GROWING PALMS

Horticultural and practical advice for the enthusiast

Edited by Randy Moore

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More on *Licuala* Horticulture

Licuala mattanensis (referred to as '*mapu*') (Fig. 1) occurs in very peaty and acid soils in Sarawak. It is also found on the Kalimantan side of the border in Indonesia. Estimates vary on the pH of the native soil within the range of 2 and 3! Obviously, to grow this sensitive palm successfully avoid having alkaline soils at all costs.

Canadian peat is the perfect growing medium. Sand, perlite and vermiculite can be added to peat to create a low pH container mix. Watering should always be generous and done on an almost daily basis but not at flooding levels. Feeding with a broad scope, slow-release fertilizer such as Nutricote, Macrocote or Osmocote will meet all nutritional needs.

The water should be of a neutral to acidic pH level. Do not use hard water as over time it will take its toll by burning the foliage tips and will affect the palm's overall health. The best results come from maintaining an even and moist local environment all year round. The palms should not be subjected to any sudden drops in or rises in temperature or ambient humidity. Ideally, keep the temperature between 28°C and 35°C. The shading level should be around 80 percent, but can be lightened up to 70 percent. However, I have seen them happily growing in Bogor, Indonesia in full sun!

1. *Licula mattanensis* grows luxuriantly at Nong Nooch Tropical Garden, Thailand.

Humidity should be as high as 80 percent and never below 50 percent. If the humidity drops below this minimum level, scorching will occur around the leaf edges. The leaves will dry in no time at all! In their native habitat a person can barely stand the high humidity. Beads of sweat are rolling off of one's forehead in under three minutes. This is the humidity level that *Licuala 'mapu'* really likes.

This palm is very reluctant to re-establish once it has been shocked by a transplant move. It takes months (sometimes years) to re-establish itself if such a drastic event happens. *Licuala radula* is almost as exacting in its requirements but can tolerate a broader range of soil types including alkalinity levels.

Licuala 'mapu' is probably one of the most difficult *Licuala* species to cultivate. However, once the code to keeping it happy is cracked, the result is one of the most fantastically mottled leaves in the palm world. – *Michael D. Ferrero, Nong Nooch Tropical Garden, Thailand*

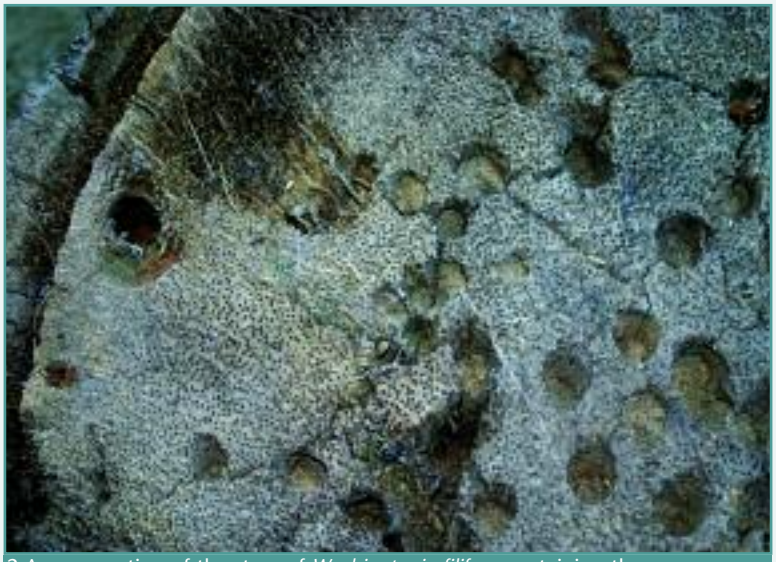
Dinapate wrighti: California's Giant Palm Boring Beetle

Dinapate wrighti is certainly one of the most impressive insects found in California. It is the giant palm boring beetle that inhabits the *Washingtonia filifera* oases in the deserts of southern California (Fig. 1). It is enormous at nearly 60 mm (2.5 in.) in length. It has a massive head and powerful jaws. Because of its distinctive characteristics, large size and relative rarity, learning more about this beetle has been a pursuit of mine for several years.

The first taxonomic description of *Dinapate wrighti* was published in 1886 by George H. Horn from specimens collected by W.G. Wright of San Bernadino, California (Trans. American Entomol. Soc. 13: 1–4. 1886.). For several years, Wright protected his discovery and remained very secretive about the habitat where the specimens were found. The only clues Wright gave were that the explorations took place in the Mojave Desert, the beetle infests only one plant, and the beetle is likely to be rare and may disappear. Wright's monopoly on specimens of this beetle meant he could sell this odd rarity to museums for as much as $1000 per pair!

