When large numbers of roots are

taken off with the division, as in dividing *Chamaedorea* or *Rhapis* clumps, the whole operation can be greatly simplified and done at one time with only normal precautions being taken. Also, as in most other transplanting, divisions can be established easiest during the warm spring and summer months when the plants are in vigorous growth.

Unusual as it may seem, it is possible to marcott, or "moss off" the top of a very few palms, namely some of the *chamaedoreas*. Quoting from O. F. Cook's article entitled "Household Palms and Related Genera" in *National Horticultural Magazine* 22:89, 1943:

"An experiment of marcotting was tried by Mr. Albert W. Close and proved entirely successful. The process of marcotting is simple, merely wrapping a ball of sphagnum and burlap around the trunk, tying it on and keeping it moist. In a few months after roots have begun to grow, the lower trunk can be cut away and the palm set in new soil."

Although Cook mentions marcotting as being done only with *Chamaedorea elegans* ("*Neanthe bella*"), I am sure it can also be duplicated with any *Chamaedorea* that would normally develop adventitious roots on the stem, such as *Chamaedorea Tepijilote*.

Growth and Care of Young Palm Seedlings

Seeds can be sown in flats or seed pans in a soil mix approximately two to three inches deep. After the seeds germinate, it is best to grow them in 50 per cent to 70 per cent shade. Warm moist conditions will encourage fast growth, especially if liquid fertilizer is applied periodically. Exposure to full sunlight or dry winds will set back young seedlings considerably. It is best to protect the young seedlings, both in the seed pan and in individual pots,

from too much exposure or from heavy rains that might wash the soil from the pots. If slat protection is unavailable a spreading tree can sometimes be used as a substitute. Although sprouting palm seeds need to be kept moist, care must be taken not to keep the soil soggy as there is then danger of losing the seedlings from rot and damp-off fungus.

It is usually best to take palm seedlings from the seed pan about the time the first leaf is fully developed or as the second leaf begins to emerge. This is the time the root system is just beginning to develop and few if any rootlets will be lost in transplanting. Also, the young seedling is still receiving nourishment from the endosperm of the seed which helps to tide it over until it establishes itself in an individual pot. If potting is delayed too long beyond this stage, the seedlings often suffer shock and have a tendency to die back.

When many seeds are sowed thickly in a seed pan or flat it is even more important not to delay in potting seedlings, because the root systems will grow together in a tight mass, making it almost impossible to separate them without loss of the small rootlets.

Most seeds will germinate fairly uniformly; but some seeds, especially those that are a bit old, will sprout a few at a time with some coming up months after the first ones. Then it is best to pot the seedlings as they sprout instead of waiting until they have all germinated.

When seedlings are taken out of the seed pan they should be potted into as small a pot as will accommodate the roots with sufficient allowance for several months growth. Seedlings should not be jammed and twisted into too small a pot; but neither should the very young seedlings be overpotted to the extent that the soil may remain too wet and become compacted before the next shift is made. In larger stages young

palm plants can hardly be over-potted if the soil mix and growing conditions are ideal. Usually two and one-half-inch and three-inch pots will take care of the first potting, except for those palms that develop a long root system prior to the sprouting of the first leaves. These sometimes need up to eight-inch pots. The soil mixture used in the smaller sized pots should be loose and porous, preferably with a large percentage of organic matter such as leaf-mold or peat-moss. Good drainage as well as sufficient aeration must be provided if optimum root growth is to be expected.

Small seedlings when first transplanted from the seed pan will grow best under greenhouse conditions with about 70 per cent shade. When they are shifted into larger pots, four-inch to six-inch, most of them need more light and the shade may be reduced to 50 per cent. Exceptions are palms that are particularly sun-loving, such as *Copernicia*. These will grow much faster in full sun from six-inch pots on. As they become large enough to be shifted to eight-inch pots or to four- to five-gallon cans, most palms can be put in full sun for much of the day after they have become gradually accustomed to it to prevent sunburn. When in comparatively sunny locations, the foliage will not develop as dark green or lush as the shade grown plants; but plants will become hardened in preparation for planting and seem much better able to withstand low temperatures.

Young palms, like most tropical and subtropical plants, grow much faster during warm weather. During the cool winter months new growth of roots and leaves almost stops, while during the spring and summer growth is comparatively rapid if the necessary nutrients and moisture are available.

