

PRINCIPES

Journal of The Palm Society

April, 1974
Vol. 18, No. 2

THE PALM SOCIETY

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JOURNAL OF THE PALM SOCIETY

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Manuscript for PRINCIPES, including legends for figures and photographs, must be typed double-spaced on one side of 8½ × 11 bond paper and addressed to the Editor for receipt not later than 45 days before date of publication. Authors of one page or more of print will receive six copies of the issue in which their article appears. Additional copies or reprints can be furnished only at cost and by advance arrangement.

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Thrinax parviflora growing at a low elevation near Salt River, Jamaica. Photo by R. W. Read. See page 39.

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JOURNAL OF THE PALM SOCIETY

An illustrated quarterly devoted to information about palms and published in January, April, July and October by The Palm Society, Inc.

Subscription price is $6.00 per year to libraries and institutions. Membership dues of $10.00 per year include a subscription to the Journal. Single copies are $1.50 each. The business office is located at **1320 S. Venetian Way, Miami, Florida 33139.** Changes of address, undeliverable copies, orders for subscriptions, and membership dues are to be sent to the business office.

Second class postage paid at Miami, Florida and at additional mailing offices.

Mailed at Lawrence, Kansas
May 22, 1974

The Ecology of the Palms

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Webster's Third New International Dictionary defines ecology as "a branch of science concerned with the interrelationship of organisms and their environments especially as manifested by natural cycles and rhythms, community development and structure, interaction between different kinds of organisms, geographic distributions, and population alterations." In other words it deals with the pattern of relations between living things and their environments. In this regard we know so little concerning palms that it is difficult to know quite where to begin. That may seem like a contradiction, but in fact our knowledge of palm ecology consists almost entirely of widely diverse observations made over a considerable period of time, in conjunction with a rather limited understanding of many of the species involved. Nearly all we really have are broad generalizations. Palms in the New World, for example, are found naturally from about 36 degrees North Latitude (*Sabal minor*) in North Carolina to about 34 degrees South Latitude in Chile (*Jubaea*). In Europe *Chamaerops humilis* occurs near the 40th Parallel in Spain and Italy; *Rhopalostylis* occurs as far as 41 or 42 degrees South Latitude in New Zealand. This is not distribution, but rather an indication that a mild climate lacking severe winters occurs in these regions, and that a few noteworthy palm species can tolerate temperate climates at these extremes of latitude.

Palms occur naturally from sea level (*Nypa* in tidal estuaries and river deltas) to well over 3000 m. (9842 ft.) in the Andes of South America (*Ceroxylon*). It was once believed that the double coconut (*Lodoicea*) grew beneath the sea and only the huge fruits bobbed to the surface. Palms are also found growing in swamps and rivers of the Amazon basin, and under desert conditions, as the doum palms (*Hyphaene*) of Africa. Some species, such as those of *Washingtonia* or *Phoenix*, may appear to be highly tolerant of extremely xeric situations but the fact is that they are excellent indicators of ground water, for they do not occur unless there is a reliable source of water. *Copernicia* in Brazil, the source of carnauba wax, grows in areas normally inundated for many months of the year, only to be subjected alternately to drying and many months of almost no precipitation.

We most frequently think of palms as belonging to the dense jungles of the tropics but they may grow fully exposed to wind and sun like the coconut along the beach and the date palms of oases. Some appear to thrive only at the forest margins along rivers or road cuts. Certain species, such as *Calamus* in southeast Asia, though infrequent in the forest may become weedy and completely take over recently cleared land. The dominant understory palms of the same area are eliminated altogether when the forest is felled, exposing them to more intense illumination and a drier atmo-

* Presented as part of a symposium entitled "The Natural History and Utilization of Palms" at the annual meeting of the Society for Economic Botany, Ithaca, N.Y., June 14, 1973.

sphere. Rainforest as an optimum ecological formation varies considerably in regard to its palm content. Some genera and species may be prominent in the canopy or upper story vegetation while others occur only among the shrubs as undergrowth plants. Swamp forests are often erroneously thought to be associated with the jungle or rainforest, but they are quite often noted for the enormous numbers of individuals of a single species which may be dominant over hundreds or even thousands of square miles in South America. The species under these conditions appear to reflect the substrate and or the seasonality of the flooding.

Palm species may be found on all kinds of substrate; it may be sand or clay, deep humus or solid rock, and the soil may be acid or alkaline in reaction. As has already been stated, these are broad generalizations and all this quite likely could lead one to believe that palms are highly tolerant of widely diverse climatic and edaphic conditions. However, as true as this may be for the family as a whole, my experience leads me to the conclusion that most genera and species of palms are highly specific and narrow in their individual tolerances. For example the genera *Pseudophoenix*, *Coccothrinax*, *Thrinax*, and *Gaussia* are strictly calciphilous and occur only on eroded limestone or coralline sand. The species, especially of *Thrinax*, may be further restricted by limits of precipitation or concentrations of salts. Other genera may be restricted to acid rock, as is *Loxococcus* on the gneiss outcrops in Ceylon, and some species of *Syagrus* in South America. Still others are found only on acid humus deposits in dense forests where only the low availability of light may limit competition. In fact, when dealing with palms it is important to keep in mind that closely allied species may be isolated from one another simply by a change in soil, water, or light relations.

Some palms, as I shall show in *Thrinax*, are phenotypically highly plastic and, depending on the species, may be extremely specific in their edaphic requirements but highly tolerant of light or water extremes. It would of course be very difficult for an ecologist to study palm ecology were he unable to recognize whether or not distinct species were involved. Likewise it has been the bane of many past palm students that they could not adequately understand the plasticity of palms in relation to their immediate environment. Fragmentary herbarium specimens from widely separated regions give no clue as to possible disjunct edaphic conditions nor the gradual changes wrought by elevation or light factors when the substrate is the dominant factor in the distribution of a particular species. In Suriname we note from Wessels Boer's (1965) work that *Bactris campestris* is restricted to white sand savannas, where it is abundant, but is entirely lacking on red sand savannas and clay. On the other hand *Acrocomia lasiospatha* is found on the red sand and clay of the coastal plain but *not* on clay of the interior *nor* on white sand. Within a single genus it was noted that *Euterpe oleracea* was always found in poorly drained, often regularly inundated areas, while *Euterpe precatoria* was always on well-drained, never inundated places. The two species often grow very near one another but are separated by edaphic conditions.

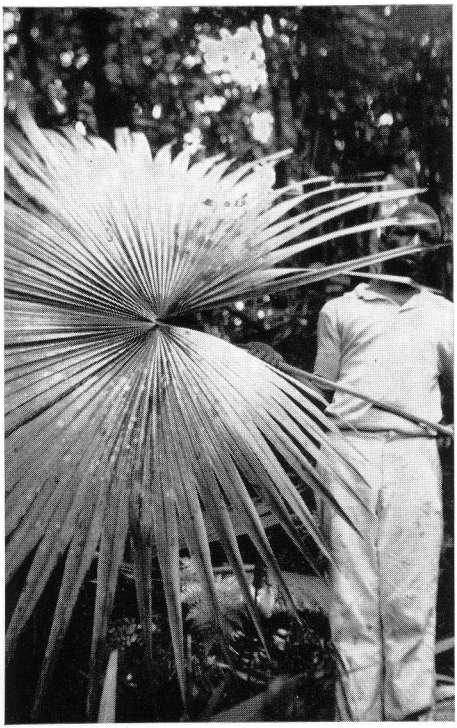
Elevation is known to be a limiting factor in the occurrence of many species. But is it simply elevation, or the climatic conditions resulting from a combination of cooler temperatures and exposure to prevailing winds at a particular



1. *Thrinax excelsa* in the John Crow Mountains of Jamaica.

latitude? Many palm species appear to be unable to compete in a situation where the forest becomes too dense, and the incidence of damping-off disease possibly increases as a result of the sustained high relative humidity and cooler wet conditions. I have noted in my studies on seedling germination that soil temperature has a distinct effect on germination and rate of root growth. A soil temperature of 70°F or below could be a very limiting factor in the starting of plants at the cooler elevations, apart from the obvious effects of freezing at still higher elevations and latitudes. I have by no means exhausted the various situations under which palms may be found, but we know so little that the relationships between palm species and their environment escapes us unless intensive studies in the field are carried out under natural conditions.

There is one generalization that I would like to make which I believe bears testing. It is that over a broad area of uniform edaphic and climatic conditions the same species (plural) of palms will likely be seen. On the other hand a change in the substrate is likely to support distinct species, or even additional



2. A small leaf of *Thrinax excelsa* held by Winston Barret, George Proctor's young assistant, in the John Crow Mountains above Ecclesdown, Jamaica. The leaf is silvery-lepidote beneath.

genera. But a gradual change in atmospheric conditions when the edaphic conditions remain constant over a topographic or latitudinal gradient will probably present some so-called difficult or problem species. Furthermore, isolated populations of a genus, where climatic conditions differ significantly, will most likely result in quite different taxa. Examples of these situations occur in the genus *Thrinax* where intensive studies over a variety of environmental conditions demonstrate what appears to be a classic pattern.

Thrinax in Jamaica

Five species of *Thrinax* were reported in Jamaica at the time my studies (Read



3. *Thrinax radiata* at Morant Point, Jamaica, exposed to the full force of salt-laden breezes from the sea.

1974) were begun. There are really only three good species native to that island, and one other species, under numerous names, is widely distributed elsewhere. The problem, as it has turned out, was of two sorts: first, a lack of a proper understanding of the type species; and second, a total lack of understanding of phenotypic variability within and between populations.

Soon after work was begun on the genus in Jamaica it became clear that plants which were known as *Thrinax rex* were instead to be called *T. excelsa* (Figs. 1, 2) and that the plants which were called *T. excelsa* in Jamaica (and in the nursery trade) should be called *T. radiata*[1]. Likewise, the plants known as *T. parviflora* in Florida and elsewhere should also be *T. radiata*. The plants under the name *T. parviflora* in Jamaica were correctly named, but their variants were not well understood. Two names

[1] By reason of a further complication of typification, the name *Thrinax multiflora* has more recently been applied by the author to what should properly be called *T. radiata* as a result of recent anatomical findings, and even the name *T. floridana* must be relegated to synonymy.

now reduced to synonymy of *T. parviflora* are *T. tessellata* and *T. harrisiana.* Both the latter names were based on inadequate specimens and a poor understanding of phenotypic variability and ecotypic variation.