However, in 1899 Wright's secrets were revealed to the world. Henry G. Hubbard published "Letters From the Southwest: The Home of *Dinapate wrighti* Horn." (Proc. Acad. Nat. Sci. 10(4): 83–89. 1899.). He provided a description of the habit and distribution of *D. wrighti*, as observed during his visits to Palm Springs, California in 1897. As Wright had feared, once word spread, more

1. *Washingtonia filfera* grove in the Thousand Palms Oasis in the Coachella Valley, California. These groves are the natural habitat of *Dinapate wrighti.*



2 A cross-section of the stem of *Washingtonia filifera* containing the numerous interior boring holes.

specimens were collected and became available to museums and collectors.

Until recently, *Dinapate* was a monotypic genus. A new species named *Dinapate hughleechi* was found in *Sabal mexicana* in east-central Mexico. It was described by Kenneth W. Cooper (Trans. San Diego Soc. Nat. Hist. 21: 81–87. 1986.). The first specimens were collected in 1946 and 1965 from eastern Mexico. They are comparable in size and appearance to smaller specimens of *D. wrighti*.

July is the time when the adults bore a hole and emerge from the palm (Fig 2). The logs also contain beetles at the very temporary pupal stage during July and August. It is believed that the beetles emerge during the summer months because of the monsoonal conditions found in the Sonoran and Mojave deserts. During damp weather, the male and female can locate each other more easily since pheromones travel better with moist air. Also, the exposed adult beetles probably have a better chance of surviving with the moisture provided by summer thunderstorms.

Dinapate wrighti is a species of bostrychid beetle (Bostrichidae), which typically feed on live plant tissue. There are about 500 species in the family. Only five of these species feed on palms. *Dinapate wrighti* is by far the largest bostrychid beetle in existence. It is twice the length of the next longest bostrychid beetle, attaining a length of 38–60 mm (1.5–2.4 in.) (Fig. 3). It has an enormous thorax which it uses as a wedge so that it can lever itself and tunnel with its huge jaws. Two large posterior horns are found on both sexes that it uses to back out of its tunnel instead of exiting head first, leaving a characteristic exit hole in the trunk (Fig. 4). Males are significantly larger than females. The ultimate size of *D. wrighti* is influenced by the environmental conditions under which they mature. The quantity and quality of food available to the individual larvae has much to do with the rate of development. Temperature is another factor.

3. An adult specimen of *Dinapate wrighti*, the giant palm boring beetle.

During reproduction, the female bores a tunnel in the softer tissue in the crown of the palm. The male, or several males, enter the chamber to mate. The female lays about 500 white eggs. The resulting larvae feed aggressively on the inner stem of the palm. Therefore, a large number

4. The tell-tale exit hole on the trunk of *Phoenix dactylifera.*

of larvae in a single palm can be devastating. The larvae pupate in the Spring (April and May). A chamber is formed about three centimeters under the surface of the stem. The pupal stage lasts about two months, followed by emergence of the adult from the exit hole.

Dinapate wrighti emerge at night. They bore a one-inch long, dime-sized exit hole through the stem and leaf skirt. Along with cooler temperatures provided by nightfall, the cloak of nighttime also provides protection from from its bird predators the Common Flicker and two species of woodpeckers. These birds locate the grubs by hearing them tunnel. They then peck a small hole and remove the larvae. The beetles provide food for birds and also nesting sites. The stem of *Washingtonia filfera* is too hard for woodpeckers to excavate nesting holes. However, breeding woodpeckers can build a nest in older palms that have been softened by large numbers of feeding larvae and exit holes. The California carpenter bee (*Xylocopa californica*) also uses the empty exit holes as a nesting site.

5 Collecting palm rounds of *Phoenix dactylifera* in Borrego Springs, California containing larvae and adult specimens.

How *Dinapate wrighti* became dispersed among the distant and isolated palm oases separated by barren desert is still a mystery. The beetle can fly only short distances. Many of the palm oases are separated by a distance of 25 km or more. One theory is that the beetle has occupied these palms since long ago when the climate was warmer and wetter. The palms were more plentiful and formed an almost continuous grove. As the climate changed, the once-continuous palm population was fragmented into isolated populaitons we see today. An alternative theory is that the beetles dispersed in more modern times after the distinct groves were established, possibly aided by humans moving infested palms or cultivating palms in areas between oases thereby providing "bridges" for the beetles.

One area of interest to entomologists is the life cycle of *Dinapate wrighti*. Roy E. Campbell collected sections of *Washingtonia filifera* containing larvae in 1917 (J. Entomol. Zool. 15: 61–65. 1923.). Campbell kept the embedded larvae in a wire cage and waited nearly three years for the adults to emerge. He concluded that the life cycle must be between three and five years. In one extreme case, an adult emerged after seven years! Fires tend to speed up the life cycle to as little as one year if the palm is killed. The drying stem and the increased heat from the blackened surface appear to stimulate the larvae into a higher metabolic rate.

