

## The Growth of Some Palms in Tahiti

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One of the titles I contemplated for this article was "Growing Palms in Tahiti." However, if there ever was a misnomer for an article, that would probably be it, since no one really grows palms in a place blessed with a wet tropical climate such as Tahiti. In reality, palms simply grow by themselves. To state that I am responsible for the growth of these palms would simply be untrue. Although my wife, Marianne, and I did plant the palms, we did not, nor did anyone else, water, fertilize, control pests, or in any way maintain the palms after planting. Thus, the title decided upon is more appropriate and reflects our experiences with palms in Tahiti.

I met my wife in 1976 on my first trip to Tahiti at the end of a three-month expedition to islands in the South Pacific from New Caledonia to Papua New Guinea to collect living plant material for botanical gardens in Hawaii. We were married a year later in Tahiti, but returned to Hawaii to make our home. At the time of our wedding in 1977, we planted a few palms around my mother-in-law's home in Papeari, located on the southeast side of Tahiti. Among the palms we planted in 1977 was *Pelagodoxa henryana*, which we call our wedding palm since we planted it on the day we were married, July 7 (see Fig. 9).

Since 1977 we had the opportunity to return to Tahiti about every year or two and, thus, a familiar pattern was established. At each visit we would plant a few more palms around my wife's former home. By circumstance, we usually visited during the rainy season (December-April) and this proved ideal for establishing the palms,

since basically no one would water them after planting. Most of the plants were obtained from the Jardin Botanique de Papeari as rather large, overgrown seedlings in 3.5 liter (ca. 1-gallon) containers. These were planted out without the use of fertilizer or soil amendments and only watered and maintained for the remaining few weeks of our visit. Then they were left on their own to live or die. Happily, most lived! Slowly over the years, the yard around my wife's former home filled up with palms, much to the increasing dismay of my skeptical, although somewhat amused, mother-in-law.

My mother-in-law, Christina, could not begin to comprehend why anyone would plant trees that for the most part didn't produce edible fruits or leaves. Although Tahitians have a great love for the ornament that plants provide, utilitarian reasons are foremost in their minds when planting a tree. Also, she thought it was most strange that I would actually plant many of the palms under existing trees and other vegetation where they would not receive the benefit of full sun. I explained to her that some palms needed shade when young but full sun when older and that they would eventually be compatible and not compete with the other plants, but she simply looked at me as if I were a crazy *popa'a* (Tahitian word for white person).

As her yard filled with palms, Christina's skepticism and bemusement turned to concern and consternation as she envisioned her home being taken over completely by these utterly worthless plants that were growing up into her prized fruit trees. On more than one occasion she called or wrote

us saying that she was considering taking out this or that palm. She really "had it in" for the few spiny palms, because she was concerned about the children getting the needles in their shoeless feet. Out of deference to her, I had planted the spiny palms on the far side of her property next to an overgrown, mosquito-infested, swampy area where only the bravest (most fool-hardy?) of palm lovers ventured. I did explain to her that my intentions were honorable, as I put the few spiny palms in an isolated, remote area of her yard. Also, I reminded her that it was she who had planted the vegetable garden beyond the spiny palms so that anyone tending the vegetables had to pass them.

Perhaps the final straw was when the *Pigafetta* started to grow with leaps and bounds and thrust its large, spiny leaves into the garden with increasing speed. She threatened to cut them down and I wrote an impassioned letter pleading with her not to do so, that given time the palm would develop a beautiful, spineless trunk that would pose no danger to anyone. Even the fierce-looking needles on the leaves were soft and relatively harmless.

I don't think it was my letters or her love for her daughter, but Christina didn't remove any of the palms, including the *Pigafetta*. I think it was the palms themselves that won her over with their beauty and ornament, not to mention that every visitor who stopped in at her house raved and ranted about how beautiful her palms were and that they wanted seeds or small plants of all of them to take to their homes and gardens! Although Christina denies this and instead says that she didn't remove any of the palms out of deference to my wife and me, I think that over the years as the palms grew and developed into their full beauty, she grudgingly at first and then willingly accepted and began to admire the palms in her yard. Would you believe that she now plants palm seeds from the trees that are fruiting so that she can give small plants to enthusiastic friends? As evidence

that all things come around, it has been reported that I was observed planting fruit trees in Christina's yard—obviously a baseless rumor that I vigorously deny as quickly as I can shiny bare-legged up an *Aiphanes caryotifolia!*

Most of the palms have grown well in Tahiti. Papeari is a wet, warm area that averages about 250 centimeters (100 inches) of rain annually and temperatures that range from 22–32° C (70–90° F) year round. Also, most of my mother-in-law's yard is blessed with a rich, well drained loam. The fringes of her property have poorly drained and/or water-logged soils and most of the few palms we have planted there have struggled. The property, which is contiguous with the lagoon, has two streams, numerous springs, and large trees for shade, imparting a natural ambience in which the palms grow.

