

PRINCIPES

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THE INTERNATIONAL PALM SOCIETY, INC.

THE INTERNATIONAL PALM SOCIETY

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PRINCIPES

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Hyphaene sp. in the Red Sea region of Saudi Arabia. Photo by Michael Otier. See pp. 24-26.

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Principes, 40(1), 1996, p. 3

Editorial

We are dedicating this first issue of 1996 to Lucita Wait and Melvin W. Sneed, two IPS members who made especially large contributions to IPS during its early years. Each of them did much to make the IPS the international society it is today. We editors were fortunate to have known both. You will find major articles and some short reminiscences about them in the issue. Lucita's name is inextricably linked to the Seed Bank while Mel's is linked with travel to far-off, palm destinations.

In this issue we include an article by Dick Endt on the problems of growing a palm from one of the remotest parts of the South Pacific—*Juania australis*. Related to the Andean wax palms *Ceroxylon*, *Juania* comprises a single species endemic to the Juan Fernandez Islands. The islands have a warm temperate, highly oceanic climate, and thus, if you live in New Zealand as does Dick Endt, there would seem to be a good chance that you could grow *Juania*. However, this palm seems to be notoriously difficult to grow, the only mature reproducing individuals known outside its native home occurring in mainland Chile. Dick's experiences should at least help other would-be growers of this rarity.

It is sometimes surprising to learn how little we know about major events in the lives of some of the most common and important palms. Despite the great importance of rattans for the cane trade, we know next to nothing about the pollination of most of the 370 odd species of *Calamus*. Anders Bøgh has studied four species of *Calamus* in detail in south Thailand and in his paper he summarizes the results of his pollination studies.

Tagua, vegetable ivory (in this instance *Phytelephas seemannii*) is, apparently, developing minor importance in Panama for the carving of curios for tourists. J. W. Dalling and his colleagues publish an account of this growing importance and discuss the sort of safeguards necessary if the harvesting is to be sustainable. One of their recommendations is for the cultivation of the palms for its seeds.

As usual there are regular news features, but also a photo feature article by Michael Otier on the beautiful *Hyphaene* palms of the Red Sea coast of Saudi Arabia. Speaking of desert palms, in the next issue we hope to run a most exciting account by those intrepid explorers, Martin Gibbons and Toby Spanner, on the rediscovery of *Medemia argun* in the deserts of Sudan.

We take this opportunity to wish you all a Happy 1996.

JOHN DRANSFIELD
NATALIE W. UHL

Principes, 40(1), 1996, pp. 3-4

Note from the President

Be sure and vote for your candidates of choice for the IPS Board of Directors for the 1996 to 2000 term. Remember, the deadline for voting is a postmark by February 28, 1996 and we are getting quite close. Members had indicated their desire for a choice of candidates. Sufficient nominations were made to achieve this in some geographical areas, but not in others. A few nominations were received after the ballots had already been sent to the printers and those persons will be considered for nomination in the next election. We consider it very important to maintain a geographical distribution on our board in line with the residences of our members. The ballot was so constructed.

Thanks to hard work by our editors, *Principes* has been essentially on schedule since the July 1995 issue. We will continue to work hard to get *Principes* mailed out during the "official" month of issue, at the latest. Effective immediately, we will also provide the option for overseas members to receive their copies of *Principes* by airmail for an optional extra fee, if they so desire.

In late October, the IPS Board of Directors met in Sarasota, Florida. Many items discussed and decided by the board will undoubtedly be of interest to all. I will recap the major issues below.

A comprehensive *Index to Principes* will be completed in 1996 and will be provided to all active IPS members as a "no-charge" supplement to *Principes*. Additional copies will be printed for sale to libraries, former members, and other interested parties. The size of the index will be consistent with the new format of the journal.

The IPS will copy previous *Principes* issues currently out-of-stock, ensuring that members can purchase any back issue of *Principes* ever published by the society. Some of these will be incorporated with existing stock to form 20 full sets of "all issues," with others retained loose for individual issue orders. These should be available in the first quarter of 1996.

The IPS Seed Bank will continue to function under much the same mechanism as before, except that Seed Bank Director Lynn Muir has been given authority to purchase palm seeds from commercial sources to supplement donations received from botanical gardens. Lyons Arboretum (HI), Fairchild Tropical Garden (FL), and The Montgomery Foundation (FL) continue to be the largest suppliers of donated seeds to the IPS Seed Bank.

The IPS received more requests for endowment fund projects than funds available. Endowment fund grants totaling \$7 000 were made. Three palm research projects were partially funded with \$2 100 grants each. These are led by Francisco Guanchez at Cornell University, Don Hodel at the University of California, and David Gorchov at Miami University of Ohio. Each of these three projects related to field studies in Latin America. The IPS funded the Sydney Branch, PACSOA, Chapter of the IPS, with US\$500 toward preparation of three interpretive signs to assist public education in palms in New South Wales, Australia. William Baker, a student in palms at the University of Reading in England, was granted \$200 toward travel expenses already incurred by him. **An additional grant of \$1 000 has been made from the IPS General Fund to the International Society for the Preservation of the Tropical Rainforest.**

IPS efforts on the InterNet continue. The IPS currently has IPS World Wide Web homepages (<http://www.palms.org>), palm newsgroups (<news://palms.org>), palm FTP facilities (<ftp://palms.org>), and several palm email listservers all up and running. Commercial advertising on the IPS WWW will soon be implemented. Several improvements are planned in each of these services over the next year.

Please send your comments and criticisms to me. All opinions are appreciated.

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1996 Biennial Meeting in California

Please make your plans for the 1996 Biennial Meeting of the IPS to be held at the Hyatt Newporter Hotel in Newport Beach, CA in August 1996. Official events will be held on August 3-9, with other related events before and after. Tentative tour sites are Huntington Gardens, Sherman Garden, Los Angeles Arboretum, Lotusland, and many private gardens.

The meetings in Southern California will be followed by post-biennial trips to Ecuador. The post-biennial trip to Ecuador will tentatively start on Saturday, August 10, and probably run ten days/nine nights. The post-biennial tour will be offered on an all inclusive basis (including round trip airfares from Los Angeles). More later as details are finalized.

Principes, 40(1), 1996, pp. 5-15

The Reproductive Phenology and Pollination Biology of Four *Calamus* (Arecaceae) Species in Thailand

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ABSTRACT

The phenology and the pollination biology of *Calamus longisetus*, *C. peregrinus*, *C. rudentum*, and *C. sp.* were investigated in southern Thailand. These species are dioecious. The pistillate inflorescences bear dyads each comprising a pistillate flower and a sterile staminate flower. The latter closely resemble functional staminate flowers. Staminate plants flower continuously for several months, whereas pistillate plants have much shorter flowering periods. Examination of the behavior and the pollen loads of captured insect floral visitors strongly suggests that the most important pollinating agents are *Trigona* bees. Wind pollination and apomixis are apparently not important. The pollinators appear to be attracted by scent, nectar, and pollen. The sterile staminate flowers of pistillate inflorescences probably attract pollinators by mimicking functional staminate flowers, as well as by producing nectar. Although the four species presented their flowers differently, there were no apparent differences with regard to their pollinating faunas.

