GROWING PALMS

Horticultural and practical advice for the enthusiast

Edited by Randy Moore

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Getting Juiced: Fertigation of Palms

Feeding your palms can occupy a significant amount of the time spent in the garden. In a small garden with just a few palms, a pail of granular fertilizer or a watering can with soluble fertilizer will suffice. However, there is a point at which the size of the garden grows too large for manual methods. Measuring and mixing by the bucket or watering can become time-consuming, inconvenient and laborious. Fertigating (fertilizing and irrigating) a large palm garden by injection of concentrated, water-soluble fertilizer into the irrigation system is an alternative worth considering.

A very simple system for small gardens is to mix the fertilizer in a 32-gallon trash can and deliver it by dipping and filling buckets to each plant. Or, a small submersible water pump can be placed in the bottom of the trash can and connected to a garden hose. The liquid fertilizer can be delivered to all of the palms within reach of the hose. To measure the dose, first count how many seconds it takes to fill up a one gallon container. The gardener can then count and measure the amount being supplied to each palm with some degree of accuracy.

Venturi Injectors. There are devices that attach between the faucet and the hose that siphon concentrated fertilizer out of a container. The pressure difference between the water line and the container is used to draw the concentrated fertilizer solution into a valve and mix it with water. These injectors are relatively inexpensive.

The Siphonex unit is popular with small growers. It draws up the concentrated solution through a small suction tube and dilutes it a rate that depends on the flow of water through the hose. The typical injection ratio is 1:16. The hose length is limited to no more than 75 feet.

For small to medium-sized gardens, there is a new in-line fertilization device made by Fertile Earth™ (www.FertileEarth.com). The company also produces several fertilizer formulas to be used with their devices. Additionally, they produce a supplement called BioNatra™ that contains micronutrients, complex carbohydrates, enzymes, vitamins and other growth stimulants. Tested by several palm growers, this product is proving to be effective for stimulating biological activity and unlocking available nutrients.

With a Venturi-type injector, water pressure variations can cause variable amounts of fertilizer to be injected. Injection ratios are typically very low. The device must be cleaned after each use to prevent it from becoming clogged.

Proportional Injectors. More sophisticated units for feeding larger gardens are available. This type of injector is proportional to the volume of water entering the mixing chamber. A dose of fertilizer concentrate is added to a fixed volume of water in the mixing chamber creating a blended solution that is supplied to the palms through the irrigation system. The ratio is adjustable. A proportional injector will create an accurate blend irrespective of water pressure and flow rates.

The fertilizer injector used in my system is the 100 GPM (gallons per minute) D20S from Dosatron® (Dosatron International, www.dosatronusa.com). While it is relatively expensive to install this type of system, a proportional injector is reliable and easy to maintain. A system for a two-acre palm garden will cost around US$2,000.

Some of the other proportional units that are available are DosMatic (www.DosMatic.com), Chemilizer, H.E. Anderson Ratio:Feeder, Smith Measuremix and Gewa Injector (Germany). Many units are sold with a preset ratio.

It is important to purchase an injection unit that is capable of handling the volume of the irrigation system. Initially, I mistakenly purchased the more economical 20 GPM unit that did not have the capacity to supply my irrigation system, causing the unit to lock up.

2. A 100 GPM Dosatron proportional fertilizer injector in use in the author's garden.

Proportional fertilizer units typically have a flow range capacity of 5–100 GPM. They can be arranged in parallel (to increase water flow) or serial configurations (for multiple solutions). They operate with just about any water pressure from 2 psi to 120 psi (pounds per square inch). The mixture ratio is adjustable on the more sophisticated units. The ratio can be adjusted from 1:500 to 1:50 (0.2% to 2.0%).

To calibrate the mixture's dilution ratio, an electrical conductivity (EC) meter is used. The meter will provide a reading of the concentration of the water-soluble fertilizer solution. The meter that I use is the Agri-Meter Model AG-5 made by Myron L Company. This meter measures a conductivity range of 0 to 5 mmhos/cm. Typically I never exceed 1.5 mmhos.