One may have the impression that it has been a veritable bed of roses for the palms and that they have led a virtually blissful existence in paradise. Nothing could be further from the truth, though, as in addition to tolerating a doubting mother-in-law for several years, they have had to withstand a host of ominous enemies including a full fledged hurricane in 1983 and several tropical storms with damaging winds; power lawnmowers; my numerous nieces and nephews on bicycles and with machetes in hand; falling coconuts and breadfruits; and perhaps the greatest scourge of all, the persistent and fearless *tupa* crabs.

*Tupas* are land crabs that make rather extensive burrows and tunnels throughout the soil as gophers and moles do in other parts of the world. In fact, a *tupa* is the Tahitian equivalent of a gopher and can cause just as much damage in a garden as its furry counterparts. *Tupas* love to invade the holes of freshly planted palms where the soil is still soft and not compacted, leaving fist-sized tunnels around and through the roots of the newly planted palm; occasionally they will even uproot a

plant. As natural scavengers that will consume just about anything, they pose the greatest danger to small and/or newly planted palms with leaves close to the ground. In one night they can completely defoliate a small palm, leaving nothing but a few leaf rachises and bases. I have retaliated by refilling the *tupa* holes with soil or heavy stones or erecting a wire mesh cage completely around the palm. The strategy hasn't put an end to my *tupa* troubles but it usually gives the palm a chance to grow up a bit where it is more resistant to attacks.

My numerous nieces and nephews, who number about a dozen at last count, delight in riding their bikes through the garden, occasionally flattening a small palm. They also have a penchant for walking around the garden swinging a machete about as long as they are tall. They have left their calling cards on several palm stems.

My mother-in-law has numerous coconut and breadfruit trees in her garden that also pose a danger to palms, especially the young or newly planted ones. A coconut (not to mention the leaf) or breadfruit dropping from 15 meters (50 feet) is a lethal weapon, pulverizing anything, living or not, that is unfortunate enough to get in its path. I can say this about coconuts, though, that at least the damage they inflict is relatively clean and clear-cut. Breadfruits, on the other hand, are usually ripe when they fall and add insult to injury by leaving behind a visually obnoxious, fly-infested, smelly glob of putrifying tissue completely obscuring its damage.

Since many of the palms were planted in lawn areas of my mother-in-law's yard, some have on occasion become the target of errant lawnmowers. Although occasionally they regrew, most became added mulch in the lawn. I finally wised up and made a circle of stones around small or newly planted palms to deter intrusions by lawnmowers as well as by bicycles.

In the early and mid 1980s, the *El Nino* effect of ocean currents in the Pacific

pushed the tracks of hurricanes (typhoons, cyclones) and tropical storms close to Tahiti. Several brushed close by and in 1983 a hurricane with 150 kilometer-per-hour winds (90 miles per hour) struck Tahiti, causing considerable damage to property. The wind blew potted palms that my mother-in-law kept on her patio across the yard, some never to be seen again. However, the palms in the ground didn't seem to suffer greatly and actually seem to have benefitted from the wetter than normal years. That we have a preponderance of palms from the South Pacific in the garden was probably advantageous, since they are indigenous to areas frequented by hurricanes and are probably more tolerant of potentially damaging winds.

One of the most remarkable aspects of the hurricane was that it dislodged and knocked over but did not uproot a large rambutan tree under which I had planted what I thought were small, shade-loving, mottled-leaved pinangas such as *P. coperlandii* and *P. maculata*. Once the tree was knocked over, the palms were exposed to nearly full sun. Much to my surprise, a few years after the hurricane these palms were medium-sized and growing quite well. The only difference seemed to be in the less graceful, more compact crown of leaves with shorter petioles; otherwise they were just as healthy and vigorous as their counterparts in full shade.

Another situation where a palm lost the protective shade provided by a tree but continued to grow well serves to demonstrate the amazing tolerance of these plants, especially when the climate is as forgiving as that in Tahiti. In 1985 we received a plant of *Johannesteijsmannia altifrons* from the Jardin Botanique and planted it under the shade of a *pacay* tree (*Inga edulis*). Two years later during the course of a telephone conversation with my mother-in-law, she told us that she had had to cut down the *pacay* tree since one of my nephews was allergic to its pollen.

I cringed when I contemplated the pitiful state of this rare and beautiful palm from the dense jungles of Malaysia now exposed to the full sun. At best, on our next visit to Tahiti I expected to find a stunted, shriveled, necrotic and/or chlorotic plant, barely clinging to life and a sorry excuse for this majestic species. Much to my surprise and delight, the plant has done exceedingly well in its new environment, has quadrupled in size, and exhibited only slight yellowing in the leaves.

Like other tropical places, Tahiti has its share of ants, mealybugs, and other insects that attack palms. In fact, many of the palms at my mother-in-law's house support tremendous and thriving populations of mealybugs and their attendant ants. However, we don't apply pesticides to the palms and, regardless, the palms and their insect pests seem to be happily coexisting. It's almost as if the palms are growing so vigorously that they stay one jump ahead of the ants and mealybugs.