Thrinax species are strict calciphiles, occurring on coralline sand and weathered limestone outcrops from sea level to over 3000 ft. (914 m.) elevation. They are distributed from areas of strong seasonal drought with an average rainfall of 39–44 in. (100–112 cm.) per year [and no more than six months with less than 3⅛ in. (8 cm.) per month] to regions having more than 300 in. (762 cm.) of rain per year. *Thrinax excelsa* and *T. parviflora* are restricted entirely to exceedingly well-drained sites far from the influence of salt spray. The former occurs in Lower Montane Rain Forest, the latter in Evergreen Woodland or Dry Evergreen Thicket.[2]

Thrinax radiata, the most widely distributed species of the genus, occurs naturally in the littoral throughout the northern Caribbean and nearby shores of the Gulf Stream, north and west from Hispaniola. It is a palm species which in nature is confined to saline conditions of the littoral, but only where there is adequate rainfall (Fig. 3). In 1958 G. F. Asprey and A. R. Loveless described an addition to their list of "Littoral Dry Evergreen" formations in Jamaica. The formation, which they called "Littoral Palm thicket," occurs on a raised, flat, soilless, coralline limestone shelf, 10 to 25 ft. (3.05 to 7.62 m.) above sea level, exposed to the full force of the strong salt-laden Northeast Trade Winds at Galina Point, Jamaica. This species forms a characteristic feature of littoral hedge, becoming increasingly plentiful on the inland side, ". . . where it would appear to take the place of Littoral Evergreen bushland, but no explanation as to why this occurs can be offered." The authors further pointed out that "The raised limestone beach is dominated by *Thrinax parviflora* [sic][3] to the exclusion of other plants. The trees grow out of fissures in the bare soilless rock and vary in height from 7.5–12 m. (25–40 ft.). They are spaced, on the average, about 1.2 m. (4 ft.) apart and form a closed canopy. The palm reproduces actively since seedlings abound and the plant is evidently in a most favourable environment."

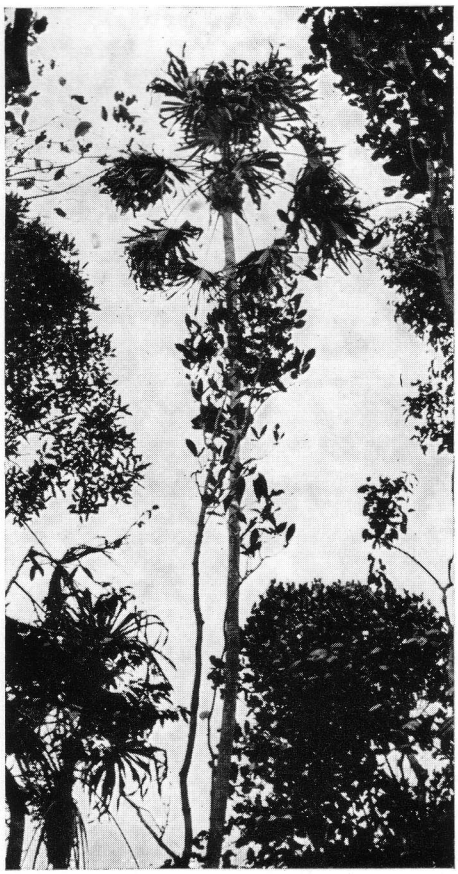
Meteorological data, based on records for Richmond Llandovery Sugar Estate some distance to the west of Galina Point, indicated 55 to 70 in. (139.7–177.8 cm.) of rain per year, which when compared with evaporation figures over the same period of seventy years, presents a condition where there are only five months in an average year when precipitation exceeds evaporation. It must be realized however that the use of such figures in a region of abrupt climatic changes within very short distances, depending on exposure and topography, is indeed tenuous. According to the most recent rainfall figures, Galina Point, at the western edge of one of the wettest regions of the island, has between 60 and 80 in. (152.4–203.2 cm.) of rain per year. These observations are brought out because, even as Asprey and Loveless observed, ". . . the only major anomaly in the data is brought about by the megaphyllous

[2] According to a classification by J. S. Beard, 1944, 1955.

[3] Asprey and Loveless (1958) failed to distinguish between *T. parviflora*, a conspicuous element in their studies on the Dry Evergreen Thicket at Portland Ridge on the south coast of Jamaica (Loveless and Asprey, 1957), and the very different *T. radiata* at their Galina Point study area.

palm *Thrinax parviflora* [*sic*]." Had they recognized that the palm in question was distinct from the palm in their Portland Ridge studies a very important fact would have been realized and quite different conclusions might have been reached. They would have recognized that *Thrinax radiata*, which only occurs in areas of regular deposition of salt accompanied by regular high rainfall, is a true halophyte and that *T. parviflora*, of their Portland Ridge studies, is not. As Asprey and Loveless themselves noted, ". . . the presence of *Philodendron* sp. among the fringing woodland plants indicates a moist habitat, . . ." from which they concluded, ". . . the relationship of Palm thicket to rainfall distribution might repay further investigation." They further observed that, "In view of the fact that the rainfall along the stretch of coastline in which Fort Point and Galena Point are situated is more than twice as much as at Port Henderson, [Near Portland Ridge on the south coast]. . ., it might at first sight seem surprising that Evergreen bushland is found at both centres." This is not at all surprising for they did not in fact find bushland at Galina Point, it was displaced by Palm thicket, and the bushland described at Fort Point (36 miles west of Galina Point) is in a much drier area than suggested by the Richmond Llandovery rainfall records. One can only agree with Asprey and Loveless, ". . . that the vegetation reflects the climate far more accurately than any meteorological data."

The plants which were described as a distinct species under the name *T. tessellata* are in fact typical (as to the type specimen) *Thrinax parviflora* (Fig. 4). Apart from that, the basis for distinguishing them from the lowland forms was the occurrence of a "tessellate" pattern of the epicarp of the mature fruit,



4. *Thrinax parviflora* at Holly Mount Hill on Mt. Diablo, Jamaica. Note the curly form of the leaf. This is the phase that was once called *T. tessellata.*

hence the epithet. This condition is a common but by no means constant condition of the fruits on plants growing in the cool moist environment of the mountains, ridges and cockpits throughout Jamaica. The atmospheric conditions there foster a fungus infestation which alters the epidermis of the fruit during maturation. The situation does not occur in drier situations at lower elevations or on dry ridges. In the same environment where fungal damage is common on the fruit, the branches of the inflorescence undergo another equally dramatic



5. *Thrinax parviflora* growing along the cliffs overhanging Ramgoat Cave in the Cockpit Country of Jamaica. Note the broad, flat aspect of the leaf blade but with a tendency to have the segments twisted.

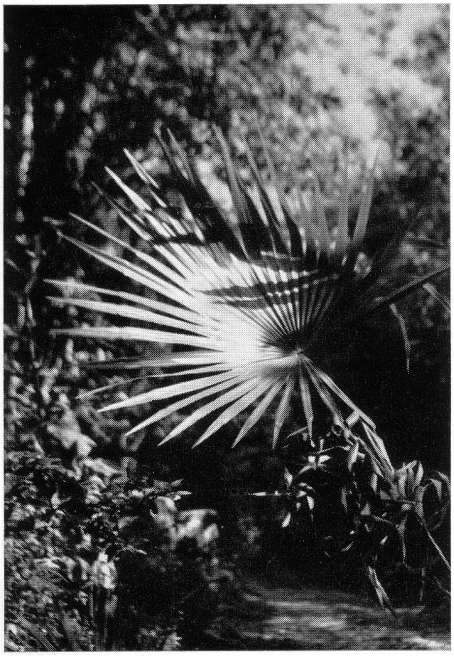
alteration of the epidermal tissue. Extensive grazing by a particular caterpillar, resulting in alternating trenches in a checkerboard fashion, is so common at the uppermost peaks as to often completely obscure the normal nature of the epidermis. At lower elevations, and on dry ridges, caterpillar grazing of epidermal tissue is quite rare. Both of these situations are direct effects of the ecology. The cool, moist environment of the higher ridges and peaks fosters attack on and considerable depredation of the palm's fruiting capabilities by both plant and animal predators. Elsewhere the climatic conditions are not conducive to such severe predation on reproductive structures because the

predators do not find the drier climate suitable.

Another effect of the ecological system on *Thrinax* results in an extreme phenotypic variability which has all too often, in numerous genera, resulted in the superfluous naming of "new" species. One of these, *Thrinax harrisiana* (now also a synonym of *T. parviflora*), was described as new on the basis of its extremely short floral pedicels. This character, also used in support of *T. tessellata* in conjunction with a number of other quantitative characters, was the subject of intensive analysis in Jamaica.

Thrinax parviflora, an endemic palm in Jamaica, is a highly variable and polymorphic species (Figs. 4–7) and occurs over an equally variable and complex system of environments, from near sea level to about 3000 ft. (914 m.) elevation. Considerable effort has been expended in attempting to correlate variability of phenotype with the environment. However, lacking experimental evidence (e.g., transplant experiments etc.) of any genetic bases for the variation, it is difficult to do more than describe the range of variation in the various environmental zones. The extent of variability can be and has been measured by field studies on plants in forty-two localities throughout the entire range of distribution of the species.[4]

If a line were drawn on a map of Jamaica from Portland Ridge, in the south, to the northern slopes of Mt. Diablo (Fig. 8) it would pass through regions of low to high elevations from sea level to about 3000 ft. (914 m.), and from hot, dry, nearly xerophytic conditions to cool, moist, mesophytic

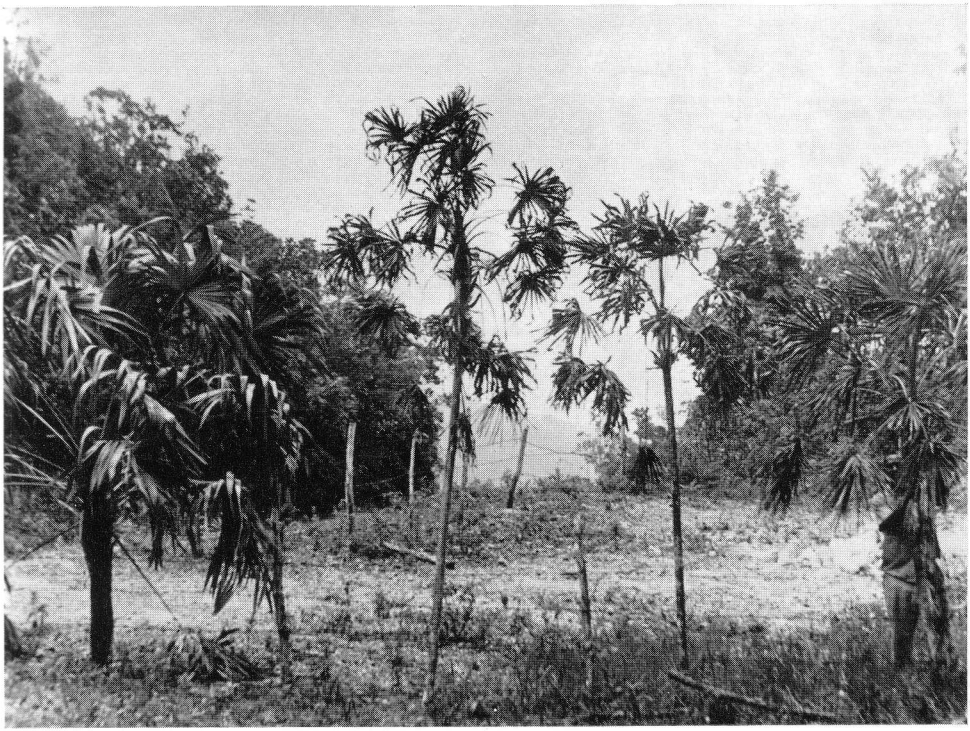


6. Juvenile (left) and adult (right) forms of leaves of *Thrinax parviflora* at the highest elevations near Holly Mount Hill on Mt. Diablo, Jamaica.

woodlands and high pinnacles frequently bathed with mist. The rainfall varies from less than 50 in. (126 cm.) per year at Portland Ridge to more than 70 in. (178 cm.) per year on the heights of Mt. Diablo. Along the line, changes in temperature and moisture availability are mostly gradual up to the middle elevations on Mt. Diablo where, as a result of the combined effect of exposure, elevation, and the very steep escarpment, the changes are more abrupt. At the elevation where cloud formation most frequently occurs, noticeable differences in the climate and flora are evident over a very short distance. *Thrinax parviflora* grows on nearly every natural outcrop of limestone along the transect.