Since Henderson's (1986) review of the literature on palm pollination, a substantial number of new case studies have been published. These studies have added much new information in many groups (e.g., Anderson et al. 1988, Borchsenius 1993, Búrques et al. 1987, Ervik 1993, Lista-barth 1992, Olesen and Balslev 1990, Scariot et al. 1991, Zona 1987). The genus *Calamus* (Calamoideae) with about 370 species is the largest genus in the palm family (Uhl and Dransfield 1987). Nevertheless the only published information about pollination biology in *Calamus* consists of a few notes scattered in the literature (e.g., Dransfield 1979, Kiew and Muid 1989). This is surprising considering the economic importance of the genus. The scandent stems extracted from a range of *Calamus* species constitute the raw material for the production of rattan furniture. The international rattan trade has an estimated value of almost \$3 billion annually (DeBeer and McDermott 1989).

This paper describes the phenology and the

pollination biology of four sympatric species of *Calamus* in southern Thailand: *C. longisetus* Griff., *C. peregrinus* Furt., *C. rudentum* Lour., and *C. sp.* (nov. sp. ined.).¹

Study Site

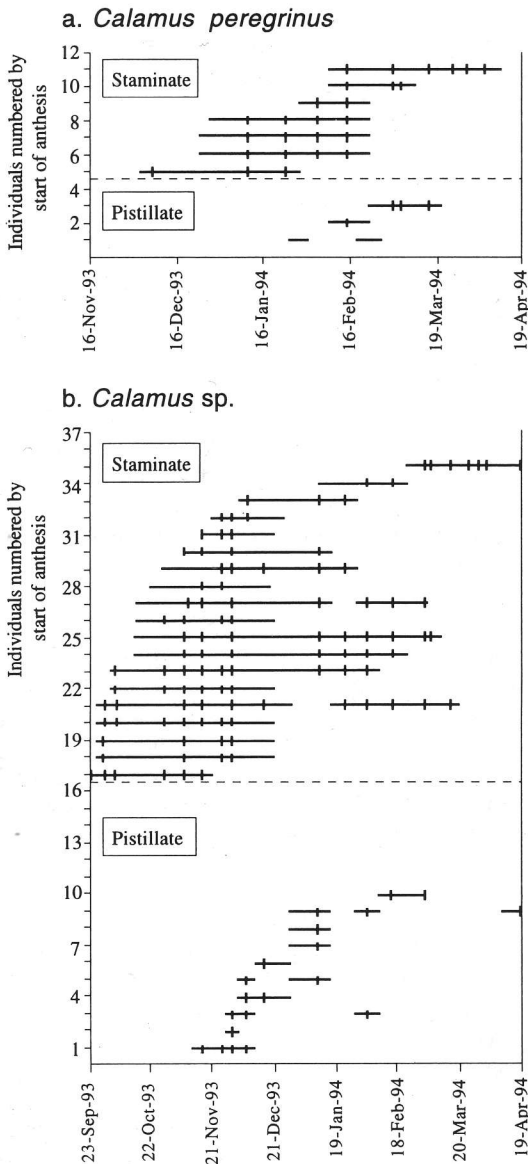
The field work was conducted in the Khao Chong National Park approximately 20 km east of Trang in southern Thailand. The *Calamus* populations studied were found at an altitude of 150–200 m, 2–4 km east of the national park headquarters (7°33.5'N; 99°46.6'E). The area is hilly and covered by mixed evergreen forest with many emergent Dipterocarps. The four species studied were the most common *Calamus* species in the area. At least four additional species occurred, but they were much less abundant than the species studied: *C. blumei* Becc., *C. javensis* Bl., *C. oxleyanus* Teysm. et Binn., *C. scipionum* Lour.

Meteorological data, recorded in 1985, 1987, 1989 (in part), 1990, 1991, 1992 and 1993, show a mean annual precipitation of 2,427 mm and temperatures ranging from 16.8 to 36.9° C with an overall average of 27.4° C. The rainfall varies from year to year but it is always somewhat seasonal with a relatively dry period in January and February and a wet season in May through December.

Methods

Observations were made from June 1993 through April 1994 in connection with a general

¹ This taxon has often been misidentified as *C. bousigonii* Becc. It will be described as a new species by Dr. John Dransfield, Royal Botanic Gardens, Kew.



1. Flowering periods of *Calamus* individuals. a: *C. peregrinus*. b: *C. sp.* The horizontal lines show the flowering periods. Where the exact date of a change in phenological stage is not known, the horizontal lines begin or end half way through the period in which the change took place. Vertical marks indicate dates when flowering was actually observed. Note the different time scales.

study of the demography of climbing species of Calamoid palms.

Descriptions of morphology and habit of the *Calamus* species are based on personal observations in southern Thailand and the following

voucher specimens (collection numbers are given in parentheses): *C. longisetus* (A. Bøgh 45179, A. Bøgh 45180), *C. peregrinus* (A. Bøgh 45183), *C. rudentum* (A. Bøgh 45213), *C. sp.* (A. Bøgh 45177). These collections are deposited at AAU, BKF, K, and PSU.

Within a one hectare study plot the phenological stages (i.e., not flowering, early bud, bud, flowering, flowering over) of all sexually mature individuals of *C. sp.* were recorded at intervals over a period of 7 months (Fig. 1a). Individuals were considered sexually mature when their stems were more than 1 m long, or when they had flowered before obtaining that length. Forty-three individuals matched these criteria. The gender of the non-flowering, mature individuals was determined by inspecting old inflorescences.

Twelve individuals of *C. peregrinus* with stem lengths of at least 4 m were kept under observation in a similar way for the 5 months duration of their flowering season (Fig. 1b).

The phenology of *C. longisetus* and *C. rudentum* was observed during the general field work.

In all four species a number (Table 2) of inflorescences were examined more closely. During anthesis these inflorescences were observed for 10–20 minutes, every second or third hour. These observations were made so that inflorescences of both sexes in all species were followed through at least a full day and night. The sequence of flower opening was studied by marking individual rachillae. The total numbers of flowers per inflorescence were counted, and rachillae of both sexes were collected and fixed in Navashin and/or alcohol for inspection in the laboratory. The glucose content of exudates from the flowers was detected by diabetics test strips ("Ketodiabur-test").

Detailed inspection of the inflorescences implied noting the presence and the behavior of visiting insects and the catch of specimens for identification and examination of pollen loads. The inflorescences of *C. sp.* were observed from the ground. In the other three species the inflorescences were observed from a ladder or by climbing adjacent trees. After scrutiny under a dissection microscope the captured insect specimens were rinsed for pollen. The resulting suspensions were transferred to microscope slides and checked for presence and/or purity of pollen loads. Some specimens were examined with a scanning electron microscope.

A number of rachillae of two pistillate inflorescences of *C. sp.* and three of *C. rudentum* were

Table 1. Some distinctive characters of the four species studied.

Character	<i>C. longisetus</i>	<i>C. peregrinus</i>	<i>C. rudentum</i>	<i>C. sp.</i>
Habit	clustering	solitary	clustering	solitary
Max. stem length (m)	50	60	100	10
Vertical height (m)	15	10-15	15	5
Inflor. length (m)*	12	9	14	1
Part. inflor. length (cm)	100	50	200	15
Color of tepals	yellowish green	purplish in ♀	yellowish green	green
Diam. of pollen grains (μ)	ca. 27	32-33	26-29	40-50
No. dyads per ♀ inflor.	800	1,000	108-2,622	50-100
No. flowers per ♂ inflor.	5,000	12,000	50,000	500-1,200

* These measures include the terminal flagella.

bagged during anthesis using a nylon net with a mesh size of 0.5 mm. The bags were removed after anthesis and several months later the fruit set was registered. To eliminate any possible effect of inherent variation in fruit set, a different part of each inflorescence was bagged.