Although most of the palms have grown well, a few have struggled and/or died. Most of the species that do poorly are from more temperate regions and probably cannot tolerate the constant wet heat of Tahiti. In other cases, palms planted on the margins of the property near or in the poorly drained soil or newly filled soil near the lagoon have for the most part grown poorly. These include *Corypha*, *Pritchardia*, and *Satakentia*. A few species just don't seem to grow well even though they are from similar climates and were planted in good soil. *Actinokentia divaricata*, *Chamae-*

*dorea elegans*, *C. metallica*, and *C. tepelote* all struggled and eventually died. I suspect that nematodes attacked them since they were planted amongst anthuriums, a plant known to harbor these injurious pests.

*Archontophoenix* sp. from Mt. Lewis, Queensland, Australia, *Dictyosperma album*, and, to a lesser extent, *Neodypsis decaryi* suffer from potassium deficiency as they exhibit the classic yellowish translucent flecking of older leaves symptomatic of this disorder.

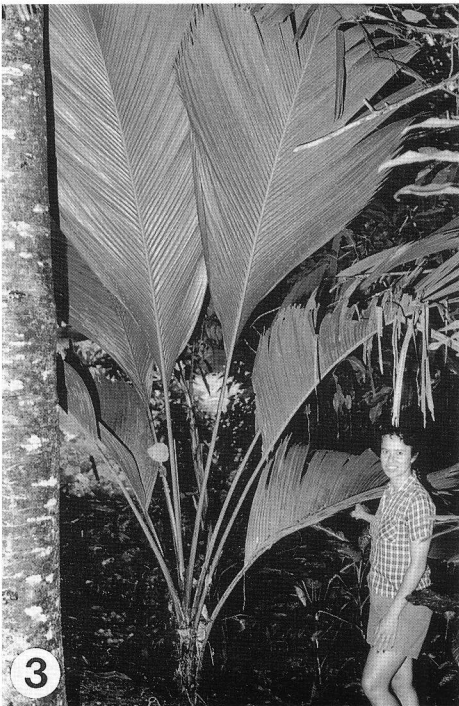
Since the soils in Tahiti are volcanic in origin and rainfall is heavy, several palms restricted to limestone rocks in their native habitat have not done well. The chamaedoreas mentioned before as well as *Copernicia* and *Gaussia* have all struggled and/or died. However, *Chamaedorea geomiformis*, *C. seifrizii*, *C. sartorii* and *Schippia concolor* appear to grow well if not thrive.

Some palms, including *Burretiokentia vieillardii* and *Areca vestiaria*, just have not done well; I don't know what ails them. Other species of both genera thrive close by.

Some of my favorite palms include *Areca guppyana*, *Kentiopsis oliviformis*, *Phoenicophorium borsigianum*, *Neodypsis lastelliana*, *Reinhardtia latisecta*, *Clinostigma samoense* (see Figs. 1-8), and *Chrysalidocarpus cabadae*. Other favorites are *Licuala* aff. *ramsayi* (see Figs. 10-13), *Verschafeltia splendida* (see Figs. 13-16), *Pinanga insignis* (see Figs. 21, 22), *Veitchia winin*, *Hydriastele microspadix*, *Drymophloeus beguinnii*, *Cham-*

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1. *Areca guppyana* (1990), a dramatic plant with stilt roots, bright red fruits, and large pinnae, is probably my favorite palm, chamaedoreas notwithstanding of course!
  2. Another favorite is *Kentiopsis oliviformis*. Shown here (1990) is the smaller of our two plants with my daughter, Christina.
  3. For bold, dramatic foliage, *Phoenicophorium borsigianum* is hard to beat. My wife, Marianne, stands next to our only plant of this species (1990).
  4. A flaring base, conspicuous rings, and a powdery-white covering give *Neodypsis lastelliana* one of the most attractive trunks in the palm family. The leaves on this specimen reach to eight meters (25 feet) above the ground (1990).
  5. Marianne stands with *Reinhardtia latisecta* (1990).
  6. *Clinostigma samoense* (1985).
  7. *Clinostigma samoense* (1986) with Marianne.
  8. *Clinostigma samoense* (1990), flowering with more than 11 meters of trunk (35 feet), also rates as one of my favorite palms.