It was believed that *Dinapate wrighti* attacked only a single palm species, *Washingtonia filifera*. Following the examination of natural palm groves in northwestern Mexico, I found no evidence of *D. wrighti* in *W. robusta* or *Brahea calcarea* (syn. *B. nitida*). However, there are exit holes in

6. The large larva of *Dinapate wrighti*.

some *Brahea armata* found in northern Baja California. Moreover, *D. wrighti* has migrated to cultivated *Phoenix dactylifera*.

My search for this elusive beetle began in 2004 culling through piles of green waste in the Coachella Valley near Palm Springs, California. I was looking for sections of discarded *Washingtonia filifera* that might be infested. Several months of effort yielded one dead and disfigured specimen. Finally, in 2006 I had the opportunity to search again in live palms where the chance of finding living larvae and adults was much better.

Date palms (*Phoenix dactylifera*) from a former grove were being transplanted to line roads in a new golf resort being developed in Borrego Springs, California. Several of the palms were dying for an unknown reason. Because of my work as the arborist for the City of San Diego, and as an amateur entomologist, I was invited to dissect several living palms in an attempt to determine the cause of the distress. We used a chainsaw to split open the stems (Fig. 5). The cause of the problem was *Dinapate wrighti*. We were rewarded with living larvae (Fig. 6) and adult specimens.

Dinapate wrighti can be a cause of death in *Washingtonia filifera* and *Phoenix dactylifera*. About one-half of the mature palms found in most groves exhibit some exit holes. These holes damage the palm's tissue. In severe cases where the palm contains hundreds of exit holes, the *D. wrighti* are the cause of death. The extent of death caused by boring beetles is difficult to determine. However, they appear to have a preference for attacking older palms.

Dinapate wrighti plays an important role in the ecosystem of California's native *Washingtonia filifera* palm groves. It also has horticultural consequences for cultivated specimens of *W. filifera* and *Phoenix dactylifera*. – *Mike Marika, Park Arborist, San Diego, California, USA*

[Editors' Note: The spelling of the family name Bostrichidae and species epithet for Dinapate wrighti *is confused in the literature. We have brought the spelling in line with the spelling used by the Integrated Taxonomic Information Database (www.itis.gov).]*

Remembering Robert Lee Riffle (1940–2006)

Robert Lee Riffle (Fig. 1) described himself as a "horticultural writer" but loved being called "an award-winning author." Winning the American Horticulture Society's "Garden Book of the Year" award for both *The Tropical Look: An Encyclopedia of Dramatic Landscape Plants* and *An Encyclopedia of Cultivated Palms* (co-authored with Paul Craft) gave him great pleasure. Riffle's third book, *A Pocket Guide to Palms*, will be published by Timber Press in 2007. Robert Lee Riffle died suddenly of cardiac arrest on Friday evening, August 11, 2006, at home in Fort Pierce, Florida.

1. Robert Lee Riffle. Photo by Mike Burnett.

From childhood, Bob was interested in plants and flowers and seed germination. Some of his earliest gardening experiments were in growing plants from outside his zone – dahlias which suffered in the humidity of the South and tulips not meant for the heat. It was the beginning of over 55 years' study of botany, taxonomy and horticulture and a passion for palms and tropical-looking plants. His partner, Rany McIntyre, said he thought Bob had spent his entire life preparing to write the books he published.

In 1980, Bob started a lush tropical garden behind his house in the Montrose District of Houston. Friends said the humidity of Houston combined with the humidity from the swimming pool and the Plexiglas cover over the entire back yard made for very wet visits. Shovels pushed into the soil were vine covered in days. When the palms grew and the cover went, he searched for more planting space. The pool was emptied, and holes were jack hammered into the bottom to allow for drainage. The shell was filled with soil and then palms, thus becoming one of the biggest plant pots in the city of Houston. Many photos of that garden are in *The Tropical Look*.

The Internet was a goldmine for Bob, and he downloaded more than 10,000 photos of palms and other tropical plants for his own reference. In kind, he would ultimately spend the last 20 years of his life generously answering questions and touching the lives of thousands of people who found him online in the gardening, palms and tropicals forums. His last Internet home was as the moderator of the IPS message board at www.palmtalk.org – he was proud of the community there and considered the participants good friends.

In 2001, Bob left Houston for the warmer zones of Florida where he finished *An Encyclopedia of Cultivated Palms*. As he wrote in *The Tropical Look*, "The lure of the beauty of tropical landscapes…is undeniable…has an almost irresistible appeal for people who don't live in such places...It is the stuff dreams are made of."

In addition to his longtime companion, Rany McIntyre, he is survived by his sister, Nancy, his daughter Donna, two granddaughters and hundreds of friends around the world. More about Robert Riffle's life including photos of him, his travels and Florida palm garden can be found in a special section of the IPS web site, the www.palmtalk.org message board in a forum under his name. – *Diane S. Laird, Kirkland, Washington, USA*