During the course of the study, numerous collections were made on nearly

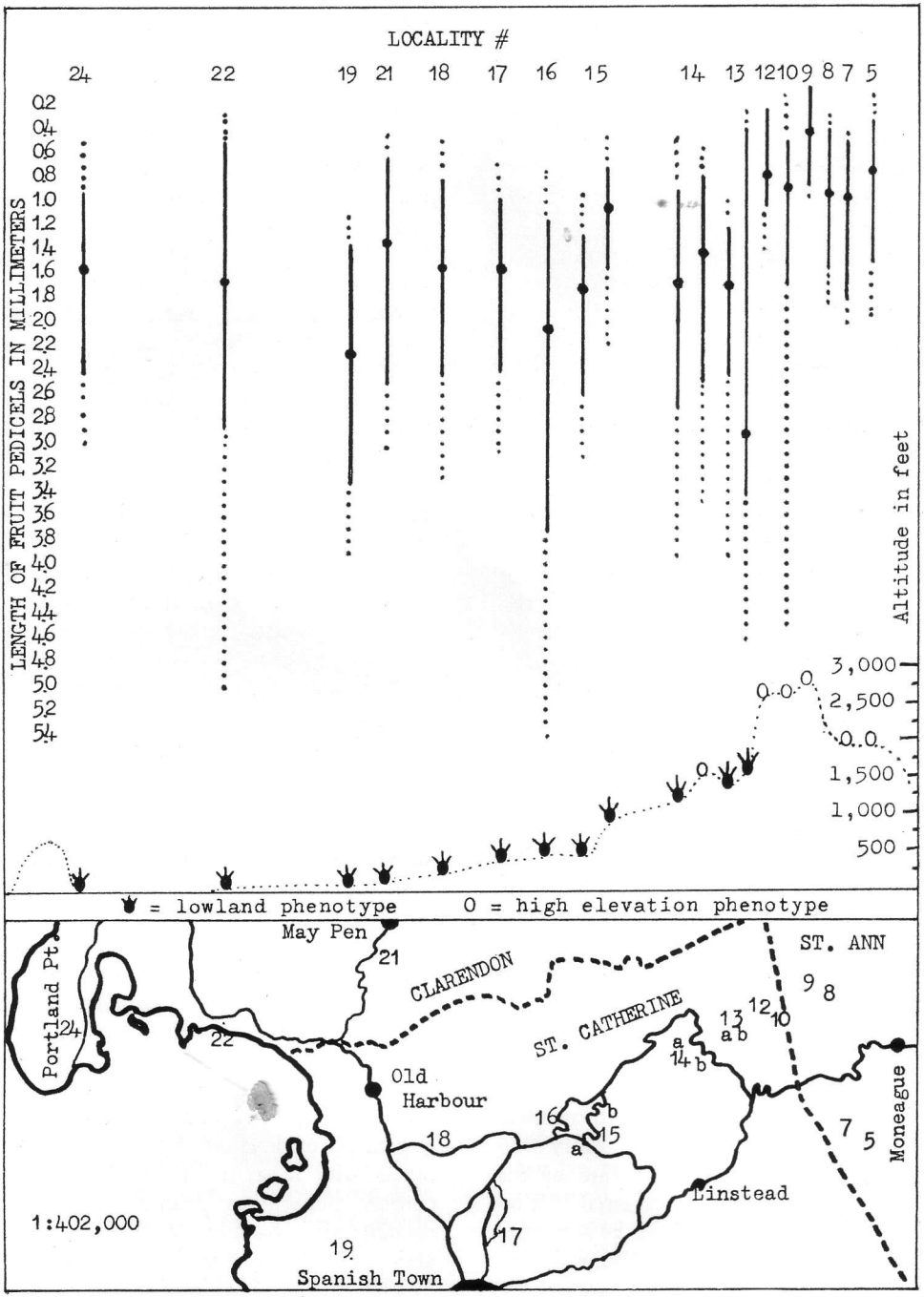
[4] A similar problem with *Metrosideros* and altitudinal variation in Hawaii has recently been published by Corn and Hiesey (1973). The research approach was different but the problems and conclusions are perhaps similar.



7. Morphological (phenotypic) variability of *Thrinax parviflora* on the Blue Mountain trail of Mt. Diablo, Jamaica. The plants were cut and removed to one place for the photograph.

every accessible area along an irregular line from south to north, and on Mt. Diablo, in an attempt to obtain adequate material over a range of variable ecology. The transect runs through two of three intensive study areas which were previously the focal point of the major study of the species for a monograph. Samples of inflorescences and leaves were taken from every available plant at each area. In addition, pedicel measurements were taken from every collection locality along the route of the transect and these are compared in Figure 8. It is obvious, as can be seen also in Figure 8, that from the results shown, the length of the pedicels cannot be used for separating taxa in Jamaica. Although the plants at high elevation have a predominance of short pedicels, those of lower elevations exhibit an abundance of pedicels in the same length ranges, and there is considerable overlap at the 90% level.

There are only two apparently reliable characters which can be used to characterize the high and low elevation phenotypes along the transect. These are the hastula and the degree of puberulence on the primary branches of the inflorescence. The designation in Figure 8 for lowland forms represents plants with long, pointed hastulas and densely puberulous primary branches, accompanied usually by large leaves and relatively short and stout caudices. The designation for high elevation forms represents plants with short, acute or blunt hastulas and glabrous to lightly puberulent primary branches.



8. Transect across central Jamaica, showing pedicel length and phenotype from the lowest to the highest elevations where *Thrinax parviflora* occurs. The large dot in the line graphs represents the mean length of the floral pedicels, the solid line represents 90 percent of all measurements and the broken line indicates 5 percent of the total taken off each end of the range.

Along the southern face of Mt. Diablo an exceedingly steep escarpment rises nearly 2000 ft. (609 m.) above the valley. Along most of the escarpment, which faces south, climatic conditions up to about 1650 ft. (502.92 m.) elevation are very similar to those at lower elevations. Full exposure to the sun, particularly in the winter months, perfect drainage, and average rainfall permit a Dry Evergreen thicket type vegetation in which the palms are almost indistinguishable from plants growing near sea level on Portland Ridge. At approximately 2000 ft. (609 m.) elevation the vegetation changes to open woodland in protected valleys and gorges, and tall slender plants of the typical high elevation palm dominate the exposed ridges and rocky pinnacles. There does not appear to be a transition zone for the palms along the trail because suitable rocky outcrop was not encountered between 1650 and 2500 ft. (502.92 and 762 m.) elevation. It is important to note here that the point between 1700 and 2000 ft. (518.16 and 609 m.) elevation is the altitude at which clouds generally form and obscure the peaks and ridges, commonly throughout the year but more frequently in the late summer and winter months. The clouds and mists which are common above 2000 ft. (609 m.) elevation on Mt. Diablo result partly from and contribute to the higher moisture availability and cooler temperatures which are reflected in a different flora.

The greatest extremes in phenotypic expression are coincidentally found on the south-facing escarpment of Mt. Diablo above an area known as Charlton. At an elevation between 1500 and 1650 ft. (457.2 and 502.92 m.) elevation (locality #13) there are several palms which exhibit among themselves the largest trunk and leaf dimensions and although two of the plants in the group had pedicel lengths averaging within the normal range of means for lowland forms, the third plant exhibited exceptionally long pedicels which caused the mean for the group to be among the longest pedicel lengths of any population on the island.

Near the upper limit of the escarpment, overlooking the group of exceptional plants just mentioned, typical high elevation plants occur between 2000 and 2650 ft. (609 and 807.72 m.) elevation in the cloud zone. The very tall, slender-stemmed palms with very small, tightly folded and curled leaf blades grow among somewhat dwarfed thicket wherein occur numerous epiphytes, ferns and herbaceous plants.

The breeding system of *Thrinax parviflora* is very complex and is not completely understood. However, over a two-year period, it has been observed that plants of high elevations and in the cockpit country bloom only during the winter months. The lowland form has been observed to bloom only during the warmer summer months. Although *Thrinax* flowers are essentially wind-pollinated, the difference in blooming season would effectively isolate the two forms if the control is genetic in origin. What we do not know is whether or not the high elevation form would retain its winter-blooming habit if grown in the lowlands.

Another pertinent problem is the means of seed dispersal. Doves are said to feed on the "tatch-peas." The doves are extremely plentiful when the palms are in fruit but are uncommon near palms at other times. It is extremely likely that seeds of plants at the higher elevations are deposited on the drier lower cliffs and slopes through the medium of dove dispersal. Whether such seeds will germinate and compete with

the lowland form is unknown. Preconditioning of the seeds or genetic differences may, in fact, prevent random occurrences of a biotype[5] outside its special niche, broad as that may be.

The accumulated data suggest that there are indeed two distinct climatic zones (one above, the other below the elevation of regular cloud formation) which support two different biotypes of *Thrinax parviflora*. Were it not for the extreme phenotypic plasticity of each, it might be possible to map their patterns of distribution. However, herbarium specimens are wholly inadequate for this task, and in two years it was only possible to study adequately about 50 or so local populations. When flying in and out of Jamaica, every peak, ridge, and rocky slope appears from the air to support great numbers of *Thrinax parviflora*. One character, the hastula, retains its distinctiveness and when used in conjunction with puberulence militates very strongly for distinct biotypes. In order to stabilize the nomenclature and typify the species, it has been necessary to delimit two subspecies which will be described elsewhere.

[5] Biotype: a collection of individuals which are genotypically all essentially the same. Experimental proof of biotypes in *Thrinax parviflora* is not feasible, but evidence suggests the distinct possibility of biotypes.

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Biennial Meeting Reminder

Don't forget to plan for the Biennial Meeting at Fairchild Tropical Garden, Miami, June 22, 23, and 24, 1974.

June 22: Welcoming-Reception hosted by the South Florida members at Corbin Educational Building, 6–8 p.m.

June 23: registration 10 a.m. to 1:30 p.m. (lunch served at Corbin Building, $1.50); Biennial Meeting at 1:30 p.m.; banquet 7 p.m.

June 24: tour of Jennings Estate 8:30–9:15 a.m.; lunch for out-of-town members at home of Paul Drummond followed by tour of Nat DeLeon's garden nearby and John Turner's atrium garden; supper 6:30–7 p.m. (about $1.75) at home of Teddie and Ted Buhler followed by slides.

June 25: tours to Nassau or Key West or in Miami.

June 26: depart for home or on tour to Colombia.

New Light on Areca langloisiana

JOHN DRANSFIELD
Herbarium Bogoriense, Bogor, Indonesia

Areca langloisiana Potztal is a handsome *Areca* now quite widely dispersed in palm collections in the United States but more or less unknown in cultivation in South East Asia. It has been illustrated in PRINCIPES on two occasions and is usually high on palm enthusiasts' desiderata lists on account of its orange crownshaft.