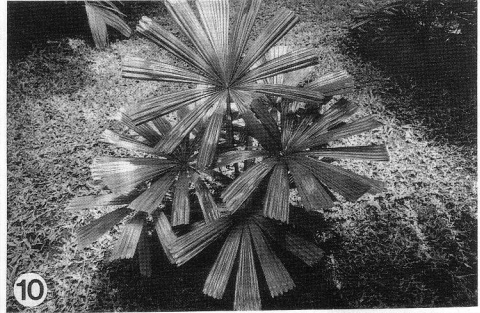




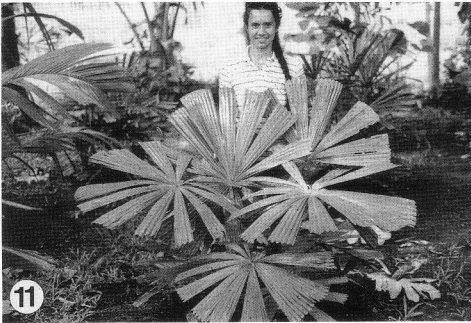




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10



11



12

9. Our wedding palm, the *Pelagodoxa henryana* planted in 1977, has been fruiting since 1987 with large, curious, warty fruits. 10. *Licuala* aff. *ramsayi* (1985). 11. *Licuala* aff. *ramsayi*, with Marianne (1986). 12. *Licuala* aff. *ramsayi*, again with Marianne (1990), showing large, dramatic leaves.

*beronia macrocarpa*, and *Brassiophoenix schumannii*. I guess I could go on and on; there's no end to them!

I have a special fondness for Pacific Island palms, since to me most are the quintessence of what a palm should be: tall, solitary, crownshafted, pinnate-leaved monarchs of the plant kingdom. Also, the South Pacific holds a special place in my heart and I have many fond memories of my travels there and of seeing most of the palms in their native habitat.

I would be remiss if I did not include *Pelagodoxa henryana* as one of my favorites. When its leaves are not tattered and split by the wind it is a striking plant, and its large, warty fruits are certainly a curi-

osity. We have planted 18 around my mother-in-law's place, since we were concerned that the number of mature, fruiting trees in Tahiti (only about 15 at its peak in the late 1970s) had been reduced to about ten by 1990. Also, since the species just was not being propagated to any great extent, it was possible that it would vanish from Tahiti, surviving only as a few specimens in its native habitat in the Marquesas Islands to the northeast.

Table 1 is a list of palms at my mother-in-law's home in Papeari, Tahiti as of August, 1990. The palms are presented alphabetically by genus and species. Following the species name is the number of plants in parentheses. Additional data

13. *Versaffeltia splendida* (1985). 14. *Versaffeltia splendida* with Marianne and my son, Robert (left background, 1986). 15. *Versaffeltia splendida* (1988) with conspicuous stilt roots at base. 16. *Versaffeltia splendida* with Marianne (1990). What growth!







17. Trio of *Pigafetta filaris*, just four years in the ground (1985). Note Marianne at the base of the tree on the right. Palm on the far right is *Cocos nucifera*. 18. Trio of *Pigafetta* with Marianne again at the base of the tree on the right (1986). Note the tremendous growth of *Pigafetta* trunk in a year's time. Also, note growth of *Cocos nucifera*.

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19. Trio of *Pigafetta* (1990) just before cutting down the center, staminate tree. Note fruiting tree on the left and my children, Robert and Christina, at the base of the left and center trees. 20. Intriguing patterns of spines on leaf bases and petioles of *Pigafetta* (1985). 21. Marianne stands with *Pinanga insignis* (1986), a rather robust species. Trunk in the left center background is *Clinostigma samoense*. 22. Inflorescences and infructescences of *Pinanga insignis* (1990). →





(taken as of 1990) follow the species and are arranged in columns as numbered.

There are different ways to measure and assess the growth of palms, and palms can be ranked by their rate of growth, but the results can vary depending on the method used to measure growth. Number of leaves produced, height of stem, ratio of number of leaves to stem, and simple biomass (weight) are all methods of evaluating and comparing palm growth. The first three methods are easier and more practical than measuring biomass, and columns eight, nine, and ten of Table 1 list these data where recorded for each species.

The clear champions in terms of trunk growth were *Syagrus sancona* and *Pigafetta filaris* with 267 cm (8.8 feet) and 217 cm (7.1 feet) respectively of trunk produced annually. They were far ahead of the runners up. In fact, the *Syagrus* more than doubled the rate of the next closest competitors, *Veitchia winin*, *V. montgomeryana*, and *Caryota rumphiana*, the last three with 133, 121, and 120 centimeters respectively of trunk produced annually. I was not surprised at the growth rate of the *Pigafetta*, since it is well known as an extremely rapid grower. However, the growth of the *Syagrus* was amazing, since my experience with other species of the genus had not led me to believe it would develop a trunk at the same rate as *Pigafetta*, let alone surpass it!

Other relatively fast producers of trunk—i.e., 100 or more centimeters (3.3 feet) annually—included *Clinostigma samoense* (108 cm), *Heterospathe elata* (100 cm), and *Veitchia macdanielsii* (100 cm). All these fast growers are large, solitary, sun-loving palms which inhabit open forest or become emergents above the canopy. However, some small, shade-loving, clustering palms were also fast producers of trunk. *Hydiastele microspadix* and *Ptychosperma microcarpum* with 110 and 100 centimeters respectively of trunk pro-

duced annually can compete with most of the tall, solitary palms, and *Areca triandra*, at 90 centimeters per year, was not far behind.