The fertilizer used in such a system demands that it be totally dissolved. Some fertilizers do not dissolve well and cannot be used in a fertigation system. Others like fish emulsion are thick and viscous and may jam up the fine openings in the irrigation spray heads.

The mainstay of my palm nutrition program is a 20:20:20 water soluble fertilizer with chelated micronutrients. Monterey Maxi 20:20:20 Micro is sold in 25 lb. bags (Monterey Chemical Company, P.O. Box 35000, Fresno, CA 93745 USA). Information on the contents can be found at www.regulatory-info-monterey.com.

The fertilizer is mixed in the water storage tank at double-strength using one-half of the required water. When fully dissolved, the remaining water is added while maintaining constant agitation. Water quality and temperature will also determine how easily the fertilizer dissolves. Interestingly, as the fertilizer goes into solution, the water temperature will drop.

My system uses a 300-gallon tank that holds 500 lbs. of fertilizer. I juice the palms with every watering until the 300-gallon tank of liquid fertilizer is depleted. Since nobody likes to eat the same thing all of the time (including palms), my nutrition program is supplemented with blood meal, bone meal, SuperThrive™ additive and kelp meal. I do not have problems with the fertilizer "settling out" of the solution, so the mix does not require agitation before each use.

Cleaning the system on a frequent basis helps to prevent it from becoming clogged. On a regular basis, fresh water should be used to flush the entire system. A fresh water by-pass around the injection unit is an important part of the installation.

In Southern California, I begin using the fertilizer injector system at the beginning of the growing season, which usually starts in March when the soil temperature begins warming and nighttime lows are above 50ºF. These conditions often prevail until late October or early November, when I discontinue use for the season. Of course, the length and timing of the growing season varies by location.

My personal results with fertigation have been remarkable. I have been able to take many palms from seedling stage to maturity in a seven-year period, while other factors, such as favorable climate (no devastating freezes), ample watering and mulching, have also been factors in my results. With so much invested in developing a palm garden, a fertigation system is a small added initial investment that pays big dividends. – *Jeffry Brusseau, Vista, California, USA*

Hydro Chams

As my passion lies with *Chamaedorea,* I wondered if a hydroponic growing system could be used to speed up their growth. The goal was to produce seeds more quickly. I have been testing this system for the last 12 months and it appears to be a worthwhile endeavor.

In general, hydroponics involves growing plants in solutions or moist inert materials. The necessary nutrients are supplied to the plants in the solution. This is accomplished without soil as the growing medium.

My hydroponic set-up is a basic flood and drain system using plastic hydroponics troughs, a 120-liter food-grade bin (recycle tank), a submersible pond or fountain pump, regular plastic plant pots filled with expanded clay (fired, porous clay spheres) and a 24-hour analog timer (Fig. 1). The system does not use water heaters or artificial lights; rather, it relies on ambient temperatures through summer and winter and natural lighting.

The troughs sit just out of level on mesh benches above the recycle tank. The pump fills the troughs from the opposite end completely flooding the pots which sit in the troughs. At the low end of the troughs I have fitted two drains – one at the bottom end of the trough and another higher on the same end. The lower drain is restricted by a gate valve allowing the nutrient to fill the trough completely and then drain the trough when the pump shuts down. The higher drain ensures the trough does not overflow. The system runs three 15-minute cycles per day. I had thought of reducing back to two cycles per day for the winter months, but even as the weather has cooled down, there seem to be no signs of over-watering.