The history of its discovery is now well known, having been described by David Fairchild in his *Garden Islands of the Great East*; a certain degree of confusion developed when the palm was first described by Potztal (1960) and H. E. Moore (1962) has summed up the discrepancies of the original description. In this article he describes how the palms in cultivation originating from seed collected on the Fairchild expedition differ in coloration and apparently also in habit from the palms illustrated in Edward P. Beckwith's photographs, two of which appear with the type description in Potztal (1960) and in Moore's article. The palms in Dominica and Mr. and Mrs. A. C. Langlois' estate, The Retreat, in the Bahamas, originating from the first collection, are described by Moore as being short in stature and, although producing some stilt roots, not producing roots of the magnitude of those photographed by Beckwith and also bearing crownshafts orange rather than lacquer-red. Beckwith also informed Moore that there was a second *Areca* nearby on Gunung Sapoetan (*sic* —Soputan, as it is now spelt) in Minahassa in North Celebes, which had taller, slender, clustered stems tipped with orange crownshafts. It was concluded by Moore (*l.c.*) that the two palms, at least from the point of view of color of the leaf sheaths were distinct as seen in color transparencies. One problem then arose—what was *Areca langloisiana*? The type description was based on living plants from the Langlois' estate and on Beckwith's photographs—the photographs of a tall, stilt-rooted, only slightly clustered palm, and the living plant, densely clustered, scarcely stilt-rooted, and short. Had the seed been erroneously referred to the red-crownshafted *Areca* when it had really been collected from the orange-crownshafted plant, or was there one variable species present on G. Soputan? In the absence of herbarium material of the wild plants, no answer could be given.

In October 1973, I made an expedition to Minahassa with Mr. Johanis P. Mogea of the Herbarium Bogoriense to collect palms, especially rattans. One other task I hoped to complete was that of clearing up the problem of *Areca langloisiana*. While we were in North Celebes we made several trips in the Minahassa region and covered a wide range of habitats. Throughout our expedition we never tired of admiring the glorious orange-red-crownshafted *Areca* which could be found in virtually any humid relatively undisturbed forest above 500 m. altitude and occasionally below. We observed the palm on Gunung Batuangus, G. Klabat, G. Lokon, Wiau Forest Reserve, G. Soputan, G. Kawatak, G. Ambang and Lolak. We made a special trip to G. Soputan in order to observe it at the type locality of *Areca langloisiana*.

Gunung Soputan is a sprawling volcano with many summits. I fear it must have changed greatly since the Fairchild expedition in 1940 as the slopes above Noongan now consist of badly disturbed secondary forest and gardens of cassava and maize. However, in the secondary forest, palms are still abundant and towering above all the trees are many fine specimens of *Pigafetta filaris*. Near the gardens, rattans have largely disappeared—but higher up they are relatively common. The *Areca* is certainly abundant and, significantly, extremely variable in height, coloration, clumping characteristics, and development of stilt roots. There is even considerable variation in fruit size within the populations.

Variation of one character appears to be independent of other characters—large, stilt-rooted specimens may have lacquer-red or orange crownshafts, and populations do not apear to be particularly uniform—I have no hesitation in declaring that the plant photographed by Beckwith represents the same species as that growing throughout the Minahassa region and that described by Potztal from material in the Langlois' estate. We can now say that *Areca langloisiana* is a very widespread and variable palm of Minahassa and the eastern part of Bolaang Mongondow in the northern part of Celebes. What, however, is the relationship of this taxon with other species of the section *Mischophloeus* of *Areca*?

Miquel (1868) described *Ptychosperma paniculatum*, an apparently new species from Batjan and the Celebes collected by Teijsmann and de Vriese. Miquel indicated that there was distinct variation in the species, the plant from Celebes being smaller than that from Batjan. Later Scheffer (1873) renamed the same plant *Areca paniculata* rightly assigning the plant to the genus *Areca*, and giving further details of the plant, based on dry material sent from Tonsea in the Minahassa region of Celebes, and on living material apparently from Ambon and from Ternate (near Halmaheira). Scheffer specifically mentions the bright orange color of the leaf sheaths and his description corresponds perfectly with the orange-crownshafted *Areca langloisiana*, except that Scheffer indicates that the palm is solitary. Then Scheffer (1876) reassigned the species to a new genus, *Mischophloeus*, separated from *Areca* on the basis of the arrangement of the male flowers. Furthermore, two excellent plates of the palm were published with the description, one of the whole palm, solitary, but with all other details including the stilt roots corresponding to the *Areca* of G. Soputan, and the other a series of analytical drawings of the inflorescence and flowers which are unmistakably the same as those of the Soputan *Areca*. Specimens in the Herbarium Bogoriense of palms cultivated at that time (now unfortunately lost in the living state) bear out this conclusion. In the description, one other discrepancy occurs—the stamens are described as being nine in number whereas in the plate and the specimens six only are found. There is apparently no doubt that Scheffer's plant, *Mischophloeus paniculatus*, is the same as *Areca langloisiana*, except in the solitary habit; however, in the wild, *Areca langloisiana* is occasionally solitary (cf. Fig. 3), so that this would seem therefore not to be an impediment to the merging of the two taxa.

Scheffer finishes his account by mentioning the possibility that *Mischophloeus paniculatus* is the same as *Areca communis* Zipp. (Blume, 1838–39), also known as *Seaforthia communis* and *S.*

vestiaria (Martius, 1838–53), *Areca vestiaria* (Giseke, 1792), *Ptychosperma vestiaria* (Miquel, 1855) and *Pinanga sylvestris e Buro—Pinanga saleyt* of Rumphius. In fact, not one but two Rumphian plants are involved here, as *Areca communis* is thought by Blume to be the same as *Areca punicea*, based on Rumphius *Pinanga sylvestris glandiformis II*. Scheffer himself (*l.c.*) concedes the possibility that his *Pinanga ternatensis* may be the same as *Areca punicea* and Merrill (1917) has apparently followed him and others in thinking this might be a species of *Pinanga* [*P. punicea* (Bl.) Merr.]. I feel certain, however, that this is not the whole story, and that Blume, who well knew the difference between *Pinanga* and *Areca* (it was he who first proposed the genus *Pinanga* more or less as we know it today), based his *Areca punicea* on perhaps a different interpretation of *Pinanga sylvestris gladiformis II* and on genuine Moluccan *Areca*, or on a complete misinterpretation of Rumphius—the left-hand palm, *Areca punicea*, in Blume's *Plate 121* bears more resemblance to an *Areca* than a *Pinanga*, fanciful though the plate may be. This problem of Blume's different interpretation of *Areca communis* and *A. punicea* does not, however, affect the interpretation of *Pinanga sylvestris e Buro*.

Pinanga saleyt was, according to Rumphius, absent from Ambon, but found on Buru. The palm is described as having a moderate-sized stem and stilt roots resembling those of a pandan. The leaf is described as having a petiole as thick as a finger, and acuminate, 7-costate leaflets 15–16 inches long, and 4 inches broad. The inflorescence is small and highly branched; the fruit is pointed at both ends and is bright red. All this fits *Mischophloeus paniculatus* except for the acuminate rather than notched leaflets, and despite no mention of the orange crownshaft. Therefore I think that Merrill's interpretation of *Pinanga sylvestris e Buro* (*Pinanga saleyt*) as being *Mischophloeus paniculatus* is eminently reasonable, and I hence follow Merrill in recognizing the earliest post-Linnaean epithet based on Rumphius' description. This is *Areca vestiaria* Giseke. Further circumstantial evidence supporting Merrill's interpretation is that material of *Mischophloeus* in the Herbarium Bogoriense from North Celebes, Ternate, Talaud and Buru, and cultivated plants supposedly originating from Ambon (but note well the discrepancy—Rumphius specifically states he does not know *Pinanga saleyt* in Ambon) are apparently conspecific—further borne out by Scheffer's descriptions of living plants and herbarium material. Furtado (1933) following Beccari has sunk the genus *Mischophloeus* into *Areca* as a section; hence the valid name of this plant is *Areca vestiaria* Giseke and not *Mischophloeus vestiarius* (Giseke) Merrill.

The merging of *Areca langloisiana* and *paniculata* with *A. vestiaria*, however, is not the only change to be made. I have examined an isotype of *Areca leptopetala* Burret represented in the Herbarium Bogoriense by *Kjellberg 2324* and also other specimens of this species quoted by Burret (1936) (*Kjellberg 2725*). I can see no difference in the inflorescence, flower and fruit features between these specimens and the variable *Areca vestiaria* in North Celebes; flower size and shape fit within the variation observed in populations of *Areca vestiaria* in North Celebes. Only the leaf shows slight differences. In the Kjellberg material, leaf representation is poor, there being mid-leaf leaflets, and one leaf apex from a full-size leaf and a small leaf apex, very diminutive

and suggestive of having been collected from a seedling or sucker leaf. The leaflets are 1–4-costate, generally narrower than leaflets of Minahassan plants. I do not regard leaflet width a sufficient difference for the separation of a species of *Areca*, and hence merge *Areca leptopetala* with *A. vestiaria*.

Areca leptopetala itself was separated from *A. henrici* Furtado (1933) on the basis of very slight differences in flower shape. The type of *A. henrici* is *Heinrich 210*, in the Berlin Herbarium now presumed lost and duplicate material, if any exists, has not been available for study. Furtado himself distinguished this species from *Areca paniculata* (*A. vestiaria*) on its narrower leaflets and smaller male flowers, and mentioned the possibility of the equivalence of this new species to the slender *Ptychosperma paniculatum* from North Celebes described by Miquel. Furtado's description can certainly fit within the range of variation of *A. vestiaria* but without authentic material, it is not possible to merge the two species.

It is possible that an intensive field study throughout the Moluccas might show variation in *Areca vestiaria* worthy of varietal rank, but on the basis of herbarium and field studies so far, the synonymy of *Areca vestiaria* may be indicated as follows:

Areca vestiaria Giseke, Prael. Ord. Nat. Pl. 78. 1792.
Type: *Pinanga sylvestris e Buro* Rumphius, Herb. Amboinense 1: 41. 1741.

Seaforthia vestiaria (Giseke) Martius, Hist. Nat. Palm. 3: 313. 1849.

Ptychosperma vestiarium (Giseke) Miquel, Fl. Ind. Bat. 3: 31. 1855 ('*vestiaria*').

Mischophloeus vestiarius (Giseke) Merrill, An Interpretation of Herb. Amboinense 121. 1917 ('*vestiaria*').

Ptychosperma paniculatum Miquel, Verh. Kon. Akad. Wetensch. 11: 3. 1868 ('*paniculata*').
Type: *Teysmann & de Vriese*, Batjan.

Areca paniculata (Miquel) Scheffer, Natuurk. Tijdschr. Ned. Ind. 32: 168. 1873.

Mischophloeus paniculatus (Miquel) Scheffer, Ann. Jard. Bot. Buitenzorg 1: 152. 1876 ('*paniculata*').

Areca leptopetala Burret, Notizbl. Bot. Gart. Mus. Berlin 13: 199. 1936.
Type: *Kjellberg 2324* (once at B; isotype, BO).

Areca langloisiana Potztal, Willdenowia 2: 628. 1960.
Type: *A. C. Langlois s. n.* (B).

?Areca henrici Furtado, Rep. Spec. Nov. Reg. Veg. 33: 237. 1933.
Type: *Heinrichs 210* (once at B).