The slowest producers of trunk on an annual basis included *Calypstrocalyx stenoschista* (10 cm), *Pritchardia lanigera* (10 cm), *Licuala lauterbachii* (14 cm), *L. spinosa* (15 cm), *Hyophorbe lagenicaulis* (15 cm), and *Rhapis subtilis* (15 cm).

Another way to measure growth is by the number of leaves produced per year. In this category, the unabashed champion was the diminutive *Phoenix roebelinii*, that has produced 40 leaves per year since a trunk formed. In second place was the giant *Pigafetta filaris* with 33 leaves produced per year, followed closely by *Livistona* aff. *benthamii* with nearly the same number. *Livistona rotundifolia* and *Licuala spinosa* were in fourth and fifth with 26.7 and 20.0 leaves respectively.

There was tough competition among nine species for the title of the lowest leaf producer. The winner by less than a frond was *Gronophyllum pinangoides* with five leaves produced annually. Close runners up and their annual leaf production were *Verschaffeltia splendida* (5.2), *Areca triandra* (5.4), *Alloschmidia glabrata* (5.5), *Areca multifida* (5.5), *Brassiophoenix schumannii* (5.5), *Pinanga philippinensis* (5.5), *Caryota rumphiana* (5.6), and *Pinanga kuhlii* (5.7).

The final way I measured growth was by the amount of trunk produced per leaf (internode). Internodes can vary and seem somewhat dependent on the vigor of the plant. Healthy, normal-growing plants tend to have longer internodes than stressed, weak-growing plants of the same species. The clear champion in this category was *Caryota rumphiana* with internodes that averaged 37.5 cm, nearly twice as long as the runners up. In a dead heat for second were *Syagrus sancona* and *Wallichia disticha* with internodes of 20 cm and in third

and fourth place were *Caryota mitis* and *Areca triandra* with internodes of 21.7 cm and 22.5 cm respectively.

The species with the shortest internodes were *Licuala lauterbachii* and *Calyptrocalyx stenoschista* with 1.4 cm and 2.7 cm respectively. Others with short internodes (and their 'size) included *Socratea exorrhiza* (2.9 cm), *Hyophorbe lageni-caulis* (3.0 cm), *Licuala grandis* (3.3 cm), *Nephrosperma vanhoutteanum* (3.7 cm), *Veitchia merrillii* (3.9 cm), and *Allo-schmidia glabrata* (4.0 cm). Several other species, including *Licuala* aff. *ramsayi*, *L. spinosa*, *Livistona benthamii*, *Phoenix roebelenii*, and *Rhapis subtilis*, certainly are among those having short internodes, if not the shortest. However, although these species had developed trunks, it was difficult to measure them accurately since their trunks were covered with leaves all the way to the ground.

I can only guess at biomass production but the clear leaders would probably be the tall, fast-growing, solitary species such as *Pigafetta*, *Syagrus*, *Veitchia*, *Clino-stigma*, and *Caryota rumphiana*.

There were no species that were leaders in all three categories of trunk produced, leaves produced, and trunk produced per leaf. Species that produced few leaves per year were not necessarily slow growers. *Caryota rumphiana* was the leader for trunk produced per leaf and among the leaders for trunk produced per year, but was among the lowest in leaves produced per year. So one can say that it gets the most out of each leaf that it produces. Likewise, *Areca triandra* gets a lot out of each leaf it does produce. Species that had short internodes could be among leaders in trunk produced if leaf production was high, as *Pigafetta filaris* demonstrated. *Syagrus sancona* was the leader in trunk production because of a combination of long internodes and moderately high leaf production.

Conversely, species which produce a

high number of leaves per year are not necessarily among leaders in trunk produced. *Phoenix roebelenii*, *Licuala* aff. *ramsayi*, *L. spinosa*, *Livistona* aff. *benthamii*, and *L. rotundifolia* all were leaders in leaves produced. However, all with the exception of the last one were not anywhere near the leaders in trunk produced, since they get so little out of each leaf that they do produce.

One of the few pleasures that I have derived from not living in Tahiti is that I appreciate to a greater extent the growth of palms there. Their growth, already generally much faster than that of palms in cooler subtropical areas, seems even that much more spectacular and dramatic when observed only on an annual or biennial basis. Their growth seems astonishing; the plants nearly seem to be leaping out of the ground. I have to pinch myself and ask, "Is this the same plant that was in this spot just two years ago?"

I have been fortunate to document pictorially the growth of several palms from year to year. Figures 6 (March, 1985), 7 (March, 1986), and 8 (August, 1990) show rather graphically the growth of *Clinostigma samoense*. Similarly, Figures 10 (March, 1985), 11 (March, 1986), and 12 (August, 1990) show *Licuala* aff. *ramsayi*. Figures 13-16 are of *Verschaffeltia splendida* in 1985, 1986, 1988, and 1990 respectively.