Young tender palm seedlings benefit greatly from controlled temperatures in

a greenhouse or hot house during the winter, but if this is not available they generally will do quite well if protected from hard frosts or strong dry winds. In many cases, drying winds seem to cause much more burning of tender leaves than actual low temperatures so it is advisable to give as much protection from winds as possible.

Most palms do not seem to require a particular soil mixture as long as it has approximately the proper texture, drainage, and nutrients. More care is justified in preparing the soil for very young seedlings in small pots since they tend to be much more sensitive to extremes in texture and drainage than older established plants. A suitable soil mixture for young palms can be made up of the following: 3 parts "hammock sand" (or sandy muck, preferably neutral or slightly acid), 2 to 3 parts peat-moss, 1 part fine grit, coarse sand, or Perlite (for drainage). Add a small amount of sheep manure and balanced chemical fertilizer to provide sufficient nutrients.

Although in many cases the pH is difficult to control, a neutral or slightly acid soil is preferred, except in instances of palms known to prefer alkaline soil.

In discussing the water requirements of young palms, I would like to quote from *Choice Stove and Greenhouse Plants*, 2nd Edition, by Benjamin Samuel Williams, London, 1876, the following advice from an English palm grower over 75 years ago: "Most stove palms should be provided a strong moist heat and be potted in equal parts of peat and loam, to which should be added a good portion of sand. Drain pots well and supply them liberally with water. Those requiring especially moist conditions may benefit from plunging in warm water, if such a convenience exists." He goes on further to caution against allowing the soil to become completely dry, as this would damage the roots of

many palms considerably.

In some ways the key to watering lies in the soil mix. The soil mixture must be loose enough to provide good drainage and allow sufficient aeration so that roots are encouraged to grow rather than remain static and rot off. If the soil becomes solid and compact about the roots and is heavily and regularly watered meanwhile, the roots can easily become rotted and the plant will begin to die back.

The amount of water needed will vary greatly according to the size of the plant and its root system; how fast it is growing; or, if it is dormant (as during cool weather), the size of the container, the porosity and water-holding capacity of the soil, and the extent that it is exposed to the drying effects of sunlight and wind. All the above should be taken into account rather than trying to specify that a certain size pot needs so much water at certain intervals. Generally, watering should be frequent enough and in large enough amounts to maintain an even, moist condition.

Although many palms can exist on very little feeding, much better growth can be obtained if an adequate amount of nutrients is made continually available to the roots. Usually enough organic and chemical fertilizer can be included in the soil mixture, and if this is supplemented with regular applications of liquid fertilizer the palms should have adequate nutrients. Any balanced soluble fertilizer such as Hy-Gro, 13-26-13, or Hyponex can be used. Palms seem to respond especially to organic fertilizers such as sheep manure if they are balanced with the other elements obtainable in commercial chemical fertilizers. A commercial fertilizer mixture of 6-6-6 [6 parts of Nitrogen (N), 6 of Phosphoric Acid (P), 6 of Potassium (K)] or 5-7-5, is quite satisfactory in most cases. Usually minor ele-

ment sprays are not needed but they are sometimes useful in correcting nutritional deficiencies that might show up.

When palm seedlings are ready to be shifted from the pots in which they were established as seedlings, they should be given sufficient room with each repotting. The size of the root system may be used as a guide to repotting. Plants should be repotted as soon as the pot becomes fairly well filled with roots and before they become root-bound and stunted. It is necessary to allow the roots room enough to develop in the larger container without becoming root-bound before the next shift is anticipated. With normal growth, they can usually be shifted from two and one-half-inch pots to four-inch pots; then from four-inch to six-inch, and from six-inch into tin, five-gallon cans or large pots or tubs of equivalent size. If a palm seedling is an especially fast grower, it could conceivably be moved from a four-inch pot into a four- or five-gallon can, but only if it shows rapid top growth with correspondingly developed roots. Beyond the four-inch pot size, it is difficult to over-pot palms if one is careful to provide a well drained soil with adequate sun and ventilation. Nevertheless, over-potting in a compact, water-retaining soil and placing the plant in a damp shady location can prove disastrous. Those palms that develop thick large roots usually need much more growing space than those that have many small fibrous roots.

