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Basics of Container Culture

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Anyone interested in growing palms must have some familiarity with growing palms in containers. For a seedling to get large enough to be introduced into the garden, it must initially be grown in a container. Even the hobbyist should use containers in his “home nursery” as he accumulates palms for future plantings.

Types and Sizes of Containers

The industry standard in containers is a black plastic pot with UV stabilizer added to the plastic during manufacture. Alternatives include plastic grow-sacks, clay pots, ceramic pots, or even containers made from recycled paper material that can be planted directly into the ground. Grow-sacks are affordable but do not last long and need stabilization to avoid falling over. Clay pots are attractive but need more frequent watering and break easily. For extremely large plants, wooden boxes are often used.

It is imperative that any pot used has ample drainage holes in the bottom. A container must give ample soil volume for growth and weight for stability. In general, palms prefer deep pots to shallow ones.

Transplanting a Palm

A palm can usually grow well in the same container for one to two years before transplanting into a larger container is needed. A new seedling should be grown in a small container, typically 10–20 cm in depth. In one to two years this seedling needs to be “stepped up” into a larger container. A general rule is to repot when the plant’s roots are coming out of the bottom of the container, when the soil is showing signs of breakdown (it becomes sticky and dense), or when the plant is just too big and unstable for the container.

With gentle tapping, a root ball should slip out of the pot “en bloc” (Fig. 1). If the soil falls away from all the roots, the plant is not ready to be stepped up. If there is nothing but white roots and no soil, you’ve waited too long. When repot-

ting into a larger pot, you should have ample new potting mix below the old root ball, at least 10 cm. I mix a small amount of slow release fertilizer or blood meal into the potting medium in the bottom of the new pot. Never put fertilizer directly in contact with the exposed roots when repotting. Next, place the root ball into the container carefully, taking care not to break it apart. Teasing or separating the roots during repotting is not necessary. Next, vibrate or shake the pot to encourage the new soil to enter into the root crevices, and tamp the soil down adequately around the old root ball, taking care not to cause a direct blow to the roots. Add additional soil, as needed. One should leave 3–5 cm of watering space above the soil line.

Water the repotted palm promptly. I find that a “triple watering” (fill the pot to the top with water, allow to drain down to the surface, and repeat two more times) is adequate for small to medium sized palms. Larger pots may need four or five applications to adequately saturate the soil.

Repotting outdoor palms is best performed in the spring or early summer, a time when the plants and their roots can grow optimally. Seedlings and smaller plants may benefit from an antitranspirant (antidesiccant) spray after repotting. Most seedlings want to be in filtered light when young, especially after being repotted. If they require sun, acclimatize them gradually after repotting. Be aware that some palms such as *Dypsis decipiens*, *Bismarckia nobilis*, and most *Brahea* are known for setbacks after repotting. Root damage is probably the number one cause of mortality during repotting.

Potting Soil

There are as many potting mixes as there are growers. No single mix is ideal for all growers. An ideal soil will offer a substrate for the roots to stabilize, provide a source of water and oxygen, and offer nutrients for growth (Fig. 1). Good drainage is also desirable for most species. In



1. Left, a fast-draining potting soil composed of sand, organic wood material, perlite, and peat moss. Note that it appears very light and airy, making it ideal for most palms in containers. Right, a well-established rootball on a container-grown palm ready for repotting.

surveying many growers in southern California, I found the soil component common to most growers' mixes was coarse sand. Otherwise they were as different as night and day. Most growers also used peat moss and perlite. Mixes varied from quite complicated formulas to something as simple as "one half peat moss, one half perlite." Mixes high in peat moss, when allowed to dry out severely, actually contract and become nearly impossible to wet again. Dolomite (lime) may be necessary to counteract the acidity of organic materials.

Any mix must offer support for the plant and simultaneously good drainage. Drainage is increased by adding perlite, peat moss, pumice, or coarse wood chips. Additional topsoil, decomposed granite and fine sand slow drainage. Larger specimens and arid loving species tend to prefer the heavy (slow-draining) mix. Seedlings and tropical species like a lighter (fast-draining) mix. Reusing old potting soil is not recommended.

Watering and Water Problems

Container grown plants tend to be more subject to drying out. Always apply water until water comes out of the drainage holes. Re-watering is performed when the top centimeter or two of the soil is once again getting dry. Dry or hot conditions require more frequent watering. Moist or cold conditions usually require less frequent applications. Fixed watering programs without plant inspection invariably lead to problems.