Figures 17 (1985), 18 (1986), and 19 (1990) document the tremendous, nearly frightening, growth of *Pigafetta filaris*. We planted three *Pigafetta* in 1981, and by 1988 the two pistillate ones had flowered and were dropping abortive, nonfertile fruits. By 1990, the third specimen had flowered and it was staminate, resulting in the ground beneath the trees being carpeted by seedlings of *Pigafetta*. In fact, they were coming up like hair on a dog's back and I was mowing them down as if they were grass. Alarmed by its propensity for reproduction and John Dransfield's

Table 1. Palms in Papeari, August, 1990. 1 = years in ground, 2 = years in ground to flowering, 3 = overall height (meters), 4 = height of trunk (meters), 5 = leaves in crown, 6 = leaf scars on trunk, 7 = years since trunk formed, 8 = trunk produced (centimeters) per year since trunk first formed ( $\#4 \div \#7$ ), 9 = number of leaves per year since trunk first formed [ $(\#5 + \#6) \div \#7$ ], 10 = trunk produced (centimeters) per leaf since trunk first formed ( $\#4 \div \#6$ ).

	1	2	3	4	5	6	7	8	9	10
<i>Aiphanes caryotifolia</i> (1)	8	7	5.0	2.3	20	40	5	46	12.0	5.8
<i>Alloschmidia glabrata</i> (1)	7	—	3.0	1.0	8	25	6	17	5.5	4.0
<i>Archontophoenix</i> sp. (Mt. Lewis) (2)	8	—	5.8	1.8	9	29	6	30	6.3	6.2
<i>Areca catechu</i> (3)	13	8	11.5	9.0	10	66	10	90	7.6	13.6
<i>Areca guppyana</i> (2)	5	4	4.0	1.3	7	15	4	33	5.5	8.7
<i>Areca multifida</i> (1)	5	3	2.7	1.3	9	14	3	43	7.7	9.3
<i>Areca ipot</i> (1)	9	4	5.0	2.3	8	35	7	33	6.1	6.6
<i>Areca triandra</i> (2)	7	4	8.0	4.5	7	20	5	90	5.4	22.5
<i>Areca vestiaria</i> (1)	5	—	1.3	—	6	—	—	—	—	—
<i>Arenga porphyrocarpa</i> (1)	5	—	2.0	—	9	—	—	—	—	—
<i>Bismarckia nobilis</i> * (5)	4	—	1.0	—	22	—	—	—	—	—
<i>Brassiophoenix schumannii</i> (1)	5	—	3.3	1.3	8	14	4	33	5.5	9.3
<i>Burretiockentia hapala</i> (3)	7	6	6.0	2.0	12	26	4	50	9.5	7.7
<i>Burretiockentia vieillardii</i> (1)	5	—	0.7	—	6	—	—	—	—	—
<i>Calyptrocalyx spicatus</i> (1)	5	—	5.0	2.0	9	15	3	67	8.0	13.3
<i>Calyptrocalyx stenochista</i> (1)	5	—	1.3	0.3	10	11	3	10	7.0	2.7
<i>Caryota mitis</i> (2)	5	4	8.0	1.3	15	6	3	43	7.0	21.7
<i>Caryota rumphiana</i> (3)	8	7	10.0	6.0	12	16	5	120	5.6	37.5
<i>Chamaedorea geonomiformis</i> (6)	2	1	0.7	—	13	—	—	—	—	—
<i>Chamaedorea hooperiana</i> (5)	2	—	1.3	—	5	—	—	—	—	—
<i>Chamaedorea sartorii</i> (5)	5	3	3.0	1.3	13	23	4	33	12.0	5.7
<i>Chamaedorea seifrizii</i> (12)	5	2	3.3	2.7	6	25	4	68	7.8	10.8
<i>Chambeyronia macrocarpa</i> (7)	8	—	8.0	3.3	10	19	4	83	7.3	17.4
<i>Chrysalidocarpus cabadae</i> (4)	9	7	8.0	4.0	12	26	5	80	7.6	15.4
<i>Chrysalidocarpus madagascar-</i> <i>ensis</i> (1)	13	9	11.0	6.5	21	86	7	93	15.3	7.6
<i>Clinostigma samoense</i> (1)	9	7	11.5	6.5	20	78	6	108	16.3	8.3
<i>Corypha elata</i> (1)	4	—	1.0	—	8	—	—	—	—	—
<i>Cyrtostachys renda</i> (1)	2	—	0.7	—	5	—	—	—	—	—
<i>Dictyosperma album</i> (1)	5	—	0.7	—	—	—	—	—	—	—
<i>Drymophloeus beguinii</i> (2)	5	—	4.0	2.0	9	20	4	50	7.3	10.0
<i>Drymophloeus</i> sp. (Papua New Guinea) (2)	5	4	6.0	3.0	12	37	5	60	9.8	8.1
<i>Gronophyllum pinangoides</i> (1)	5	4	2.5	2.0	5	20	5	40	5.0	10.0
<i>Gulubia costa</i> (3)	5	—	3.0	—	6	—	—	—	—	—
<i>Gulubia macrospadix</i> (1)	5	—	3.0	—	7	—	—	—	—	—
<i>Heterospathe elata</i> (1)	12	9	12.0	9.0	25	120	9	100	16.1	7.5
<i>Hydiastele microspadix</i> (1)	5	4	6.0	3.3	7	21	3	110	9.3	15.7
<i>Hyophorbe lagenicaulis</i> (1)	5	—	2.5	0.3	6	10	2	15	8.0	3.0
<i>Hyphaene coriacea</i> * (1)	4	—	0.3	—	3	—	—	—	—	—
<i>Johannesteijsmannia altifrons</i> (1)	5	—	1.0	—	6	—	—	—	—	—
<i>Kentiopsis oliviformis</i> (2)	8	—	6.0	1.7	11	14	4	43	6.3	12.1
<i>Lantania lontaroides</i> (3)	4	—	3.0	—	10	—	—	—	—	—
<i>Licuala grandis</i> (2)	12	7	4.0	2.0	25	60	6	33	14.2	3.3
<i>Licuala lauterbachii</i> (2)	8	7	2.3	0.7	26	50	5	14	15.2	1.4
<i>Licuala</i> aff. <i>ramsayi</i> (3)	5	—	3.0	—	9	—	—	—	—	—
<i>Licuala spinosa</i> † (3)	8	7	3.7	0.3	40	—	2	15	20.0	—
<i>Livistona</i> aff. <i>benthamii</i> † (3)	7	—	5.0	1.0	130	—	4	25	32.5	—