A strip of transparent adhesive tape was suspended for approximately 24 hours near a pistillate inflorescence of each of the species, *C. sp.*, *C. longisetus*, and *C. rudentum*. At least 3 cm² of each strip was inspected under microscope to reveal windborne pollen deposited on it.

Results

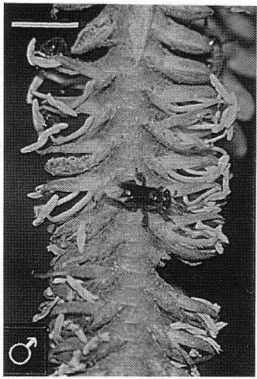
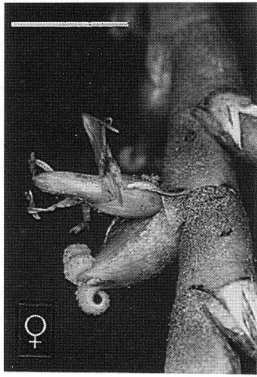
Description of the Calamus species. The genus *Calamus* belongs to the subtribe Calaminae of the palm subfamily Calamoideae. It is distributed in Southeast Asia, where it is a conspicuous element in most forests. A single species occurs in Africa. The majority of *Calamus* species are climbers. Some have a solitary unbranched stem whereas others are clustered. All species are dioecious and pleoanthic with axillary inflorescences (Uhl and Dransfield 1987). The inflorescences of the species studied here have up to six first-order branches

(partial inflorescences) distributed along the main axis, which terminates in a long whiplike climbing organ armed with hooklike spines (flagellum). The vertical position of the inflorescences depends on the height of the flowering stem and on where the flagellum is anchored. An individual stem produces up to 4 inflorescences in a flowering season. The rachillae of pistillate inflorescences bear flowers in dyads which consist of a pistillate flower and a sterile staminate flower. In the staminate inflorescences the flowers are solitary and distichously arranged along the rachillae. During anthesis the three stigmatic lobes in the pistillate flowers gradually bend, whereby the receptive surfaces become exposed. The staminate flowers have six widely exposed anthers. In the species studied the pollen grains are spherical, clavate to reticulate, and moderately sticky. The sterile staminate flowers in pistillate inflorescences are similar to the functional staminate flowers, but have empty anthers.

Calamus longisetus (Fig. 2a) is a large clustering rattan. It is common in gaps in primary forest, but it also occurs in disturbed habitats along roadsides and in secondary forest. The stems which may reach 50 m in length often climb to more than 15 m above the ground. The inflorescences may reach a length of 12 m including the terminal

Table 2. Numbers of inflorescences on which detailed observations were made. The phenology is described in the text, the captured insect taxa are listed in Table 3, and the number of flowers or dyads per inflorescence are given in Table 1.

Type of Observation	<i>C. longisetus</i>		<i>C. peregrinus</i>		<i>C. rudentum</i>		<i>C. sp.</i>	
	♀	♂	♀	♂	♀	♂	♀	♂
Phenology during anthesis, and insect visitors	1	1	1	1	2	1	4	3
Total number of dyads (♀) or flowers (♂) pr. inflor.	1	estimated	1	estimated	4	estimated	6	2



flagellum. The up to 1 m long partial inflorescences which are lax and pendulous are evenly distributed along the basal three-quarters of the rachis. Inflorescences that are not attached to the surrounding vegetation by the terminal flagellum may bear flowers from ground level to the height of the tallest stems. Each pistillate inflorescence typically bears 800 rather large dyads and staminate inflorescences bear 5,000 flowers. In both sexes the tepals are yellowish green. The pollen grains are ca. 27 μ in diameter. In 1993–94, the flowering season peaked in December and January.

Calamus peregrinus (Fig. 2b) is a large solitary rattan that grows on slopes in undisturbed rain forest, where it prefers small canopy gaps. The stems climb to a vertical height of 10 to 15 m, and may attain a length of up to 60 m. The inflorescences are up to 9 m long. The flowers are densely clustered on the stiff partial inflorescences which are crowded at the base of the rachis. Thus, the vertical position of the flowers depends on the position of the stem apex. The tepals are purplish in pistillate flowers. On staminate flowers they are green. One-thousand dyads and 12,000 flowers are typical for pistillate and staminate inflorescences, respectively. The pollen grains are 32–33 μ in diameter. During anthesis the staminate inflorescences present hundreds or thousands of flowers daily. Staminate individuals flowered for up to two and a half months, whereas the anthesis of the pistillate plants only lasted for two to four weeks. The flowering season of staminate plants lasted from late November to mid April. Pistillate anthesis began in late January. The season peaked in the second half of February for both sexes (Fig. 1a). The study plot contained 4 mature pistillate individuals and 8 staminate individuals. One individual of each sex did not flower in 1993–94.

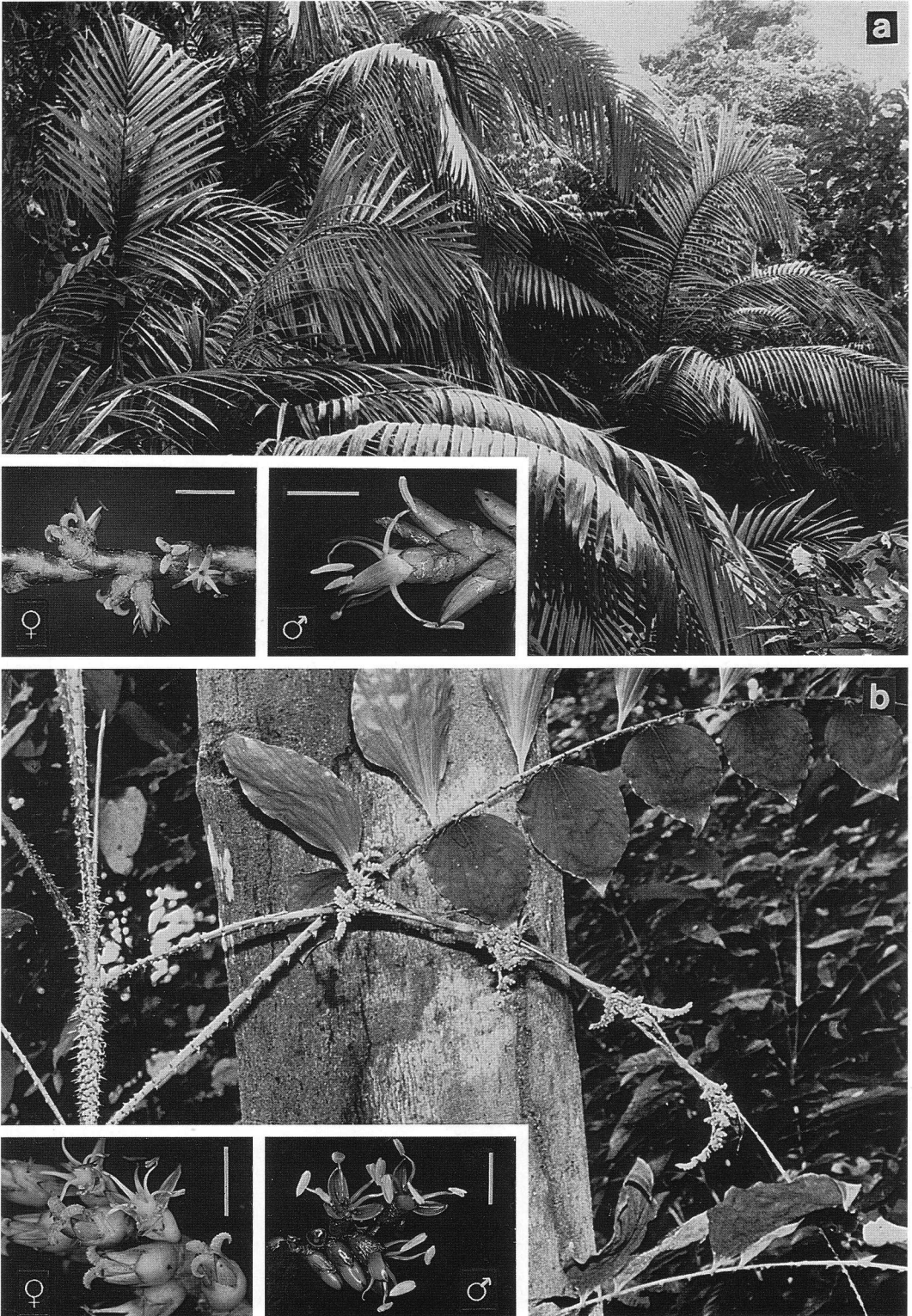
Calamus rudentum (Fig. 3a) is a large clustering rattan that grows in primary rain forest. The climbing stems are up to 100 m long and climb to about 15 m above the ground. The inflorescences are up to 14 m long. The partial inflorescences are regularly distributed along the basal three-quarters of the rachis. They are lax, pendulous, and up to 2 m long. Pistillate inflorescences have between 108 and 2,622 dyads. Large staminate inflorescences may have 100,000 flowers,