Collections of *Areca vestiaria* in Herbarium Bogoriense. CELEBES: *Lam 2440*; *Alston 16236*; *Heyne s.n.* 14.9. 1907; *Koorders 18416B, 19734B, 18434B, 18415B*; *Teijsmann 12897*; without collector, possibly Heyne; *Kjellberg 2324, 2725*. TALAUD: *Lam 2792, 3779*. TERNATE AND HALMAHEIRA: *Beguin 1717, 2099, 699*; *Boerlage and Smith 618*; *Lam 3724*; without collector, 2 sheets. BURU: *Teijsmann s.n.* CULTIVATED IN BOGOR: specimens from XIIC, II, XD 84, VK 73 (from Ambon), without registration number from Cipanas (i.e. Cibodas mountain garden), 1 collection.

Some further notes concerning the natural history of *Areca vestiaria* in North Celebes may be of interest. In the Minahassa area, *pinang yaki* (monkey pinang) as it called locally, is certainly very common and apparently tolerant of a wide range of habitats, growing as it does in valley bottoms, hill slopes and ridge tops. It reaches its greatest abundance between 500 m. and 1,200 m.



1. A fine clump of *Areca vestiaria* on Gunung Soputan, Celebes.



2. Base of a clump of *Areca vestiaria* showing production of stilt roots.

altitude; near Lolak in Bolaang Mongondow we observed it at 100 m. altitude—at this low altitude coloration was rather muted. The palm is normally clumped though occasionally solitary plants are encountered. In a clump usually only one or two stems develop massive stilt roots; the group illustrated in Figure 1 shows such stilt roots more or less confined to one stem in a clump. Figure 2, however, illustrates another clump where there is slight development of stilt roots from all stems in the clump. Figure 3 illustrates great stilt root development in a solitary individual. At first it seemed that greatest stilt root development occurred in palms growing on steep unstable slopes, but on Gunung Soputan itself, this correlation broke down—giant stilt-rooted individuals could be found next to individuals without stilt roots, with every conceivable intermediate.

Coloration of the leaf sheath was most intense in populations on Gunung Soputan and on the ridge of nearby Gunung Kawatak.

Flowering behavior is also very variable. Plants may come into flower when they are still only 1 m. or so in height (as is the case with cultivated plants from the original introduction), or in other instances may not flower until the trunk is 3 m. or more in height (as evidenced by inflorescence scars). Inflorescences on young stems are often smaller than on older stems and linked with this there appeared to be slight difference in the size of the flowers. Flowers open pale cream on slightly



3. Massive production of stilt roots from the base of a solitary individual of *Areca vestiaria*.



4. *Areca vestiaria* in ripe fruit, crown damaged by exposure.

yellower axes, bursting out of the brilliant orange or scarlet spathes. Rachillae and calyces deepen in color—at first palest yellow, then scarlet, then bright pillar-box red. Fruit color change lags behind, so that the combination of yellow-orange half mature fruits on bright red rachillae is very striking, especially when the whole inflorescence is contrasted with the scarlet sheaths and perhaps a ripe infructescence below—a great, almost crimson mass of fruit (Fig. 4). We found ripe fruit in large quantity and this has been distributed to The Palm Society Seed Bank under the collector's number *Dransfield and Mogea 3755*.

I have no doubt that this palm has a great horticultural potential in the tropics. In some ways it produces an even more spectacular array of colors than *Cyrtostachys lakka*. The palms I have seen in cultivation in the Foster Garden, Honolulu, and the Fairchild Garden, Florida are not nearly so exciting as some of the wild plants—this may be put down to the relatively young age of these cultivated specimens, to less favorable climatic conditions, or some other factor. Most surprisingly, *Areca vestiaria* is apparently nowhere in cultivation in the Minahassa region. It is hoped that it can be popularized in Indonesia as a garden plant.

ACKNOWLEDGMENTS

I should like to express my gratitude to our co-workers in the field during the Minahassa expedition; Drs. E. F. de Vogel and Ir. Djunaedi Gandawid-

jaya who joined us from Bogor, and to Mrs. Lies Pangemanan and Mr. Freddy Kaseger from Manado, who gave us an inestimable amount of help in sorting out the logistics of the expedition and for help and companionship in the field.

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LETTERS

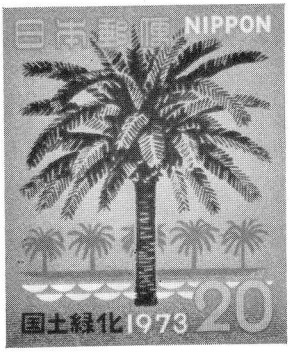
MITSUNE, HACHIJO-MACHI
HACHIJI-JIMA
TOKYO, 100-15

The 24th National Arbor Day, the central event of the National Reforestation Campaign, was held in Hinamoridai at the base of Mt. Kirishima, Miyazaki Prefecture, Japan, on April 8, 1973. Since 1950, the National Arbor Day has been presented jointly by the committee of the National Reforestation Campaign and the prefecture in charge. Such events as ceremonial tree planting and awards to the people who had devoted themselves to the campaign were watched by a crowd of 33,000 people as well as by the Empress.

On the previous day, a twenty-yen stamp, bearing a design of *Phoenix* printed in three colors by the gravure method, was issued to celebrate the campaign. *Phoenix* is the prefectural tree of Miyazaki and the stamp was designed by Mr. Otsuka, a member of the staff of the Ministry of Postal Service. Along the coast of Miyazaki, particularly at Nichinan Beach, the *Phoenix* is common, the number estimated to total 50,000.

The first potted *Phoenix* is said to have arrived here early in the Meiji era (1868–1911). *Phoenix* was chosen as the prefectural tree by popular vote in 1966, reflecting the proper image as the symbol of Miyazaki, a land of everlasting spring.

TOSHIO KANAGAWA



Palmologue Letters and Excerpts

The last shall be first and the first shall be last, which in this instance refers only to certain letters old and new received by the subscribed commentator. The old letters are two, one received in 1956 and the other in 1957, from the late Professor Armando Dugand, eminent student of the palms of Colombia, his native country. They have a special interest just now, perhaps, in connection with the post-Biennial trip to Colombia proposed by the Society's president, Mr. Kenneth C. Foster.

Any members planning to go on the group trip to Colombia, following the Biennial Meeting in Miami in late June of this year, would be well advised to read beforehand Dugand's contribution to the October, 1961 issue of PRINCIPES, *entitled "Palms of Colombia." It is a full and intimate account written for popular consumption, and hence would give the travelers a fairly comprehensive understanding of what they may expect to see as well as of what they will not see in other palm regions not to be visited during the journey. It's a rara avis indeed, including the kind equipped with wings and feathers, who has seen all the palms in Colombia, for that country has extremely diverse typography and also "has the second richest palm flora in the world," excelled only by Brazil. Dugand believed that the total number of species, when eventually all would have been discovered and validly published, would be "well above 300." Before his untimely death in 1971, he actually compiled a checklist of Colombian palms then known to science.*

It has been advanced that palms endemic only in high altitudes are not adaptable to cultivation near sea level, but this is demonstrably not true of all such palms. In seeking out new palms for introduction to culture in the United States much of the effort should be to find palms tolerant enough of cold to withstand the dissimilar winter climates where some palms are already grown within its continental borders. Even in southern Florida the winters are not always hospitable to all tropical palms, although surely the least risk is run there to cold attacks.

Numerous palms in Colombia are found at medium elevations of from 3,000 to 7,000 feet, and hence well able to withstand coolish weather and some of them will surely endure cold temperatures in varying degree, wherefore it would seem that Colombia, with its great range of climates, would be a very hopeful field as well as a fertile one for collectors from subtropical lands. Even palms from very high elevations, of the genera Ceroxylon *and* Parajubaea, *are said to be successfully cultivated not far above sea level in California, though in Florida all attempts to grow them outdoors have ended sooner or later in total failure. The point is that the post-Biennial trippers will be on the right track if they succeed in bringing back seed of Colombian palms with something of built-in cold tolerance, though doubtless seed will be collected from lowland palms that might have to be grown under glass.*

That many palms of medium elevations will do well at sea level is in one sense pointed to by an obverse fact, to wit, that palms from habitats near sea level are doing well at quite high eleva-

tions. Professor Dugand tells us that the parks of Bogotá, the capital of Colombia at an elevation of 8,563 feet above sea level, are adorned not only by the native Ceroxylon quindiuense, *but also by these exotics:* Phoenix canariensis, Howea forsteriana, Trachycarpus fortunei, Washingtonia filifera, Livistona australis.

Dr. H. E. Moore, Jr. refers to the late Armando Dugand as the foremost student of the Colombian palms. His stature as a scholar adds interest to the two letters following these preliminary comments.

—Dent Smith
P. O. Box 7008
Daytona Beach, Florida 32016

From the late Professor Armando Dugand, Barranquilla, Colombia, September, 1956.

I have received your kind invitation to become a member of The Palm Society. It is with the greatest pleasure that I accept. In fact, as a Botanist who has worked frequently since 1940 on the taxonomy and the distribution of the palms of Colombia, and as an admirer of the *Principes vegetabilium*, I sincerely feel that joining The Palm Society is a pleasant "must," quite agreeable to my vocation. Therefore please enroll my name as a member, and accordingly I enclose with pleasure ten dollars as a voluntary contribution.

It may interest the readers of the Bulletin that the known palm flora of Colombia—which I believe to be the second richest in the world, being preceded only by Brazil's—now exceeds species of 58 recognized genera, among which are found both the tallest and the smallest kinds, namely the lofty Quindio Wax Palm (*Ceroxylon quindiuense*) which attains a height of 160 feet—and occasionally as much as 200—and the recently described *Malortiea pumila*, a dwarf scarcely two feet tall when fully adult.

Colombia may also boast of the widest altitudinal range in palm distribution: from the sultry lowland forests of the Tropical Zone teeming with species of many genera, to the cold, misty upper slopes of the Andes where *Ceroxylon utile* is found growing at 13,400 feet above sea level, not very far below snow line.

Also from Professor Dugand, May, 1957.

I am very grateful for your kind letter of April 21 and the valuable information that you have given me concerning the palm gardens in Florida.

I was Dr. and Mrs. David Fairchild's guest at their home "The Kampong" in Coconut Grove in the first days of September, 1942. I had the pleasure of meeting the Fairchilds when they visited Colombia in 1941. We went then on a short trip for collecting seeds of various Andean plants on the Páramo de Guasca, at 12,000 feet near Bogotá. In spite of his age Dr. Fairchild did not seem the least disturbed by the greatly diminished oxygen in the air at such altitude. Bogotá itself, Colombia's capital, is at 8,600 feet above sea level.

I also met Dr. Harold Emery Moore, Jr. in Boston during my last visit in 1951. Dr. Moore and I have been corresponding by mail on the subject of Colombian palms and I have often sent him material from the Colombian National Herbarium, for study.

A brief biographical note on Professor Dugand appeared in PRINCIPES 17: 66–67, *followed by a list of his publica-*

tions on palms. Except for his contribution to PRINCIPES, *mentioned in the comments preceding the above letters, all were in Spanish. One of the latter, "Las palmas y la tierra" (in Caldasia* 9: 187–217), *shows a surprising grasp of many facts about palms other than Colombian, and most of them from the Temperate Zone.*

From Mr. Elwood Bear, Alexandria, Virginia, January, 1974.