Table 1. Continued.

	1	2	3	4	5	6	7	8	9	10
<i>Livistona rotundifolia</i> (12)	12	—	11.0	5.0	70	90	6	83	26.7	5.6
<i>Mackeeea magnifica</i> (2)	5	—	1.5	—	5	—	—	—	—	—
<i>Metroxylon warburgii</i> (1)	13	—	10.0	2.0	35	21	4	50	14.0	9.5
<i>Neodypsis decaryi</i> (3)	5	—	4.0	1.0	14	6	2	50	10.0	16.7
<i>Neodypsis lastelliana</i> (1)	8	—	8.0	0.7	17	5	2	35	11.0	14.0
<i>Neodypsis</i> sp. ("Darrian") (1)	8	7	8.0	4.0	18	33	5	80	10.2	12.1
<i>Neoveitchia storckii</i> (1)	8	—	8.7	3.7	17	32	4	93	12.3	11.6
<i>Nephrosperma vanhoutteanum</i> (1)	8	—	4.0	0.7	8	19	4	18	6.8	3.7
<i>Normanbya normanbyi</i> (3)	8	7	8.0	4.0	11	43	6	67	9.0	9.3
<i>Nypa fruticans</i> (2)	13	—	2.0	—	6	—	—	—	—	—
<i>Pelagodoxa henryana</i> (18)	13	10	7.0	3.0	25	50	5	60	15.0	6.0
<i>Phoenixophorium borsigianum</i> (1)	5	—	4.0	—	8	—	—	—	—	—
<i>Phoenix roebelenii</i> † (1)	5	—	2.5	0.7	120	—	3	23	40.0	—
<i>Pigafetta flaris</i> (2)	9	6	16.0	13.0	28	167	6	217	33.0	7.8
<i>Pinanga copelandii</i> (4)	9	3	6.0	5.0	8	69	8	63	9.6	7.2
<i>Pinanga insignis</i> (1)	8	5	9.0	4.0	10	27	5	80	7.4	14.8
<i>Pinanga kuhlii</i> (2)	11	3	7.0	4.0	6	45	9	44	5.7	8.9
<i>Pinanga maculata</i> (3)	9	3	7.7	5.0	10	68	8	63	9.8	7.4
<i>Pinanga philippinensis</i> (2)	9	—	5.0	2.0	11	22	6	33	5.5	9.1
<i>Pritchardia lanigera</i> (2)	5	—	3.0	0.3	12	10	3	10	7.3	3.0
<i>Pritchardia vuykstekeana</i> (3)	4	—	0.7	—	7	—	—	—	—	—
<i>Ptychococcus elatus</i> (1)	7	—	8.5	5.0	15	30	6	83	7.5	16.7
<i>Ptychosperma elegans</i> (1)	13	6	8.0	5.3	12	70	10	53	8.2	7.6
<i>Ptychosperma macarthurii</i> (2)	5	4	4.0	2.3	9	20	3	77	9.7	11.5
<i>Ptychosperma microcarpum</i> (1)	7	6	5.5	3.0	9	18	3	100	9.0	16.7
<i>Ptychosperma</i> sp. (Papua New Guinea) (1)	5	—	4.0	1.3	9	15	4	33	6.0	8.7
<i>Reinhardtia latisecta</i> (1)	5	—	2.3	—	7	—	—	—	—	—
<i>Rhapis subtilis</i> ‡ (1)	5	3	2.0	0.3	25	—	2	15	12.5	—
<i>Rhopaloblaste augusta</i> (2)	9	8	9.0	4.5	18	51	5	90	13.8	8.8
<i>Satakentia liukuensis</i> (1)	2	—	0.3	—	5	—	—	—	—	—
<i>Schippia concolor</i> (1)	5	—	1.7	—	18	—	—	—	—	—
<i>Siphokentia beguinii</i> (1)	5	4	5.0	2.3	12	27	4	58	9.8	8.5
<i>Socratea exorrhiza</i> (1)	4	—	2.7	0.7	4	24	4	18	7.0	2.9
<i>Syagrus sancona</i> (4)	7	—	11.0	8.0	18	40	3	270	19.3	20.0
<i>Thrinax radiata</i> § (1)	13	8	8.0	—	—	—	—	—	—	—
<i>Veitchia macdanielsii</i> (1)	8	7	9.0	6.0	11	58	6	100	11.5	10.3
<i>Veitchia merrillii</i> (1)	13	6	7.0	4.0	16	103	10	40	11.9	3.9
<i>Veitchia montgomeryana</i> (1)	9	8	12.0	8.5	12	96	7	121	15.4	8.9
<i>Veitchia winin</i> (5)	8	5	11.0	8.0	12	76	6	133	14.7	10.5
<i>Verschaffeltia splendida</i> (1)	7	—	5.0	1.7	6	20	5	34	5.2	8.5
<i>Wallichia disticha</i> (1)	5	—	9.0	1.0	16	5	3	33	7.0	20.0
<i>Wendlandiella polyclada</i> (1)	2	—	0.7	—	8	—	—	—	—	—
<i>Wodyetia bifurcata</i> (1)	5	—	8.0	2.1	12	21	4	53	8.3	10.0