but half this number is probably more typical. In both sexes the tepals are dull yellowish green. As in *C. longisetus* the flowers may be borne at all vertical heights. The pollen grains are smaller than in the other species studied (26–29 μ in diameter). The flowering of a pistillate inflorescence lasts a few days. Staminate inflorescences may open up to one-third of the flowers in one day, but a few hundred is more common. When the study site was visited for the first time in late June 1993, a few individuals of both sexes were already flowering. The flowering season peaked in July and it was over by the end of August.

Calamus sp. (Fig. 3b) is a small solitary rattan which grows in the understory of primary rain forest. Its stems reach a maximum length of about 10 m, but it rarely climbs to more than 5 m above the ground. The inflorescences are up to 1 m long. The short and stiff partial inflorescences are concentrated in the proximal half of the rachis. The flowers are small, relative to the other species studied, and they are closely aggregated on the partial inflorescences. Thus, the vertical position of the flowers is determined by the position of the stem apex. The tepals have an inconspicuous pale green color. The pollen grains are larger than in the other species studied (40–50 μ in diameter). Pistillate inflorescences typically bear between 50 and 100 dyads, whereas staminate inflorescences bear between 500 and 1,200 flowers. In pistillate plants short flowering periods often alternate with longer periods without flowering. In 1993, the pistillate plants began flowering in mid November. The flowering peaked in early January, when 25% of the pistillate plants were at anthesis (Fig. 1b). Staminate inflorescences present less than 50 flowers daily. Staminate individuals with several inflorescences may flower continuously for up to five months, occasionally with short lapses without open flowers in between anthesis of two inflorescences. The first staminate plants began flowering in mid September, and their number increased until a maximum of 76% of the individuals were in anthesis from mid November to mid December. Thereafter flowering decreased and by early April only a single individual remained in flower. The study plot contained 16 mature pistillate individuals and 20 staminate individuals (Fig. 1b). Ten of the 16

←

2. Habits of the *Calamus* species studied with insets of pistillate and staminate flowers. a: *C. longisetus*. Scale bar on insets 10 mm. Note *Trigona* bee on staminate rachilla. b: *C. peregrinus*. Scale bar on insets 5 mm.



pistillate individuals flowered in 1993–94 whereas all but two of the staminate individuals flowered.

Some of the distinctive characters described above are summarized in Table 1.

Phenology. The phenological development around the time of anthesis follows largely the same pattern in the four species studied. Thus, the following description applies to all four species. The first indication of flowering is an inflation of the peduncular bracts which sheath the basal part of the rachis. Until then the inflorescences closely resemble the flagella. One or two months later the bracts split and the flower bearing parts are exposed. The first flowers open a month after exposure.

On staminate inflorescences the distal flowers on the proximal partial inflorescences generally open first. No sequence of flowering is evident as anthesis progresses. The anthesis of the individual flowers begins in the period from 10:00 PM to about 6:30 AM, but a few additional flowers may open until about 10:00 AM. When a staminate flower opens, it exudes droplets of nectar (glucose containing liquid) at the base. At dawn, the inflorescences emit a strong sweet, gardenia-like scent. This scent is conspicuous throughout the day, but it diminishes greatly at dusk. By noon, most anthers are empty, and the flowers are shed before sunset at 6:30 PM.

Pistillate anthesis is initiated by a recurving of the stigmatic lobes. After 48 hours, the tips of the lobes point towards the base of the flowers (Figs. 2 and 3, insets). At this stage, the adjacent sterile staminate flower opens and exudes nectar. This almost invariably occurs between sunset and sunrise, peaking around midnight. Apparently the pistillate flowers do not produce nectar. The stigmatic surfaces remain white and appear receptive until about noon. During the afternoon they gradually turn brown. Pistillate inflorescences produce a strong scent similar to that of staminate inflorescences. As in staminate inflorescences the scent is very faint during the night, and becomes intense again the following day. On a single pistillate rachilla all the flowering usually occurs within 48 hours, and the anthesis of a whole inflorescence rarely lasts more than a week.

The individual species differ from the general description given above in some aspects. *C. longisetus*: The anthesis of a whole pistillate inflorescence is simultaneous, and the scent production begins already on the day prior to the opening of the sterile staminate flowers. In both sexes the scent produced by this species is stronger than in the other three species studied. *C. peregrinus*: The stigmas are receptive somewhat longer than in the other species, and the sterile staminate flowers remain attached until between dusk and midnight. *C. rudentum*: The filaments are relatively long, and the antesealous stamens bend so far back that they almost contact the rachilla (Fig. 3f). The scent produced by this species is similar but much less conspicuous than in *C. longisetus* and *C. peregrinus*. *C. sp.*: This species follows the general description except for the fact that neither sex produced a detectable scent.

Pollination. In all four *Calamus* species studied, the inflorescences of both sexes were visited by worker ants (Hymenoptera, Formicidae) during the night. At night, immature crickets (Orthoptera, Gryllidae), cockroaches (Dictyoptera, Blattaria), and a few spiders (Araneida) were also observed, but none of these were abundant. At sunrise the insect activity increased markedly as bees (Hymenoptera, *Trigona*, and *Apis*), wasps (Hymenoptera, Vespidae) and a diverse range of fly species (Diptera) arrived at the inflorescences. These taxa clearly dominated the visiting insect faunas (Table 3). Later in the day, Hymenopterans became rarer, whereas various flies were present until sunset.