I am enclosing an article from the Washington (D.C.) *Star-News* describing the palms that I have cultivated in my northern Virginia garden since 1967. I also reported on their cold tolerance in the June, 1970 issue of The Palm Society *Newsletter*.

Although the *Star-News* article focuses primarily on the Windmill palm (*Trachycarpus fortunei*), I have been especially pleased with the rapid growth and cold tolerance of a specimen of Needle palm (*Rhapidophyllum hystrix*). This plant has bloomed and produced seed the past two years. It is situated in my garden at the base of a 6-foot south-facing wall which does afford protection from cold winds. But this palm has not been covered or otherwise protected from temperatures as low as 5° F. during the past two winters. It has been a very vigorous grower. It stood perhaps two feet high in October, 1969 when I acquired it in Virginia Beach, and it now forms a clump five feet high and equally as thick. The leaves have rarely been damaged by low temperatures.

It is my judgment that *Rhapidophyllum hystrix* is probably the hardiest of the palms I have attempted to cultivate at Alexandria, Virginia, followed by *Trachycarpus fortunei* and *Chamaerops humilis*. I have yet to try *Nannorrhops ritchiana* or *Butia capitata*,



1. Mr. Elwood Bear examines a specimen of *Trachycarpus fortunei* following a light snowfall. The plant has grown in his garden in Alexandria, Virginia, since 1967.

so I cannot comment on the hardiness of these palms in the Washington area.

The *Chamaerops*, incidentally, did not survive the particularly cold winter of 1969–1970. The sabals, following repeated introduction, do not survive in my garden—for reasons hard to explain, as it is this genus that is found in nature farthest north along the Atlantic seaboard; but then I am not going to lament the absence of palm species in northern Virginia, when, indeed, the needle and windmill palms have performed so well.

The enclosed photos, taken in late December, 1973, show the needle and windmill palms in my garden with a dusting of snow.

Several other palms besides those mentioned in the foregoing letter might prove adaptable to the climate in Alexandria, but no certainty exists until proved by trials. The mighty Jubaea chilensis *is one that could be tested, although the limit of its cold endurance is not yet known. The dwarfest of the genus* Sabal, S. minor, *is the most tol-*



2. *Rhapidophyllum hystrix*, here photographed after a light snowfall, has grown in Mr. Bear's garden since 1969.

erant of cold, and that despite its lack, usually, of an emergent trunk.

Certain points brought out in the newspaper article referred to in Mr. Bear's letter, may be of special interest to those who grow palms in "marginal" areas and perhaps of general interest to many other gardeners also. In it he mentions that Trachycarpus *has been introduced into gardens as far north as southwestern Scotland, central Japan, and the coastal plain of the United States northward to Virginia. Even Canada, though only a diminutive section of it, may be added to the list, for in 1958, following a revelation by my friend Dr. Walter Hodge, I sought out the palms he had mentioned and found and photographed two perfectly sound specimens of* Trachycarpus, *presumably* S. fortunei, *out in the open at Beacon Hill Park, Victoria, British Columbia. Inquiry revealed that those two stalwarts had been growing in the Canadian park for 25 years, the larger then about 16 feet tall to top of crown, and my photograph of it was reproduced in* PRINCIPES 4: 72. *But to have suggested that they might be the northernmost palms in North America proved subject to becoming outdated, for five years later Mr. Robert O. Schnabel advised me that, some 65 miles north of Victoria, he had come upon two newly planted* Trachycarpus *in good condition, both of them quite small.*

Mr. Bear's newspaper article says that Trachycarpus *is reported to grow poorly in Florida, and this I can verify, at least along the state's Atlantic seaboard, from long experience with eight examples and observation of others. For a guess, and only a guess, the total lack of clay in the soil may be responsible for the poor growth rather than the long hot and humid season.*

When a temperature of 12° or lower is forecast for Alexandria, Mr. Bear protects his two Trachycarpus *plants by drawing the leaves upward with a ring of old garden hose and wraps the trunk and foliage with a roll of insulating material. Apparently he finds it unnecessary to protect the needle palm. Among several other points of interest, he states that there are in Virginia Beach "many healthy specimens of* Butia capitata," *which we should devoutly hope is of some consolation to Mr. Otto Martens, past president of The Palm Society, who recently came to live there after retiring from his nursery business in California.*

From Dr. U. A. Young, Tampa, Florida, January, 1974.

At the time of your last visit you expressed an interest in the *Chamaedorea* hybrids which I had developed and acquired over the past few years. I am now literally seeing the fruits of this venture since some of the crosses are beginning to flower and fruit, and we can evaluate them from a horticutural standpoint. I have not sent Dr.

Moore any flowers or fruit, but would be happy to do so if there is any scientific interest. I am very pleased with the plants and especially the "hybrid vigor" they seem to possess. Among the older plants, which can be evaluated at this time, are the following:

Chamaedorea ernesti-augusti × *sartorii*. This cross has produced a very attractive and unusual hybrid. There is usually leaflet division proximally with a very broad terminal leaf, but even when the leaf is simple like *C. ernesti-augusti*, it is larger, slightly ruffled and less rigid. I am certain of the cross, for pollen from *C. sartorii* produced almost 100% fertilization of the female *C. ernesti-augusti* inflorescence. Seed production was much heavier than ever produced on the same plant without cross-pollination, even by hand. At the time the cross was made no male *C. ernesti-augusti* was flowering. This hybrid is now blooming. The second generation plants could be even more interesting.

Chamaedorea tepejilote × *neurochlamys*. These two species are naturally very similar, the main difference being the lack of aerial roots on *C. neurochlamys*. The latter is more cold tolerant and I hope to produce a cold-tolerant cross. Hybrid vigor has produced a very nice plant with a larger trunk and leaves. It is rapid growing and, as yet, no aerial roots. It seeds heavily and the seeds are viable. I am certain of this cross since the female *C. tepejilote* is at my office, far removed from any other *Chamaedorea*. It was hand-pollinated from a plant at home and never set any seed before or after.

Chamaedorea oreophila × *sartorii*. I feel this is also a certain cross. I have only one *C. oreophila*, a female plant, and it never set seed except when hand-pollinated with pollen from *C. sartorii*. The hybrid plants are now in the adult form and should flower this year. Their appearance is that of a more glorious *C. oreophila* with very broad, dark green leaflets, and they seem to be much faster growers than either parent.

Chamaedorea elatior hybrid. This is a natural or accidental cross. The seeds from *C. elatior* have developed into a variable but very nice plant which has produced viable seeds for two years. Some adult specimens appear to favor *C. glaucifolia* and this probably is the parent male. The nicer plants do not climb, in that the trunk is self-supporting, and the leaves do not break down at the base as in *C. elatior*. Otherwise, the leaf is very similar to *C. elatior*, with the tenuated leaflets and even the terminal hooks.

Chamaedorea species (clustering *tepejilote*) × *neurochlamys*. This *Chamaedorea* species is the palm that is so prevalent around the Tikal ruins in Guatemala. I crossed an old plant, which incidentally years ago changed its sex from male to female, with *C. neurochlamys*. I hope to produce a suckering plant without aerial roots, which I feel detract from the appearance. Thus far this seems to be true, but the crosses are now only beginning to form trunks. Hybrid vigor is certainly present, and here again the hybrid seems to be a more attractive plant than either parent plant.

Chamaedorea ernesti-augusti hybrid. This is apparently an accidental hybrid. Seedlings I had marked as *Synechanthus fibrosus*, from a plant in my yard, developed long leaves similar to, but two or three times as long as, *C. ernesti-augusti*. I feel there was an error in labeling,

so the history is obscure. It is a very graceful and attractive palm.

Chamaedorea seifrizii hybrid. A number of unusual and interesting plants have been produced from a female plant in Miami. This plant is located in a private garden in which there is no male of that species available for pollen, but there are a number of other *Chamaedorea* species. The appearance of some of the adult hybrids seems to implicate *C. elatior* as the pollen source.

Chamaedorea seifrizii × *erumpens*. This is a fairly common hybrid. My plants were obtained from a local nursery. I understand from Ken Foster that pure *C. seifrizii* seeds for the commercial nursery trade are somewhat hard to come by, and most are felt to be this hybrid form.

Not very many attempts to hybridize palm plants for gardens have been made, or else not many have been publicized. Dr. Young seems to qualify as a pioneer in attempting to cross more than just two or three species in the genus Chamaedorea. *There is at least one other experimenter with such crosses, in California, but the results have not progressed far enough yet to be conclusive.*

From Prof. Harold E. Moore, Jr., Ithaca, N.Y., February, 1974.

You asked earlier about hybrids. I'm afraid that much is said about palm hybrids, some is written, but little is documented. I would guess that the best-documented hybrids are those between *Elaeis guineensis* and *E. oleifera* (*Corozo oleifera*) reported from Malaya by J. Hardon and colleagues who are concerned with the commercial oil palm. Hybrids have been recognized in *Syagrus* by Glassman (see PRINCIPES 15: 79–88, 1971), but these are not the product of controlled crosses. It is widely thought that hybridization occurs among species of *Caryota*, *Latania*, *Phoenix*, *Ptychosperma* and perhaps others in gardens, but again I'm not aware of adequate documentation.

I believe that U. A. Young is hybridizing *Chamaedorea* species. *Chamaedorea* is a good genus to work with since most species must be hand-pollinated to obtain fruit in any event and the sexes are on separate plants so that crosses can be controlled by bagging the female inflorescence to prevent any possible contamination except that pollen which is used by the crosser. I have first generation progeny of one cross that I made on February 28, 1970 between *Chamaedorea erumpens* (female) and *C. seifrizii* (male). Seed was harvested and planted on November 4, 1970, and of three resultant plants, which are intermediate between the parents in aspect, one is already flowering. Unfortunately, I have not yet determined whether the offspring are sterile or fertile. I shall not be surprised if the hybrid does prove to be at least partially fertile because the parent species are very closely related. I look forward to having time to pursue the question further.

From Mr. C. S. Fremaux, Miami, Fla., February, 1974.

As a winter visitor here I have been taking more and more of an interest in the palms. Born in Saigon in French Indo-China I have lived most of my life in Montreal, San Francisco and now Chicago, but I intend to move down here to south Florida next year. I intend to grow all the kinds of palms we had in the land of my youth, if that is possible. Do you think that all the palms from that part of the tropical world would be all right in south Florida? I am not yet a member of your

organization, but a friend has been letting me read his copies of the journal, which is very fine and educational.

I had a hard time finding your address. It should be printed with your name so readers will know where to send a letter, do you think so?

Yes, I think so, and hereafter it shall be done. The Society publishes a roster containing the name and address of every member, but I have to agree that it would simplify matters to find my mail address as well as name where it would be more readily visible, at the end of the usual preamble and before the quoted letters.

Will "all" the palms of the countries now called Vietnam, Laos and Cambodia succeed in south Florida cultivation? Very likely, yes, unless in colder locations far inland. But for the sake of certainty, it would first be necessary to obtain the botanical names of all such palms, and then check against the list of palms (or catalog of plants) now in cultivation at the Fairchild Tropical Garden. It seems a fair guess that Mr. Fremaux would find in the list all or nearly all, and then, if he should wish further assurance, he could proceed to inspect in that Garden any individual palms in question.

From Mr. Otto Martens, Virginia Beach, Virginia, February, 1974.