\* Grown from seeds planted *in situ*; † leaves occur to ground, no bare trunk; trunk height estimated; ‡ not possible to count leaf scars on stem; § missing data.

observation that *Pigafetta* was a colonizer of disturbed areas, we cut down the staminate tree in 1990 to eliminate any possibilities of it escaping from cultivation and becoming naturalized in Tahiti.

As much as I admire *Pigafetta*, it would truly be a disaster if large groves of it one

day covered Tahiti's beautiful hillsides. The only other specimen of *Pigafetta* in Tahiti is at the Jardin Botanique about two kilometers distant, and it too is a pistillate plant.

With a crowd of curious onlookers composed of my wife, children, and numerous

nephews and nieces, my brother-in-law, who is very talented with a chainsaw, made quick work of the majestic beauty. Recorded on our video camera, the 16-meter (50-foot) giant fell with a resounding crash into an abandoned taro patch, much to the delight of the numerous children. They all agreed it was much more exciting than school!

I encourage all travelers to Tahiti to stop during their around-the-island tour

and visit my mother-in-law and the palms. She lives about an hour's drive from the capital Papeete in the village of Papeari and about two kilometers from the Jardin Botanique and Musee Gauguin. She is a wonderful and delightful person whom I admire very much and who would be happy to show visitors the palms. She may even put a machete and a rake in your hand and order you to start cleaning in the garden!

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### **1994 IPS BIENNIAL MEETING SCHEDULE SET FOR CARACAS, VENEZUELA FOR JUNE 13-16, 1994**

Plans have been finalized for the 1994 IPS Biennial Meeting to be held in Caracas, Venezuela during mid June of 1994. The Instituto Botanico (and Botanic Garden) Foundation in Caracas and the Asociacion Venezolana de Palmas (Venezuelan Palm Society) have graciously agreed to co-host this event in conjunction with the IPS Executive Committee. Arrangements are being finalized with the Hotel Avila, a reasonably-priced and tranquil host hotel. Arrangements for overflow are being set up with another hotel near the Avila, but without its tropical garden ambiance. Lost World Adventures has been selected to oversee several planned horticultural tours and side trips, with additional cooperation from the local Venezuelan Palm Society.

Superior International Services of Houston, Texas will serve as the travel agent who will handle flight and hotel arrangements. Local assistance in Venezuela will be provided by Lost World Adventures, through their local office there.

Quite a few local excursions are planned to palm gardens and local indigenous palm habitats. In addition, a suite of additional in-country excursions will be offered as Pre- and/or Post-Biennial trips.

All IPS members are encouraged to start making their plans to attend! Further details will be provided in subsequent issues of *Principes*. Please contact Jim Cain should you have any questions in the interim.

(For more about Caracas and the pleasures of visiting with August Braun, see the article by Richard Vlasic, p. 168.)