Wasps usually paid such short (few seconds) visits that it was impossible to establish what they were doing. Bees usually crawled about on the inflorescence for several minutes before they left. In staminate flowers *Trigona* bees actively collected pollen. On pistillate inflorescences they spent most of their time consuming nectar, but they also tried to collect pollen from the anthers of the sterile staminate flowers. The *Trigona* bees often touched the stigmatic surfaces with their legs and undersides as they moved around. Most of the observed flies were small (0.5 to 2 mm long). They were found everywhere on the inflorescences. Larger

←

Table 3. *Insect visitors to Calamus inflorescences.*

	<i>C. longisetus</i>		<i>C. peregrinus</i>		<i>C. rudentum</i>		<i>C. sp.</i>	
	♀	♂	♀	♂	♀	♂	♀	♂
Coleoptera sp.			—					
Diptera								
Calliphoridae sp.						—		
Chloropidae						—		
Drosophilidae sp. 1			—			—		—
Drosophilidae sp. 2						—		
Drosophilidae sp. 3					—			
Drosophilidae sp. 4						—		
Drosophilidae sp. 5	—			—		—		
Lauxaniidae sp.					—			—
Milichiidae sp.	—			—		—		
Phoridae sp.								—
Platystomatidae sp.			—			—		
Syrphidae sp.								x
Hymenoptera								
Apidae, <i>Apis</i> sp. 1						x		
Apidae, <i>Apis</i> sp. 2						x		
Braconidae, Agathidinae sp.				x				
Formicidae sp. 1								x
Formicidae sp. 2								—
Formicidae sp. 3								x
Formicidae sp. 4						x		
Pteromalidae sp.				—				
Trigonidae, <i>Trigona</i> sp. 1			—		—	x	—	x
Trigonidae, <i>Trigona</i> sp. 2							—	
Trigonidae, <i>Trigona</i> sp. 3		x				x		
Trigonidae, <i>Trigona</i> sp. 4						x		
Trigonidae, <i>Trigona</i> sp. 5						x		
Trigonidae, <i>Trigona</i> sp. 6						x		
Trigonidae, <i>Trigona</i> sp. 7			x			x		
Trigonidae, <i>Trigona</i> sp. 8	x	x		x		x		
Trigonidae, <i>Trigona</i> sp. 9						x		
Vespidae sp. 1						x		
Vespidae sp. 2			—	—		—		—
Vespidae sp. 3								—
Vespidae sp. 4			—					
Orthoptera								
Gryllidae sp.								—
Psocoptera sp.						—		

—: Specimen(s) caught.

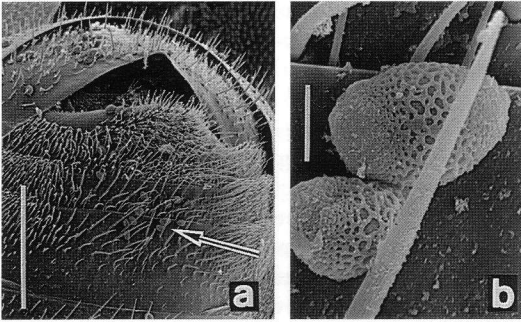
x: Specimen(s) carrying *Calamus* pollen caught.

flies that sucked nectar from the base of the flowers were seen occasionally. Nocturnal cricket nymphs chewed anthers or stigmas, whereas ants consumed the newly released nectar.

The bees carried more pollen than any of the other insects captured (Table 3). Besides the loads that were kept in the corbiculae, pollen often stuck to the hairs on other parts of the body (Fig. 4). The wasps rarely carried pollen loads. A few grains were found on a single specimen of Vespidae sp.

1. Ants occasionally carry a few pollen grains. Flies were omnipresent, but apart from Syrphidae sp., which was only observed once, none of the 29 examined specimens carried any pollen load.

In all four *Calamus* species staminate inflorescences clearly attracted more insects than pistillate inflorescences. In *C. sp.* the highest observed frequency of visiting insects was one bee or wasp every 10 minutes on pistillate inflorescences, whereas often 20 Hymenopterans were present in



4. A *Trigona* bee caught while it was collecting pollen on a staminate inflorescence of *C. sp.* The same species was also found on pistillate inflorescences. a: The underside of the abdomen with deposited pollen. Arrow indicates the position of the pollen magnified in b. Scale bar 500 μ . b: Magnified section showing pollen from *C. sp.* Scale bar 10 μ .

staminate inflorescences at a time. In *C. peregrinus* a similar difference between the sexes was observed. In *C. rudentum* the frequency of insect visits to staminate inflorescences depends on the number of flowers in anthesis on a given day. Thus, several hundred insects were constantly swarming around a large inflorescence, which had opened about one-third of the flowers. Pistillate inflorescences were visited by just one bee every 5-minutes. *C. longisetus* seemed aberrant since pistillate inflorescences were visited almost as frequently as staminate inflorescences and since a single species of *Trigona* totally dominated among the visiting insects.

Fruit sets were much lower on those parts of the inflorescences of *C. sp.* and *C. rudentum* that had been bagged during anthesis, compared with the remaining parts of the same inflorescences (Table 4). These results are statistically highly significant except for one *C. rudentum* inflorescence where very few fruits developed even on the unbagged rachillae.

No pollen grains resembling those of the four *Calamus* species were found on the pieces of adhesive tape suspended near pistillate inflorescences.

Discussion and Conclusion

The morphology of *Calamus* inflorescences gives no obvious indication about their pollination mode. The exposed stigmas and anthers are easily accessible to any potential insect visitor and even to the wind. However, the four species studied here suggest an entomophilous pollination syndrome, where bees play the most important role.

When bees (*Apis* and *Trigona*) collect pollen, numerous grains stick to their densely hairy bodies. Several of the *Trigona* species found on staminate inflorescences were also captured on the pistillate inflorescences, where some of them actually carried conspecific pollen grains. On pistillate rachillae the bees are constantly in contact with the stigmas, and thereby can transfer pollen to the receptive surfaces. Thus, bees, especially *Trigona*, are probably important pollinators.

Contrary to bees, wasps are probably not important pollinators. Their behavior renders a transfer of pollen much less likely. The ants, and the majority of the other nocturnal visitors, are incapable of flying. Therefore, it is unlikely that they transfer pollen between plants that are spatially well separated. Dipterans were also common on the inflorescences, and although their activities did bring them into contact with anthers and stigmas, the pollen did not stick to them. A single Syrphid fly did carry a few pollen grains but this family was seen too rarely to be of any importance.

Considering the sticky pollen and the absence of *Calamus* pollen on the suspended tape strips, wind pollination does not seem to occur. Neither does apomixis. A few fruits did set on the bagged rachillae, but the explanation is probably that insects active on the exterior of the bags deposited

Table 4. Results of bagging experiments.

	No. Bagged Flowers	Fruit Set	No. Free Flowers	Fruit Set	χ^2	P
<i>C. rudentum</i>						
inflor. 1	125	0%	164	70%	145.5	≤ 0.0001
inflor. 2	44	0%	136	7%	3.1	0.08
inflor. 3	45	0%	63	49%	31.1	< 0.0001
<i>C. sp.</i>						
inflor. 1	38	5%	54	46%	18.1	≤ 0.0001
inflor. 2	13	0%	16	94%	25.2	≤ 0.0001

pollen on stigmas that were in contact with the nylon net.