1. The author's hydroponic system.

I first set up the system in June (early winter in Australia) 2004 with four plants – two *C. ernesti-augusti* and two *C. tepejilote* – to see what would happen. After the first two months there were no signs of any increased growth. I marked new

2. Conventionally grown *Chamaedorea metallica* (left) compared to the same species grown hydroponically.

"spears" of the hydroponic plants and regular potted plants of the same, for a growth comparison. After testing the water, the four plants drew all of the nutrients (down to a "safe" level) from the 120 liters of water within four weeks while only using 2 liters of water. As the weather started to warm up, progressing through spring and during summer, the nutrient level uptake declined and water usage increased. I was surprised the nutrient uptake declined but expected the water use to increase, also taking evaporation into consideration. At the beginning of spring, I added a few more *Chamaedorea* seedlings, two double-planted *C. cataractarum* and two double-planted *C. metallica*. Figure 2 shows one of the double planted hydroponically grown *C. metallica* along with its "comparison," a conventionally grown, double planted *C. metallica*. All four plants in Figure 2 were from the same batch of seeds and were growing at the same growth rate before I placed two of the four into the hydroponic system in September 2004. I think the results speak for themselves.

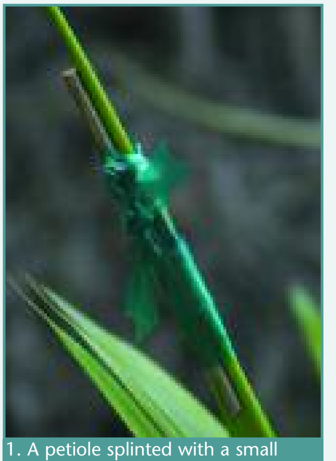
The system is relatively inexpensive to maintain. An average cost per month, taking power, water and nutrient costs into consideration would be about US$15.00. Initial setup costs would vary depending on size and monitoring equipment used. The size of this system would allow up to twelve 200 mm (8") pots and initial set-up costs including monitoring equipment (a pH and EC meter) were around US$125.00

When these plants flower, it will be interesting to see whether the flowers/inflorescences are more plentiful and whether pollen and seed quantity/quality differs from conventionally grown plants. In the meantime, I am looking at introducing a few more "exotic" species to the system. I think *C. tenella* would be a great candidate. – *Jason Cox, Port Kennedy, Australia*

Quick Fix for Palm Fronds

Have you ever experienced a partially broken palm leaf, caused by strong winds, improper transport or by the falling frond of a taller palm? In my garden, falling fronds from 40-year old *Rhopalostylis* are the biggest hazard to delicate understory palms. Damage of this sort can be very frustrating because frequently one of the newer leaves is broken, and it detracts from the overall appearance of that palm. It may take a few years for that leaf to become the lowest leaf and ready for removal. Over the years, I have developed a technique to repair many of these damaged leaves.

If the leaf is merely bent or only partially severed, it is possible to apply a simple splint to the break. A length of flat stick or bamboo stake can be used. The stick should extend an inch or two below and above the break, and should be secured to the leaf by 20–30 lb test monofilament fishing line, or with green plastic garden tying tape (Fig. 1).



1. A petiole splinted with a small wooden stake and plastiic tying tape.

If the break is not too severe, this method is usually successful, and the splint can be removed as early as a month later. I have found this technique is most effective on my smaller palms such as species of *Chamaedorea* and *Linospadix*. Larger and longer leaves are less successful but are still worth the attempt. – *Jim Wright, San Diego, California, USA*

Preventing Blow-Over of Palms in Containers

Wind can play havoc with containerized palms. Palm leaves are all too effective at catching the wind, with the result that even gentle breezes can knock down potted palms. Palms often have small root balls (in correspondingly small pots) in proportion to their above-ground parts, a situation that exacerbates their instability. The problem is particularly acute in commercial nurseries, where blow-over can break and disfigure leaves, dislodge palms from pots and cause top dressings of granular fertilizer to spill. Containerized palms lying on their sides will not receive proper irrigation and can dry out if not placed upright quickly. The cost of righting fallen palms, re-applying fertilizer and repotting can be substantial. Are there solutions for hobbyists and professional growers?