You really hit it off with "Palmologue." Here is a reply to Mr. H. A. Paden's inquiry, Fort Worth, Texas.

There are *Washingtonia filifera* and *W. robusta* hybrids galore in California. They hybridize under cultivation so easily that we nurserymen have difficulty getting foolproof seeds of one or the other species. Since some of the commercial palm-seed collectors are not too exact in the choice of what they collect, we have for many years collected our own *Washingtonia* seeds, making sure that no *W. filifera* tree is in proximity of *W. robusta*, and vice versa.

Hybrids are strong robust plants, with a heavier trunk than the long stately *W. robusta* but not as tall. Another point of variance is the leaf; whereas the leaves of *W. robusta* are slick, smooth, the ones of hybrids show a greater number of filaments like *W. filifera* (origin of name), and also the segmentation is generally deeper. As nurserymen we consider hybrids of inferior quality, although hardiness has never been a point and is not considered in the judgment. Often in street and row plantings we observe occasional unevenness in height of washingtonias. In most cases it is due to hybrid origin of seeds used for propagation.

Unintended hybridization amongst cultivated *Washingtonia* species may be as common as amongst *Phoenix canariensis* palms. The latter are not choosy at all, and it seems they join up with anyone that comes along in the *Phoenix* group.

The problem of unwanted hybrids between the two species of Washingtonia *does not exist in Florida, for* W. filifera *has been so sparingly planted in the state that it is something of a rarity. The main mix-up in Florida is in the genus* Phoenix, *of which, as Mr. Martens notes, the species seem not to care whose company they keep.*

Errata

Volume 17, page 148, column 2, line 33, add:

This work has been supported by National Science Foundation grants G-18770, GB-1354, GB-3528, GB-7758, and GB-20348X.

Volume 17, page 175, column 2, line 40: for 173 *read* 149.

PALM BRIEFS

The Propagation, Growth, and Distribution of Pritchardia affinis

According to Marie C. Neal in *Gardens of Hawaii* (1965, p. 97), "Of some 36 species of Pritchardias, 31 are natives of Hawaii; the remainder, of Fiji and the Tuamotos. It is the only genus of palms native to Hawaii." It is unfortunate that many of these species have declined in number to the point that they are almost nonexistent in their native habitat.

The present author is most familiar with *Pritchardia affinis* Beccari, a variable species from South Kona and Ka'u on the Island of Hawaii. The species was at one time found abundantly from the Volcanoes National Park boundary along the coast to the Kailua area of Kona, a distance of more than 100 miles. Today, only occasional isolated specimens can be found in the area and few seedlings appear around the parent plants.

Otto and Isa Degener published an article in June 1971 *Phytologia* (Vol. 21, No. 5) that speculates as to why the species has declined. "On the Island of Hawaii at Kailiili, near Wahaula within the Hawaii Volcanoes National Park, a few impressions of prostrate trunks can be seen on a prehistoric, though not very old, pahoehoe lava flow. Beyond the southwestern boundary of the National Park, between the main road and the ocean, at Kawaa, lies an expanse of prehistoric, smooth pahoehoe. . .Here the pahoehoe had gently flowed through a palm grove, the wet trunks burning slowly through the base so that the trees fell helter skelter upon the cooling lava. . .the writers are convinced that the *loulou* reached the Hawaiian Islands some eons ago, and may have even more or less encircled many stretches of the Islands with extensive groves, particularly before the Polynesians brought the pig and, perhaps as stowaway, the seed-eating Polynesian rat. The fossil impressions at Kailiili and above all at Kawaa are irrefutable proof of this fact."

By 1969, *Pritchardia affinis* was possibly within 20 years of extinction in its original habitat unless measures were taken to insure its survival. Fortunately, C. Brewer and Company, Ltd., the major landholder in the district had just embarked on a major resort development in the region and was developing a large nursery to supply materials for landscaping the project. As Horticulturist, hired by the company, one of the author's duties was to locate and propagate plants adaptable to this dry, windy region. It was felt that native plants of the region should have first consideration since they had proven their worth under Ka'u's climatic conditions.

In April of 1970, the author collected 4,000 seeds of this palm at the Beamer home adjacent to Punalu'u Black Sand Beach. This was done over several weeks since mature seed that fell was quickly damaged by rats or insects. One thousand seeds were shipped to Fairchild Tropical Garden in Florida. The remaining seeds were then soaked for three days, changing water every day. They were then planted in flats containing 50 percent nitrohumus and 50 percent sponge rock. The mix was lightly dusted with 5 percent chlordane dust to discourage insect damage.

The seed commenced to germinate within 60 days and seedlings were planted in one-gallon containers between the 90th and 120th days after initial germination. Germination was very good and approximately 80 percent or 2,400 plants were potted. Mix used for planting was a combination of one-third

macadamia nut husks, one-third local volcanic cinder and one-third soil. One level teaspoon of Osmocote 18-6-12 was applied to each container.

During the last 18 months, the plants have remained in one-gallon containers with one teaspoon Osmocote applied every three months. An occasional



1. *Pritchardia affinis* left when forest was cleared for a home, Punalu'u, Ka'u District, Hawaii, Hawaii.

light (½ tsp.) application of 14-14-14 with minor elements was also applied when some plants showed signs of nutritional stress.

The nursery spray program for prevention of insects and disease included periodic treatments of tribasic copper or benlate to control fungus organisms and Cygon or Sevin to control insects.

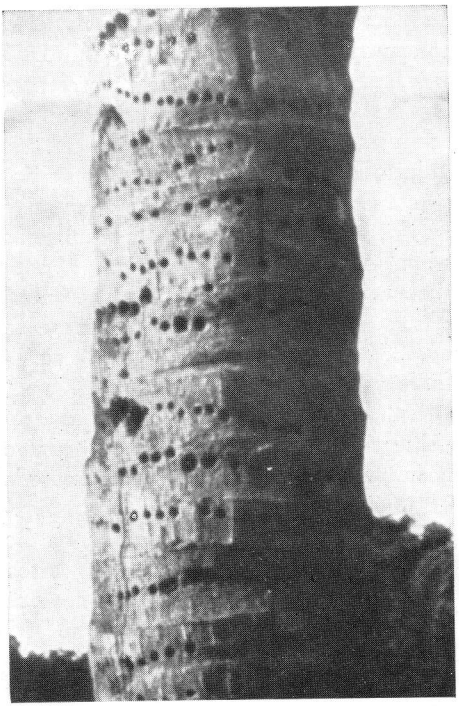
To date, the plants are doing remarkably well and are being planted heavily in the gardens surrounding Punalu'u Restaurant and Ninole Sea Village Hotel adjacent to the Black Sand Beach.

Only time will tell if the addition of 2,000 plus new trees will again bring this endemic into prominence as part of Ka'u's unique scene.

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Sapsuckers: Do They Suck Palm Sap?

The yellow-bellied sapsucker (*Sphyrapicus varius*) is a species of woodpecker which seems to feed on the sugary phloem sap of trees. It drills a series of holes about 5 mm. wide in stems. These are often arranged in "bands," but occasionally also in "spirals" and "columns" (Fig. 1). In the early 1900's a controversy arose over the feeding habits of this bird. Some considered that released sap merely served to attract insects which formed the bird's food. Others believed that the bird actually imbibed the sap, and ate the insects as an incidental garnish. This latter theory is now strongly supported by observation and other evidence. Thus birds apparently feeding on sap have a copious and frequent cloacal discharge.[1] Also the beak, unlike that of a true woodpecker which has a harpoon-shaped tip, is tipped with an absorbent brush.[2] However studies of intestinal contents and droppings have shown that solid plant material and insects do also form an important part of the diet.



1. Sapsucker wounds in *Cocos* trunk. The holes are arranged in the typical horizontal "banded" pattern.

We saw sapsucker wounds on coconut palms (*Cocos nucifera* cv. 'Malayan Dwarf') on the Jenning's Estate in Miami. This is interesting because it is notoriously difficult to extract phloem sap from the trunks of palms. Sap is transported in phloem tissue through

[1] Tate, J. Jr. Methods and annual sequence of foraging by the sapsucker. The Auk 90: 840–856 (1973).

[2] Pearson, T. G. Chap: Woodpeckers, guardians of our trees. *The Book of Birds*, 2: 51–63 Ed. G. Grosvenor and A. Wetmore (1939).

sievetubes which contain relatively high concentrations of sugars (around 20% w/v) and at remarkably high pressures (up to about 15 bars). Highly efficient sealing mechanisms seem to protect this vulnerable pipeline. They operate instantaneously to prevent an excessive loss of sugars and other plant nutrients when sievetubes are punctured. If sapsuckers really drink the sap the interesting question is how they manage to avoid the tendency of the phloem sievetubes to seal.

Although sapsucker activities on palms are well known locally, we have been unable to find published records of their feeding on palm trees. Sapsucker damage has been studied in the northern states where trees are often damaged and even killed. It is curious that often a single palm, but *not* its neighbors, has been attacked over several years, possibly during the winter when the birds migrate southwards from their summer breeding grounds.

It would be an advantage if we could learn from the bird where and when to cut into the phloem sievetubes to obtain sap. Our studies of translocation physiology which are connected with the transmission of lethal yellowing disease, might be assisted if we had more observations on the bird and its feeding habits. Time of day, season, region of trunk bored, and the type of palm are all interesting. It seems that varietal and even individual differences between trees may influence the birds preferences, presumably in response to the release of sap. If anyone has the opportunity to observe sapsuckers feeding on palms we would be most grateful to hear about it.

JOHN A. MILBURN, AND
MARTIN H. ZIMMERMANN,
Harvard Forest,
Petersham, Ma. 01366

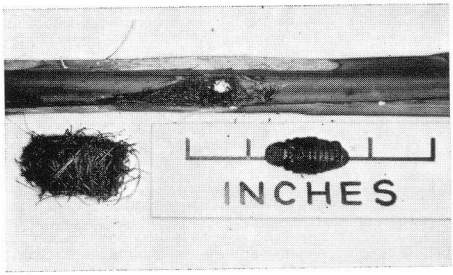
Some Observations on the Palm Weevil Rhynchophorus cruentatus

In the past few years we have been warned repeatedly that the Canary Island palm (*Phoenix canariensis*) is always a tempting feast for the palm weevil, but by most home owners this warning is usually taken lightly until the weevil strikes. This was true in my case; this pest always worked on some one else's palm, not on mine. However, in the fall of 1972, when I was living in Venice, Florida, a sudden wind storm blew a frond out of the top of my date palm and when examined, it had been chewed off by an insect. This began an interesting study of the palm weevil on my part.