The conclusion, from the experiments described above, is that the bees are the only important pollinators. A number of indirect indications point to this conclusion as well. Apart from the lack of conspicuously colored tepals (except in *C. peregrinus*) and the fact that dioecious plants per se cannot be protandrous, the observations of morphology and phenology conform very well with Henderson's (1986) description of the bee pollination syndrome in palms. Staminate inflorescences attract insects by emitting scent and by offering pollen and nectar rewards. The anthers, jutting in all directions, deposit pollen on any insect, of a suitable size, that crawls around on the rachillae. Attraction to pistillate inflorescences seems to operate on a combination of scent, nectar rewards, and deceit. The sterile staminate flowers resemble the functional staminate flowers so closely that the bees are tricked into trying to collect pollen from them. The function of these flowers is, therefore, probably to mimic the functional staminate flowers, as well as to produce nectar. When an insect consumes nectar or tries to collect pollen from a sterile staminate flower it will almost inevitably touch the stigma of the adjacent pistillate flower. The importance of the nectar produced by the sterile staminate flowers depends on whether they are the only nectar sources in pistillate inflorescences. The apparent absence of nectar production in the pistillate flowers might be confirmed through anatomical studies. No such studies were performed.

The staminate plants have long and continuous flowering periods. Contrary to this, pistillate flowers are rare in time and numbers. Under these circumstances, the chances are relatively high that a floral visitor will have visited a staminate inflorescence of the same species before it arrives at a pistillate flower. A similar sexual difference in flowering periods has also been observed in connection with bee pollination elsewhere in the palm family (Bullock 1981, Henderson 1985).

In palms that are pollinated by bees and other diurnal insects the flowers often open from dawn to about noon (Henderson 1985, Bullock 1981, Olesen and Balslev 1990, Zona 1987). That the staminate flowers of the *Calamus* species studied open and release nectar well before dawn is puzzling. This exposes them to theft and damage by nocturnal insects. The exact time of stigma receptivity is another point in need of further investi-

gation. It is difficult to understand why the stigmas should be receptive before the opening of the sterile staminate flowers.

So far, this discussion has dealt with features common to the species studied. Noteworthy differences do exist, however (Table 1). *C. rudentum* flowers are borne on widely spaced, long, pendulous partial inflorescences, whereas those of *C. peregrinus* are crowded near the stem apex. *C. longisetus* inflorescences structurally resemble those of *C. rudentum*, whereas those of *C. sp.* are much smaller and usually borne much nearer to the ground than in any of the other species. Equally conspicuous differences exist in, e.g., the size of the individual flowers, the number of staminate flowers presented each day, the size of the pollen grains, and the presence or intensity of scent.

These differences do not have a pronounced effect on the pollinating faunas. They are dominated by *Trigona* species in all cases. The four *Calamus* species are the most common palms in the study area. Therefore, their sequential flowering seasons (*C. rudentum* peaks in July, *C. sp.* in November–December, *C. longisetus* in December–January, *C. peregrinus* in February), may have evolved in response to competition for common pollinators. However, until more is known about the behavior of the pollinators and the spectrum of food sources they utilize, this remains highly speculative. It is possible that the different *Trigona* species prefer different species of *Calamus*, but such preferences are apparently not exclusive. The dominance of a single species of *Trigona* among the floral visitors to *C. longisetus* may reflect the preference of the bees, or it may be the result of the proximity of a nest of that species. At present, no clue can be given to a link between the pollinators and the morphological and phenological variation in *Calamus* flower presentation.

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LITERATURE CITED

- ANDERSON, A. B., W. L. OVERAL, AND A. HENDERSON. 1988. Pollination ecology of a forest-dominant palm (*Orbignya phalerata* Mart.) in northern Brazil. *Biotropica* 20: 192-205.
- BORCHSENIUS, F. 1993. Flowering biology and insect visitation of three Ecuadorean *Aiphanes* species. *Principes* 37: 139-150.
- BULLOCK, S. H. 1981. Notes on the phenology of inflorescences and pollination of some rain forest palms in Costa Rica. *Principes* 25: 101-105.
- BÚRQUES, A., J. K. SARUKHÁN, AND A. L. PEDROZA. 1987. Floral biology of a primary rain forest palm, *Astrocaryum mexicanum* Liebm. *Bot. J. Linn. Soc.* 94: 407-419.
- DEBEER, J. AND M. McDERMOTT. 1989. The economic value of non-timber forest products in Southeast Asia. Netherlands Committee IUCN, Amsterdam.
- DRANSFIELD, J. 1979. A manual of the rattans of the Malay Peninsula. *Malayan Forest Records* 29.
- ERVIK, F. 1993. Notes on the phenology and pollination of the dioecious palms *Mauritia flexuosa* and *Aphandra natalia* in Ecuador. In: W. Barthlott, C. M. Naumann, K. Schmidt-Loske, and K.-L. Schuchmann (eds.). *Animal-plant interaction in tropical environments*. Zool. Forschungsinst. und Museum Alexander Koenig, Bonn.
- HENDERSON, A. 1985. Pollination of *Socratea exorrhiza* and *Iriartea ventricosa*. *Principes* 29: 64-71.
- . 1986. A review of pollination studies in the Palmae. *Botanical Review* 52: 221-259.
- KIEW, B. AND M. MUID. 1989. Bees and palms in Peninsular Malaysia. *Principes* 33: 74-77.
- LISTABARTH, C. 1992. A survey of pollination strategies in Bactridinae (Palmae). *Bull. Inst. Fr. Études Andines* 21: 699-714.
- OLESEN, J. M. AND H. BALSLEV. 1990. Flower biology and pollinators of the Amazonian monoecious palm, *Geonoma macrostachys*: A case of Bakerian mimicry. *Principes* 34: 181-190.
- SCARIOT, A. O., E. LLERAS, AND J. D. HAY. 1991. Reproductive biology of the palm *Acerocoma aculeata* in central Brazil. *Biotropica* 23(1): 12-22.
- UHL, N. W. AND J. DRANSFIELD. 1987. *Genera Palmarum*. Allen Press Inc., Lawrence, USA.
- ZONA, S. 1987. Phenology and pollination biology of *Sabal etonia* (Palmae) in Southeastern Florida. *Principes* 31: 177-182.

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Natural History and Uses of Tagua (*Phytelephas seemannii*) in Panamá

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Seeds of palms from the subfamily Phytelephantoideae were among the principal forest products of northwestern South America and Panamá at the turn of the century. These seeds, known as "tagua" in Latin America, were of comparable importance to cacao, rubber, cinchona, and balsa as export commodities (Acosta Solís 1944; Barfod 1989; Barfod 1991b; Bernal 1992). From the mid-19th century to the early 20th century, tagua was primarily used as a raw material in the manufacture of buttons. Following World War II, tagua, or "vegetable ivory" as it was known in the United States, was replaced by synthetic materials and its exploitation was greatly diminished in Ecuador and Colombia, and extraction essentially ceased in Panamá (Acosta Solís 1944; Barfod 1989, 1991b).

The economic importance of South American and Panamanian tagua is again on the rise. In South America, the increase is largely due to demand from foreign clothing manufacturers, although some Ecuadoran and Colombian tagua is carved into figurines, chessmen, and keyrings (Barfod et al. 1990). In contrast, all Panamanian tagua is carved into figurines and jewelry for sale to tourists within Panamá. This domestic market has developed rapidly during the last 10 years.

