GROWING PALMS

Horticultural and practical advice for the enthusiast

Edited by Randal J. Moore

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When Lightning Strikes

Lightning is one of nature's most spectacular phenomena, but as beautiful as it is to see, lightning is no friend of palms. Lightning strikes are as perilous to palms as they are to people. Tall palms are especially vulnerable to lightning strikes, and in some parts of the world, lighting is the leading natural cause of death for such palms. Large, stately palms are sometimes the tallest objects in the landscape, so it is only natural that they are struck by lightning. The loss of a big palm to lightning is not only tragic but costly, as a large, dead palm can be expensive to remove and replace.

1. *Roystonea regia* less than 24 hrs after a direct strike by lightning. The only visible damage is the longitudinal gash in the crownshaft. The palm died a slow death several weeks later.

Among the palm-growing regions of the US, the Tampa Bay (Florida) region receives the most lightning (over 16 flashes per km^2 per year). Central Florida and the coastal regions of North Carolina, South Carolina, Georgia, Louisiana, Mississippi and Alabama are next in line for lightning (8–16 flashes per km^2 per year). South Florida, the interiors of the southeastern states and southern Arizona are less prone to lightning (4–8 flashes

2. Two *Veitchia arecina* palms dying from a lightning strike that occurred about one week earlier. The collapse of the crown is a classic symptom of lightning strike. A small *Cryosophila* palm at the base of the center *Veitchia* was also killed.

per km^2 per year), but palms there are still at risk. Elsewhere in the world, Central America, the Amazon Basin, tropical west Africa, Madagascar, the Malaysian Peninsula and Darwin, Australia, have high rates of thunderstorms and associated lightning.

Some palms may be more vulnerable to lightning injury than others. Planters claim that coconuts (*Cocos nucifera*) are much more likely to be injured by lightning than African oil palms (*Elaeis guineensis*). Different factors may play a role in a species' vulnerability to strikes, including trunk diameter, height and water-holding capacity.

Plant injury is directly proportional to the duration and intensity of the strike. Direct strikes that cause visible damage (Fig. 1) are inevitably fatal. Even when no injury is apparent, internal damage can lead to decline and death. Moreover, lightning can "jump" from one palm to another, so that an entire zone around the strike target sustains injuries (Fig. 2). Minor strikes are survivable; however, even non-lethal wounds can lead to secondary problems, such as weevil infestation or fungal infections.

Strike damage manifests in several ways. The acoustic shock wave generated by the bolt can shatter stems and crowns outright. Moreover, water in the palm tissue may be vaporized by the intense heat of lightning, and the steam may explode tissues. If the strike occurs without accompanying rainfall, the lightning can ignite the palm, causing fire damage. Damage may be visible from the crown all the way down the stem to the ground. Longitudinal fissures and scorch marks are obvious signs of lighting strikes. The leaves yellow and droop, and the entire crown will eventually die, with its dead and dying leaves hanging like a skirt (Fig. 2). Trunk wounds exude a gummy discharge within a week or so. Usually the symptoms manifest quickly, within a few days, but in the case of a *Roystonea regia* adjacent to my house (Fig. 1), the leaves appeared green and healthy for many weeks. Eventually the developing spear leaf turned yellow, and the mature leaves discolored soon thereafter.

In a coconut plantation, the palms surrounding the strike will show a characteristic damage pattern. On the side facing the electrical discharge, leaves will break about a third of the way back from the tips. The broken tips hang and soon discolor. If broken leaves are the only sign of damage and no further leaf yellowing or dying occurs, the palm will likely recover.

There are no cures for palms struck by lightning. Once the health of the affected palm begins to decline, there is little a grower can do. As the palm begins to die and decay, it will emit the aroma of fermentation and attract palm weevils (*Rhynchophorus* spp.) and other pests. It may be best to remove the stricken palm as soon as the leaves begin to yellow, because once insects arrive, they may move to infect nearby, healthy palms.

Preventing lightning damage is possible using lightning rods, in much the same way they are used on buildings. A conductive rod is mounted in the crown of the palm and grounded via a copper cable of prescribed thickness attached to a metal stake driven in the ground approximately three meters away from the trunk. This is the standard adopted by the Tree Care Industry Association in the USA; standards may differ in other countries. As most large palms have only one main stem to protect, the systems are easier to deploy than similar systems for broadleaf trees. Nevertheless, they are expensive and should be installed only by an experienced arborist. The expense of a lightning protection system may only be justified for high-value palms on the grounds of hotels, monuments or other important sites.

If there is a bright side to palm deaths, it is that standing dead palm trunks are ideal nest sites for woodpeckers and other cavity-nesting birds. In many managed ecosystems, such as suburban gardens, dead trees are scarce resources. In suburban settings, the abundance of animals that depend on tree cavities has declined along with the availability of dead palms. At Fairchild Tropical Botanic Garden, large dead *Roystonea* palms are allowed to remain in the garden and are quickly colonized by woodpeckers. In turn, abandoned woodpecker cavities are used by parrots, owls, and other animals that cannot excavate their own nest cavities.

Lightning is a frequent and natural occurrence in many palm-growing regions of the world. We are helpless to prevent lighting strikes, but growers should be aware of the symptoms of damage and how to manage the risks of lightning. – *Scott Zona, Miami, Florida, USA*.

Palms, Turf, Budgets and Priorities: Strategic Horticulture Management at Montgomery Botanical Center

Just inside the front gates, at first glance the Montgomery Botanical Center (MBC) Palm Collection, carefully set in a canvas of seemingly lush, verdant lawn, appears extravagant for a living scientific collection. Admittedly, when one has seen diverse palms in habitat, or for that matter, in the drier environs of southern California, the MBC presentation may seem extravagant at first glance. Certainly majestic solitary palms such as the *Roystonea, Attalea* and even the relatively diminutive *Hyophorbe* are striking as they tower up from the surrounding turf.