In order to get to the damaged fronds it was necessary to cut off *all* the fronds, so it was denuded (Fig. 1). In the very heart of the palm, I found a lot of damage where the insect had been working. I also found some of the pupal cases. This pupal case is made from coarse palm fibers and is about 2½ inches long. The larvae bore into the leaf sheath and, if left alone, can kill



1. Treating my Canary Island date palm with BHC.

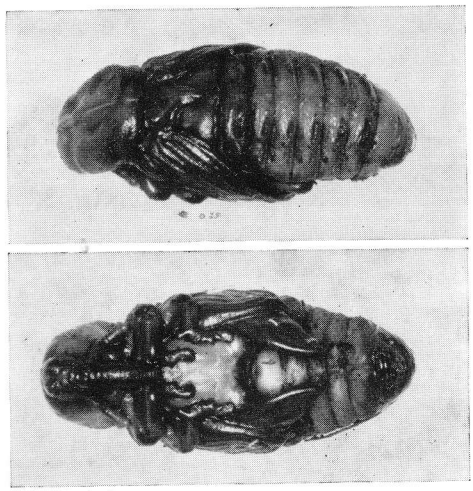


2. Pupal case, pupa, and damage to palm leaf from the palm weevil, *Rhynchophorus cruentatus*. Photo by Lewis S. Maxwell.

a palm. One authority claims that the larvae can be heard when feeding, making a noise "like the escape of water with an occasional screech like a choked hen. . . ." In the West Indies the larvae of some palm weevils are called "grugru" and are fried and roasted and are considered a delicacy. They are reported to have the property of producing milk in women. It is also reported that the palm weevil is found in all states where the cabbage palm is native.

For the reader who is not acquainted with weevils, a weevil is a beetle with the head prolonged into a beak or snout, with the mouth part at the end. The palm weevil is the *largest* weevil in the United States and is known scientifically as *Rhynchophorus cruentatus* (Rińe-cofór-us croo-en-táte-us) from the Greek *rhynchos*, meaning "with a big snout" and *phorus*, meaning "carrying"; *cruentus* means "blood-red." A liberal interpretation might be "with a big snout, blood-colored." This is a fine way to describe the insect pest.

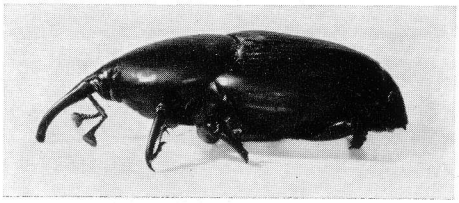
Nearly all weevils are injurious to plants, being voracious feeders both as larvae and as adults. Everyone has heard of the cotton boll weevil, considered the most notoriously evil insect in all the world; it has been estimated that every person in the United States pays ten dollars a year more for cotton goods just because of this weevil. However, this weevil taught the farmers of Alabama that the only way to control it was in crop diversification; in Coffee County, Alabama, the farmers tried peanuts as a cash crop in place of cotton and cleared five million dollars the first year, and so, the citizens of Enterprise, Alabama erected a monument in honor of the Boll Weevil with this inscription:



3. Two views of the pupa of the palm weevil. Photos by Lewis S. Maxwell.

IN PROFOUND APPRECIATION
OF THE BOLL WEEVIL
AND WHAT IT HAS DONE
AS THE HERALD OF PROSPERITY
THIS MONUMENT WAS ERECTED
BY THE CITIZENS OF
ENTERPRISE, COFFEE COUNTY,
ALABAMA

Here in Florida, we are *not* about to erect a monument to the palm weevil. The pupal cases and larvae that I found in my date palm were sent by mail to Lewis S. Maxwell of Tampa, a renowned entomologist and expert photographer, who sent me copies of the photos he took of the weevil. I also wrote to the University of Florida for any literature they had on the palm weevil and they sent Entomology Circular No. 63 dated



4. The adult palm weevil, *Rhynchophorus cruentatus*. Photo by Lewis S. Maxwell.

August 1967 which contained some interesting facts; one is that the male weevil's snout is covered with wart-like granules while the snout of the female is smooth. It is also stated that the weevil is a pest of cabbage palms and also coconut palms. It seems that adults have been found every month of the year in Florida.

It is said that the best control for these pests is the use of BHC. It is recommended that susceptible palms be treated with a dust of the above material.

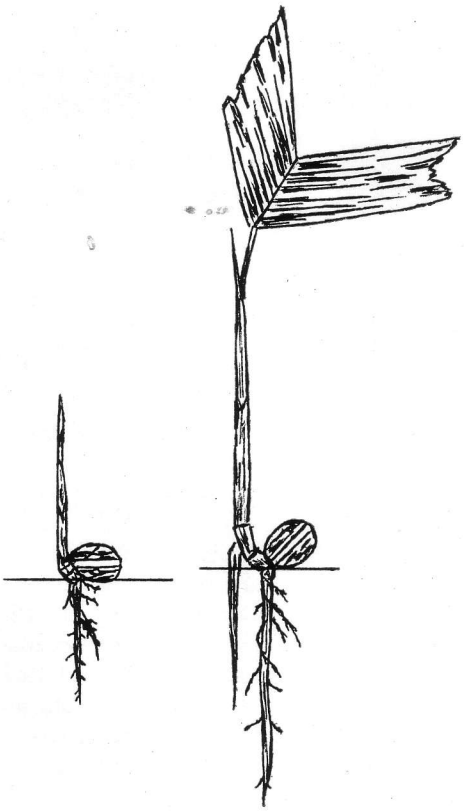
CLAIRE C. COONS
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PALM QUESTIONS AND ANSWERS

1. Q. I have a problem raising palm seedlings. They tend to rot off at the base, especially after being transplanted from the seed pan. What is wrong?

A. Quite often newly transplanted seedlings damp-off because of being planted too deeply. The accompanying illustrations show the correct depth of planting. It is very important that seedlings not be planted too deeply because the growing point can be buried and thus more susceptible to injury and disease. During the seedling stage, palms are extremely vulnerable to damping-off fungi, especially when injured or planted too deeply. The attached seed should not be buried.

Also it is important that the palm seedling be kept healthy and growing fast. Insect or disease damage is often fatal to a small, tender seedling. Even when the disease or insects have been arrested, seedlings will often be too weak to survive and outgrow further fungus attack.



An outstanding article on the culture of palm seedlings after germination by Dr. R. W. Read appears in PRINCIPES, Vol. 6, No. 4, pp. 126–132 (October 1962). Basically, a well-drained soil mix along with 80 degree temperatures are important. It is better to start off with good cultural practices than to try to save sick seedlings, the result of poor cultural conditions.

2. Q. Should palm seedlings be treated with a fungicide when they are transplanted?

A. Yes. A fungicidal drench of seedlings upon transplanting will enhance their survival. A drench with Truban, Benlate or Banrot is extremely beneficial and a good disease preventative measure. From personal experience, the systemic fungicides, Banrot and Benlate, are outstanding in being a preventative since they are taken up in the plant juices.

3. Q. Should palm seedlings be fertilized? I have burned up many seedlings by overfertilizing.

A. Yes, palm seedlings should be fertilized, but with very diluted concentrations. Using fish emulsion at half strength is very safe. Also, using small amounts of milorganite in the soil mix will give a slow release of nutrients. Another slow release fertilizer is the pelleted osmocote (Poracil). Again, be sure to use very small amounts.

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PALM LITERATURE

Arecanut and Spices. Quarterly Bulletin. Directorate of Arecanut and Spices Development, Calicut, Kerala, India. Annual subscription Rs. 2/–.

The present importance of arecanut or betelnut (*Areca catechu* L.) as a cultivated palm in India is evidenced by this journal published since 1969. It is a successor, with a broadened scope to include spices, of the *Arecanut Journal* (originally named the *Areca Bulletin*) published from 1950 to 1963. This review considers only the palm papers of the 16 issues which constitute volumes 1–4.

The stated purpose of the journal is to provide arecanut growers with information about efficient crop management and protection. Despite being listed first in the title, only about 40 percent of the papers published thus far have dealt with arecanut. These papers fall into three main categories: cultivation practices, processing, and marketing. In addition to such articles, each issue has a regular section devoted to recommended agricultural operations, and reviews of recent market conditions and prices. Occasionally, statistics are reported on arecanut production and the area under cultivation.

Although directed primarily to the nontechnical reader, the quality of contributed articles makes the journal much more valuable than the typical farm journal. Palm researchers studying cultivation practices as well as those seeking current general information on the arecanut palm should consult this periodical.

Dennis Johnson
University of California
Los Angeles

NEWS OF THE SOCIETY

On the evening of October 5, 1973, the Palm Beach County (Florida) Chapter of The Palm Society was formed at the Mounts Agricultural Center in West Palm Beach. The group, organized by DeArmand Hull, Extension Agent in Ornamentals for Palm Beach County and the University of Florida, had over 200 in attendance. Bill Mowry was elected President, Norman Moody Vice-President, Dr. Benjamin Martin Treasurer, and DeArmand Hull Secretary.

At least 50 different large potted specimen palms, carefully labeled, were

lined up along the sides of the hall. The plants were mostly of the less-known species and drew the attention as well as the admiration of those present. The wide diversity in the palm family was clearly demonstrated by these plants furnished by De Hull and Bill Mowry.

A display table held copies of PRINCIPES and other palm literature. Palm seeds were sold and as an inducement to join the society, a sign proclaimed that they were to be sold only to members! Amidst lively bidding, many palms, both large and small, were auctioned off. That evening 23 new members joined the society and more have since become members.

Palm Beach County, the third largest county in horticulture in the United States, is known for the beautiful landscaping and outstanding plantings of its Gold Coast homes. The many palms used help to create a tropical effect. It is said that the first coconuts planted in Florida were planted here.

The new chapter had had three meetings by the end of February. It is actively working to educate home owners about lethal yellowing disease in coconuts, veitchias, and pritchardias, and is making efforts to introduce new palms for the South Florida landscape.

WHAT'S IN A NAME?

Acoelorrhaphe (ah sée low ráy fee) (f.) is composed of the Greek prefix *a* (without), *coelos* (hollow) and *rhaphe* (seam) because the seed lacks the impressed raphe common to many coryphoid genera.

Arecastrum (áh ree kás trum) (n.) from the palm genus *Areca* and the Latin diminutive suffix *-astrum* which, according to Stearn (*Botanical Latin*, p. 305), "indicates inferiority or incomplete resemblance, hence often applied to the wild equivalent of a cultivated plant . . . ." Here the meaning might be taken as "[a palm] somewhat resembling *Areca*."

Arikuryroba (áh ree kóo ree róe ba) (f.) was derived from words of an indigenous Brazilian language, according to Barbosa Rodrigues, as follows: *arib*, meaning the long bunch or inflorescence, plus *kury*, the fruit commonly known as *coco* or nut, and *rob*, or sour, hence the sour fruit of a long inflorescence.

Arikury (áh ree kóo ree) is an abbreviation of and a synonym for *Arikuryroba*.

Calyptrocalyx (ka líp tro kále ix) (m.) was taken by Blume from the Latin *calyptra* (veil) and *calyx* (outer envelope of a flower) because the sepals of *Calyptrocalyx spicatus* include the inner parts of the flower in the form of a veil.

Carpentaria (cár pen táre ee a) (f.) comes from the Gulf of Carpentaria, northern Australia, where the only species of the genus was originally discovered at Escape Cliffs, not far from Darwin.

Ceratolobus (seh rát oh lów bus) (m.) combines the Greek *keras* (horn) and *lobos* (pod) because the conformation of the connate bracts or spathes were thought by Blume to resemble a horned pod or silique.

Cyrtostachys (sír toe stáy kiss) (f.), according to Blume, is derived from the Greek *cyrtos* (curved, but equated with the Latin incurvus, curved inward) and *stachys* (ear of grain, spike, and equated with the Latin *spica* meaning ear of grain, point, spear). Although *stachys* is masculine in Greek, it is accepted as feminine in botanical usage from custom sanctioned by the International Code of Botanical Nomenclature. The name appears to stem from the almost glumaceous texture of the male flower reminiscent of grain.

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