In this paper we briefly describe the natural history, distribution, and uses of Panamá's tagua palm, *Phytelephas seemannii*, in Panamá. We wish to highlight differences between the tagua-producing palm of Panamá, *P. seemannii*, and the main tagua species of Ecuador, *P. aequatorialis*. Anders Barfod and colleagues (Barfod 1989, 1991b; Barfod et al. 1990; Borgtoft Pedersen 1993) have written excellent overviews on the history and current status of tagua use in South America, especially Ecuador. We wish to compare and contrast the biology and uses of *P. seemannii* in Panamá with the Ecuadoran endemic *P. aequa-*

torialis. We also wish to emphasize the current lack of demographic data from which to make sound sustainable management decisions for the harvest of wild tagua in Panamá. It is unknown to what extent many demographic and life-history parameters can be extrapolated from the better studied *P. aequatorialis*. Finally, we address the status of *P. seemannii* within the Darién National Park and the future prospects of tagua as a non-timber forest product in Panamá.

Natural History

Although several species of phytelephantoid palm are utilized in Panamá and South America, the only species found in Panamá is *Phytelephas seemannii*, where two subspecies are recognized (Barfod 1991a). All phytelephantoid palms are dioecious (Barfod 1991a). Little is known of the pollination biology of this group of palms, although cantharophily has been suggested to be important (Henderson 1986; Barfod et al. 1987; Ervik 1993).

P. seemannii can be reproductive in sub-caulescent form, and as a fully mature tree has a trunk generally less than 1 m in height (Fig. 1), although Barfod (1991a) reports that some may attain trunk heights of 4 m. In contrast, Barfod et al. (1990) report that *P. aequatorialis* (formerly referred to as *Palandra aequatorialis*) can attain a height of 15 m. During the peak pre-WWII exploitation of tagua, many *P. aequatorialis* individuals in Ecuador were cut down in order to harvest their mature seeds (Acosta Solís 1944). Since trunks of *P. seemannii* generally do not reach >2 m in height, the palm is never sacrificed in order to collect seeds. Julie Velásquez (pers. comm.) informs us that *P. aequatorialis* is also currently not harvested by felling.



1. *Phytelephas seemannii* growing along a stream near the Cerro Pirre station of the Darién National Park, Panamá. Photo by Kyle E. Harms.

Fruits of *P. seemannii* are found in large club-shaped infructescences borne on interfoliar stalks that project from between the leaf bases and are usually less than 0.5 m above the ground (Fig. 2). The coarsely-spined infructescences consist of several fruits, each of which contains an average of 5 seeds. A single infructescence can contain up to 8 fruits and, therefore, 40 seeds. In the Darién, we found palms with over a dozen infructescences developing simultaneously. Individuals of *P. aequatorialis* may have >40 infructescences at any one time (Julie Velásquez, pers. comm.). Seeds of both *P. seemannii* and *P. aequatorialis* are initially protected from seed-predators by the thick (ca. 1 cm), fibrous fruit wall.

During early development, seeds contain a liquid endosperm similar to coconut. As the seeds ripen, the endosperm progressively hardens, until at full seed maturation the fruit wall softens and eventually disintegrates. At this point the seeds become accessible to foraging rodents, since the infructescences are near the ground, or seeds simply spill onto the ground. Members of Wounaan

and Embera villages in the Darién told us that squirrels and agoutis have been seen feeding on the fleshy inner mesocarp surrounding the endocarp, but are unable to consume the rock-hard endosperm.

Unlike other large-seeded palms in Panamá, *P. seemannii* appears to be impenetrable to native insect pests. Seeds of two large-seeded, often co-occurring palms, *Scheelea zonensis* and *Astrocaryum standleyanum*, are routinely infested by larvae of beetles from the family Bruchidae (Wright 1983, 1990; Smythe 1989). We have been unable to locate reports—even anecdotal reports—of insect damage specifically to seeds of *P. seemannii*. However, given the limited quantity of published information on the natural history and ecology of *P. seemannii* we cannot rule out the possibility that *P. seemannii* is host to insect pests. Acosta Solís (1944) reported that the larvae of a coleopteran attack seeds of *P. aequatorialis*. Bright (1981) reported that *Coccotrypes dactyliperda* (Scolytidae) has been collected from seeds of a species of *Phytelephas*, although this scolytid is



2. Inflorescence from *Phytelephas seemannii* growing along the same stream as in Fig. 1. Photo by Kyle E. Harms.

an insect introduced to the Americas with date palms (Wood 1982). Johnson et al. (1995) report a collection of a bruchid beetle (Bruchidae) from seeds of a species of *Phytelephas*. The previous two reports did not identify the palm to the species-level. Finally, Borgtoft-Pedersen (1993, 1995) reports that a bruchid beetle, *Caryoborus chiri-quensis*, is a serious seed-predator on *P. aequatorialis* in parts of that palm's range.

Given the apparent absence of insect seed pred-

ators, and the inability of rodents to consume the mature endosperm, *P. seemannii* seeds appear to be able to survive and germinate even beneath the crown of the maternal parent (see below and Table 1). Nonetheless, seeds have been observed to be dispersed by agoutis, *Dasyprocta punctata*, (N. Smythe, pers. comm.) and by paca, *Agouti paca* (Zona and Henderson 1989). Furthermore, seedlings can be found up to 20 m from the nearest adult (JWD, KEH, and JRE, unpublished data).

Table 1. Demographic data for *P. seemannii* along two, 10-m wide, 0.8-km long transects. Transect I follows the Río Perresénico upstream from Estación Pirre. Transect II follows the Cerro Pirre ridge trail, beginning c. 100 m up the trail, at the point where it joins the ridge crest. Seedling, Sapling, Trunked, and Trunkless categories are defined in the text. Under and Away refer to whether or not an individual seedling or sapling was found beneath or beyond, respectively, the crown of a trunked individual.

	Seedling Under	Sapling Under	Seedling Away	Sapling Away	Trunkless with fruit	Trunked with fruit	Trunkless w/o fruit	Trunked w/o fruit
Transect I	9	16	9	77	1	7	24	23
Transect II	0	1	0	27	0	0	10	3

Although seeds of *P. seemannii* do not float in water, moving water for riverine individuals, and gravity for individuals found on slopes are also likely agents of seed dispersal.

Distribution of *P. seemannii* in Panamá

P. seemannii appears to be widely distributed along the Atlantic coast of Panamá. It has been reported from Bocas del Toro, the Santa Rita Ridge (eastern side of the Panamá Canal), Kuna Yala and Darién Province (see Barfod 1991a for further information). Within its range in central Darién, however, *P. seemannii* appears to be restricted to sub-montane sites around the fringes of the cordillera, and is most abundant along stream margins and flood terraces. The absence of *P. seemannii* from the low-lying "bajos" of central Darién appears to be due to habitat requirements rather than historical over-exploitation. Barfod (1991a) also suggests that *P. seemannii* does not extend beyond 1,000 m in elevation.

P. seemannii is also found in the Chocó region of Colombia where it is currently under investigation by Rodrigo Bernal of La Universidad Nacional in Bogotá (pers. comm.).

Demographic Data for Estación Pirre, Darién

In July of 1994 we censused all *P. seemannii* within two, 10-m wide, 0.8-km long transects near the Estación Pirre at the edge of the Darién National Park. One transect was located along the flood terrace of the Río Perresénico, and the other transect ran along lower elevations of the ridge-top trail to Cerro Pirre. Individual palms were classified as seedlings (<0.5 m height), saplings (>0.5 m, but <2 m height), trunkless (>2 m height, but without a trunk), and trunked (>2 m with trunks). In the case of reproductive females, we recorded the number of infructescences and fruits per infructescence.