A major difference between container plants and garden plants involves the potential for salt build-up in the containers. Most palm enthusiasts use either water supplied by their municipality or well water. Both usually contain dissolved salts that, along with applied fertilizers, can result in salt build-up in the soil over time. This condition is especially common with palms grown as house plants. Affected plants just look sickly, perform even worse than expected, and demonstrate a slow general decline in their appearance. Build-up can result in leaf tip discoloration.

oration (burning) and eventual death if not corrected. A simple soil salt meter with metal prongs can be inserted into the damp soil to measure soil salinity. The simplest meters usually read "safe" or "danger." Leaching the pot with repetitive and generous amounts of water may help drain out unwanted salts, especially if one uses rainwater or distilled water. Drastic measures would include barerooting and repotting into fresh potting soil. Avoidance of this problem includes applying generous amounts of water on a regular basis and a regular leaching program prior to the salt buildup. Also, one must carefully use fertilizers and meter the salt content at regular intervals.

Fertilizers

To understand fertilizers, one must understand what fertilizer is and does. Fertilizer is a substance that gives nutrition to the palm for growth of the leaves, trunk and roots. It may be derived from an organic source (blood meal, bone meal, manure, etc.) or inorganic (chemical fertilizers). Its major components (major nutrients) are nitrogen, phosphate (phosphoric acid), and soluble potash (K_2O). The concentration of these components is given as the N-P-K ratio. Palms generally like a ratio of approximately 3:1:3, such as 18-6-18 or a similar formula.

Minor nutrients (microelements) are the elements necessary in trace amounts yet still very important to overall palm growth. These include such things as iron, manganese, magnesium, copper, zinc, boron, and molybdenum. The minor elements may be part of a fertilizer formula or can be used separately.

Organic fertilizers (except for steer manure) are slower acting and have less chance of burn. Regular chemical fertilizers typically are faster with greater likelihood of burn. Slow release chemical fertilizers diminish but do not eliminate this risk of plant burn. Soluble fertilizers can be quite efficient but require strict adherence to manufacturer's directions. Fish emulsion is a soluble organic fertilizer and thus reduces chance of burn. Customized combinations of such things as blood meal, quick and slow release fertilizers and microelement agents can be quite successful and workable.

Three good rules to follow regarding fertilizers are: 1) follow the manufacturer's directions; 2) do not use them too aggressively; and 3) never fertilize dry containers. Palms usually do not die

from too little fertilizer but they die quite quickly from too much. Also, when broadcasting granular fertilizers, take care not to throw fertilizer into the crown of a small plant.

Amounts used and frequency of fertilization depend on the fertilizer used. A new seedling is still dependent on nutrition from its seed and has small, chemically fragile roots, so care must be taken to avoid overaggressive fertilization. An older palm in a container can tolerate recommended dosages of fertilizer. Year around fertilization is safe in tropical areas; however, in areas where cold winters are a factor, fertilizers should not be given after early fall. Winter applications of microelements may serve to replenish these compounds while the plant is inactive and after the rains have leached the soil. Foliar applications of very dilute fertilizer can be used to "green up" the foliage but should not replace applications to the soil.

Sun, Shade, and Humidity

In general, most palms prefer full sun but there are definite filtered light and shade lovers. Seedlings of sun loving species may need a year or two of filtered light before they are ready for full sun exposure. Also, as outdoor humidity lessens, many species tolerate less direct sun. Therefore, a palm which tolerates full sun in a coastal environment (i.e., *Rhopalostylis sapida*) may need sun protection in a drier, hotter inland area. In contrast, *Brahea armata* loves dry, hot conditions and does not thrive in tropical areas.

Cold Protection

Overhead protection or canopy offers two kinds of protection. First, it protects from the hot sun. Secondly and more importantly, it provides some shelter from exposure in cold winter areas. This protection can be accomplished by overhead shade cloth or naturally with fast growing species such as *Caryota*, *Archontophoenix*, *Syagrus*, or *Ravenea*. Overhead canopy (synthetic or natural) can offer as much as 5°C (10°F) protection from winter's cold. If you experience cold nights, locate the containers where the early morning sun will warm the plant. Cold protection can also be accomplished by placing plants close to the house or a structure. Antitranspirant sprays (synthetic) and other applicants may also give some degree of protection from cold.