When shifting from one container to another, unnecessary shock can be avoided if one is careful to have the soil moist so that it does not drop off the roots and leave the feeding rootlets exposed to bruising. Also, it is important to pot the plant so that the soil is not above the root crown. Planting too deep can hold back young plants considerably and even kill those that are

especially tender. It is well to place drainage material in the bottom of the pot to allow excess water to drain out easily and to discourage roots from growing through the hole into the soil beneath. When a major part of the root goes down through the drainage hole and is broken off when the pot is taken up for shifting a severe setback if not the death of the plant may be caused. When roots are damaged to any extent during repotting, it is best to cut off a portion of the leaves and move the newly shifted plant to a more shaded location until it has a chance to recover from the shock.

There are some palms that may be difficult to grow as seedlings, such as *Stevensonia*, *Nephrosperma*, *Oenocarpus*, *Orania*, *Calyptrocalyx*, *Rhopaloblaste*. Although relatively little is known about the cultural requirements of these palms, the following points should be kept in mind:

1. These palms seem to be more sensitive than most to pH in that they prefer an acid soil to one that is alkaline.
2. Keep the soil mixture evenly moist at all times. If the soil in which they are planted is allowed to dry out thoroughly, they often do not recover from the damage to the roots.
3. If leaves become chlorotic, minor element sprays and neutral iron and manganese soil treatments sometimes help if the deficiency has not developed too far.
4. If possible, keep in a warm moist atmosphere, but with good air ventilation.
5. Most important of all, do everything possible to keep the seedlings in healthy active growth. If they once become stunted recovery will be very slow, if at all.

Among palms one group which in-

cludes *Hyphaene*, *Borassus*, *Corypha*, *Latania* and *Orania*, needs more than general care. These genera develop a long extended hypocotyl or root structure before the first leaves sprout. If sprouting seedlings are kept in a crowded seed pan until the secondary roots begin to develop it is almost impossible to separate them for potting without damaging most of them badly. The long brittle root-like growth that first develops can stand crowding if need be, but if it is damaged or broken the young seedling will be severely stunted. In years past, seeds of palms such as *Borassus* were planted singly at the top of a box three feet long set on end. As the seed sprouted the hypocotyl pushed down several feet before the primary leaves were put out at its base and the roots developed just below that point. This made it difficult to handle and plant the young palm. In recent years we have learned to sprout the seeds in small pots just large enough to hold the seed until it begins to germinate. Then the seed is shifted to a six-inch or seven-inch pan, and the long root-like structure is allowed to wind about the lower sides of the pan until it stops and the leaves and true roots begin to develop. When leaves appear, the seedling is shifted into an eight-inch pot or a large tin can for growing. This method has proved successful with a number of palms that germinate in this way. It is absolutely necessary, however, to keep the developing plants under close observation so that they do not become stunted.

Some sun-loving palms, such as *Coccothrinax* and *Copernicia* will grow much faster and stronger if they are moved into slightly larger than usual containers and put in almost full sun as soon as possible. Under shaded conditions growth is very slow.

Chamaedorea, *Geonoma*, and other

similar small, shade-loving palms have a particular dislike for growing in pots in a compact, heavy soil. These normally grow in moist loose leaf-mold on the forest floor so they do much better in containers if the soil is loose and the drainage good, or if they can be planted out in a shaded protected location.

PALM LITERATURE

The quarterly journal *Economic Botany* devoted to applied botany and plant utilization, contains a number of excellent and well illustrated articles on palms which are noted below. *Economic Botany* is obtainable at a price of \$1.50 per single copy or \$6.00 per volume at Box 749, Lancaster, Pa., or The New York Botanical Garden, New York 58, N. Y.

Acosta-Solis, M., Tagua or Vegetable Ivory A Forest Product of Ecuador. *Economic Botany* 2: 46-57. 1948. [A study of *Phytelephas* in Ecuador with notes on common and scientific names, habitat and distribution, production and exploitation, pests and diseases, local and industrial uses.]

Aschmann, Homer, The Introduction of Date Palms into Baja California. *op. cit.* 11: 174-177. 1957. [Evidence is presented to show that 1765 or thereabout is a more acceptable date of introduction than 1730.]

Hume, E. P., Coir Dust or Coccopeat—a Byproduct of the Coconut. *op. cit.* 3: 42-45. 1949. [An analysis of the tiny particles residual after extraction of fibers from coconut husks and suggested use as a mulching, rooting, soil-conditioning and seed-germinating medium.]

Lévi-Strauss, Claude, The Use of Wild Plants in Tropical South America. *op. cit.* 6: 255-258. 1952. [A section

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