At MBC, meeting high botanical and aesthetic targets with the greatest efficiency is our operational goal. This principle is woven through all aspects of horticulture management, starting with design strategies, and going all the way through to maintenance protocols. Behind the serene tropical scenes, balancing the mission priorities of scientific palm collections and beautiful landscaping is challenging and takes careful planning. Palms and greens are not necessarily competitors: identifying areas of overlap helps considerably.

Budgeting Priorities. An insightful article (Labbance, B. 2006. A century of minimal change: the benefits of low budgets. Superintendent 30: 30–38.) offers a clear example of how a specific long-term use coupled with conservative budget management act to preserve a classic landscape aesthetic. At MBC, the Olmsteadian aesthetic dovetails nicely with the priorities for a scientific collection – open vistas are vitally important, but homogenous lawns and manicured displays are not. Trends in MBC staffing demonstrate these priorities. Since 2004, staffing allocation for grounds maintenance has been reduced from 22% to 14%, while the allocation for collections care has been strengthened from 26% to 34%. (Administration remains flat at 8%). Living scientific collections are definitely top priority.

Site Selection Strategy. Meticulous site selection is essential to meet plant health and landscape aesthetic standards. Yearly review and planning by our landscape architect, Joe Hibbard, keeps our palm collections in visual harmony. This aesthetic expertise is brought together with the in-house horticulture experience to ensure the siting will allow the palms to thrive.

1. Turf and palm from Colonel Montgomery's Coconut Grove Palmetum. St. Augustine turf was reputedly established in this location for the Colonel prior to the 1932 holiday season. This *Sabal causarium* was also planted in 1932. Trunk diameter = 60 cm, height to crown = 17 m. Both palm and turf are in superior health.

Grounds Maintenance. Good turf does not have a negative effect on palm health. Arguably, healthy, sustainable turf management practices correlate with healthy palm collections. But briefly stated, turf is expensive. In recent years, we developed turf maintenance priority zones, ranking our maintenance intensity from grade 1 through grade 4. Only the area of the Colonel's Coconut Grove Palmetum requires irrigation and fertilizer (Fig. 1.); other open areas are progressively less intensively managed (Fig. 2.). Following the principle of the *Environmental Lawn* (Bormann et al. 1993. Redesigning the American Lawn: A Search for Environmental Harmony. Yale University Press; Shimonski, J. 2005. Parrot Jungle Island: A zoological theme park built upon IPM and plant health care practices: Featuring the ongoing development of an onsite mosquito larvicide program. Proceedings of the 2005 Association for Zoological Horticulture Conference Proceedings.), we maintain a heterogeneous, unfertilized assembly of grasses, perennial groundcovers, legumes and annual flowering plants is mowed to lawn height.

A large number of palms are solitary plantings which date to the 1930s, when the original caretakers favored the aesthetic of a single palm emerging directly from the lawn. Currently, we leave a collar of bare soil or mulch, which eases maintenance for both palms and turf.

Bedding also requires careful consideration. Massed plantings dictate co-bedding

2. The Environmental Lawn as expressed at MBC. Growing in shade here, this volunteer herbaceous cover contains broadleaved annuals, perennials, and grasses, mowed to turf height. These *Sabal domingensis* were grown from seed collected in the Dominican Republic by Dr. William Hahn in 1996.

and therefore turf removal. Smaller clumping species such as the *Chamaedorea* collections are also consigned to group planting in extensive mulched beds.

Irrigation Strategies. South Florida averages 152 cm (60 in.) of rain annually, and this rain is highly concentrated around the summer months. In the dry months of April and early May, South Florida can feel more like Palm Springs than Miami. Consequently, irrigation is essential for the palm collections. Deep extended irrigation immediately following granular fertilizer application assures that a good percentage of nutrients are flushed down into the deep feeder roots of the palms. The MBC Curators examined this carefully with tensiometer data to correlate irrigation zone run times with depth of water penetration. Their findings corroborated their thought process – longer run times equal deeper water penetration. Turf irrigation is not critical, so it has been reduced greatly in recent years. Unirrigated turf zones quickly spring back to verdancy in the summer.

Fertilizing Strategies. Except in our "grade 1" turf areas where vigorous growth is preferred, we avoid turf-specific fertilizers. The high nitrogen content of turf fertilizers is not in the best interests of palm health. A palm specific formulation (we prefer a 08-02-12 mix with a healthy dose of minor elements, especially manganese, potassium and boron) is broadcast over the entire root zone of a palm, which can extend out many feet in all directions. We use 25 tons of palm fertilizer per year (divided among three feedings), but only 1000 pounds of turf fertilizer.

It has been hypothesized that abundant turf may rob nutrients from some palms (Fig. 3). In theory, mulching blades installed on the mowers also allow for the rapid sequestration of whatever nutrients grass has taken up from the palm fertilizing regimen, since the clippings are left in place around the palm.

3. Coconut palm with nutrient deficiency, potentially caused by competition with abundant turf.

Endnote. Serious dedication to scientific palm collections is compatible with verdant vistas. Careful allocation of resources, harmonious landscape architecture and the unsurpassed natural beauty of palms can make conservation and research a surprisingly lush mission. – *Lee Anderson, Superintendent and M. Patrick Griffith, Executive Director, Montgomery Botanical Center, Miami, Florida, USA*