1. Seedlings grown in plastic tubes are supported by the wire mesh of the bench.

Obviously, windbreaks (hedge rows, screens, fences) can mitigate wind intensity, and locating containerized palms in sheltered locations in the garden or nursery is a viable strategy. If relocating palms is not possible, then some sort of staking or supporting mechanism becomes necessary. For seedlings in small pots, methods of holding the pots upright include placing pots on benches made of wire mesh such that the pots slip partially through the openings between the wire, thereby holding the pots upright (Fig. 1). This method has the added advantage of allowing good air circulation and free drainage. A similar level of support can be obtained by using plastic trays and racks that are manufactured to hold square or round pots or tubes (Fig 2). Each tray may hold a dozen or more pots, so they are cost effective. Their disadvantage is that they impede air circulation by holding plants close to one another and provide hiding places for pests such as snails and slugs. Be sure to use trays that have drainage holes.

2. Trays of molded plastic are available to hold round or square pots.

Some growers place containerized palms into supports made of concrete blocks. One block supports one or two pots and can be reused for many seasons. The blocks are bulky and heavy, but they can be deployed around the nursery where needed. However, concrete blocks are hiding places for snails and slugs. A variation on the concrete block system employs lengths of bamboo that run over the surface of the pots and whose ends are anchored by blocks (Fig 3). The poles function like straps, holding the pots to the ground.

Purpose-built systems are available commercially. One kind (http://www.alabama wire.com) is a wire basket – a ring of wire to encircle a pot and stakes to anchor the ring to the ground – that holds a pot to the ground. Pot-in-pot systems are also available, or could be made using regular plastic pots. A "socket" pot is permanently buried in the ground up to its rim, and the containerized plant sits in this socket. An advantage of this system is that a

3. The ends of these bamboo poles are anchored by concrete blocks, effectively "strapping" the pots to the ground.

below-ground socket keeps the root ball well insulated from temperature fluctuation. A major disadvantage is the high cost of installing the socket pots, and once installed, they must be used in place or re-installed for use elsewhere. In addition, the socket pots may impede drainage or collect standing water. With both basket and pot-in-pot systems, the palm's container must match the size of the basket or socket, so the grower is locked into using the pot size required by the system.

As an alternative or as a supplement to supporting the base of the plant, growers may use a guy wire or trellis system to support the top of the plant. In its simplest form, this system is simply a wire that runs horizontally along the nursery row at 1.0–1.5 m above the ground. Palm stems are tied to the horizontal guy wire to prevent blow-over. The most inexpensive ties are made from strips of webbing or mesh (which dry faster than rope after irrigation), but manufactured ties, such as Tree-Mate-O™ (www.tmateo.com) or High Caliper Tree Collar™ (www.treebag.com), are available. They are designed to hold a stem firmly but without leaving a scar or without girdling, but the additional cost of purchasing and installing such devices can be significant. Another disadvantage, reported by some growers, is that the devices can be tedious to disconnect from the plant.

In a recent study in a Louisiana tree nursery, Parish (Parish, R. L. Blocking blow-over. Ornamental Outlook, April 2005, pp. 10, 11.) found that all of the tested staking methods performed satisfactorily; however, all but one of the tested staking methods added more than one dollar in labor and material costs per plant. The only inexpensive method is the one employed by many nursery professionals – driving a stake into the ground through both the root ball and plastic pot. Depending on the height of the pot (and the depth and texture of the underlying soil) a metal rod 45–80 cm long is used. Typically, rebar (concrete reinforcing bar) is the stake of choice. Parish (2005) reported that the only problem with this method is the potential hazard to workers and vehicles posed by rods left sticking up in the ground when the plants are moved or sold. In addition to worker safety, one needs to consider plant safety when using the rebar technique. Be careful to keep the rebar stake away from the stem of the palm. This precaution is particularly critical with palms that form underground stems or saxophone-shaped establishment growth. Do not drive the rebar through the stem! Also, the roots of palms may not regenerate after damage as quickly as dicot tree roots do, so staking the pot runs some risk of injuring the roots. The risk is probably acceptable when weighed against the risk of damage caused by blow-over. – *Scott Zona, Miami, Florida, USA*.