Demographic data for these populations is summarized in Table 1. A total of 166 individuals were found along the river transect, and 41 individuals within the ridge-top transect. Approximately one-third of the individuals were potentially reproductive (>2 m height); this apparently high proportion of reproductive individuals could indicate either low levels of recruitment and/or high survivorship of mature individuals, assuming a stable population. Of reproductive-sized individu-

als, 11% bore fruit, though we have no information on the proportion of female trees that were reproductive. No male trees were in flower at the time of the census. Nineteen percent of seedlings and saplings were found directly beneath the crown of adults (i.e., within 3 m of the base of the trunk).

Exploitation of *P. seemannii* in Panamá

Barfod (1991a) briefly described the uses of *P. seemannii* to be: seed exports of Panamá and Colombia before WWII and, currently, handicrafts from the hard endosperm from a few factories located in Colombia. The current uses of *P. seemannii* in Panamá are summarized below.

There are three principal uses of *P. seemannii* in Panamá: food, thatch, and seeds for carving. The liquid endosperm of the immature seeds is consumed as a beverage by Wounaan and Emberá peoples. Duke (1986) reports that, "the thin crust around the ivory is occasionally brought into the market in San Blas as a food." This "thin crust" is the inner mesocarp, which is also consumed from South American species of *Phytelephas* (Barfod 1991b). Leaves of *P. seemannii* are cut for roofing thatch by rural and indigenous (Wounaan and Emberá) Panamanians (Fig. 3). Mature seeds are carved primarily by Wounaan craftsmen. Carving of seeds ("tagua") appears to have developed recently in Panamá, and was stimulated by the suggestion of Dr. John Cubit while at the Smithsonian Tropical Research Institute (J. Cubit, pers. comm.; G. Membache, pers. comm.). Adoption of tagua as a carving material, primarily by the Wounaan, apparently is derived from a historic tradition of carving the wood of Balsa (*Ochroma spp.*), "Caoba" (Mahogany, *Swietenia macrophylla*), and "Cedro" (*Cedrela spp.*) (Torres de Araúz 1975), and more recently "Cocobolo" (Rosewood, a species of *Dalbergia*).

In August of 1994, we visited the Wounaan village of Vista Alegre, approximately one and a half hours by motorized "piragua" (dug-out canoe) upstream of El Real on the Río Tuira (Fig. 4). Within this community of 100 people, the income from agriculture, fishing, and hunting is supplemented by basket weaving and carving. In 1989 craftsmen switched from carving rosewood to predominantly carving tagua.

The village of Vista Alegre appears to lie outside the natural range of *P. seemannii*. Although the



3. *Phytelephas seemannii* from which leaves have been harvested for thatch; found just inside the boundary of the Darién National Park, Panamá. Photo by Kyle E. Harms.

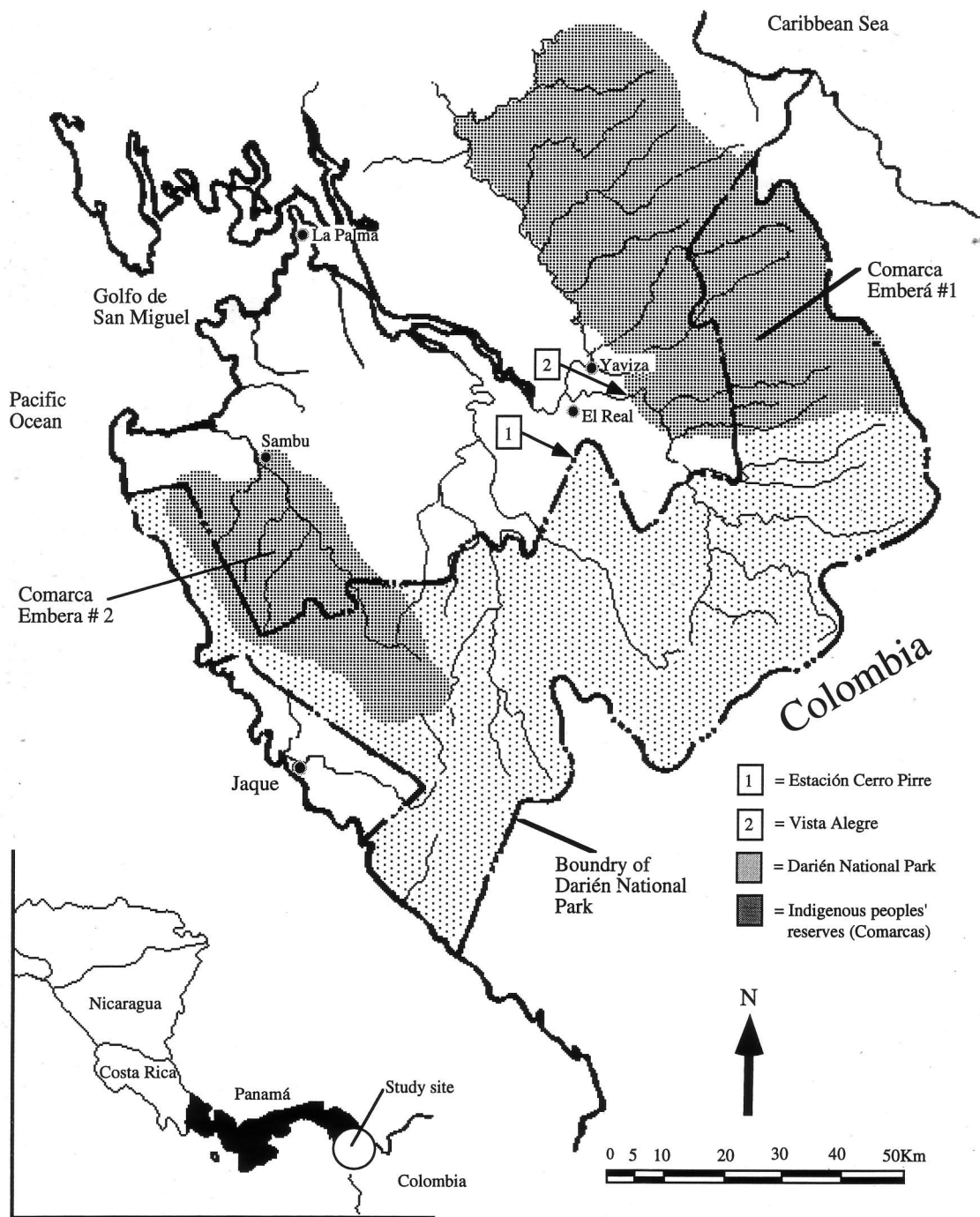
lands surrounding this community have now been converted to agriculture it was the impression of the older villagers that tagua had never grown in the immediate area. Instead, tagua is collected approximately 30 km away within the Darién National Park and within the cordillera of Cerro Pirre. Collection trips by villagers take five days and are made at intervals of approximately three months; each craftsman collects about 80 seeds per trip. There are currently six craftsmen and several apprentices carving tagua in Vista Alegre; the annual production of tagua carvings for this community is therefore approximately 2,000 finished pieces, each made from a single seed.

Tagua is generally carved into animal forms (Fig. 5), with each piece taking between one and three days to complete. The initial carving is made with scalpels and small chisels, and is subsequently smoothed using sandpaper and dentists' silicone powder. Seeds are often soaked in water prior to carving, which softens the endosperm. Some nuts are painted on or drawn on using India ink ("tinta

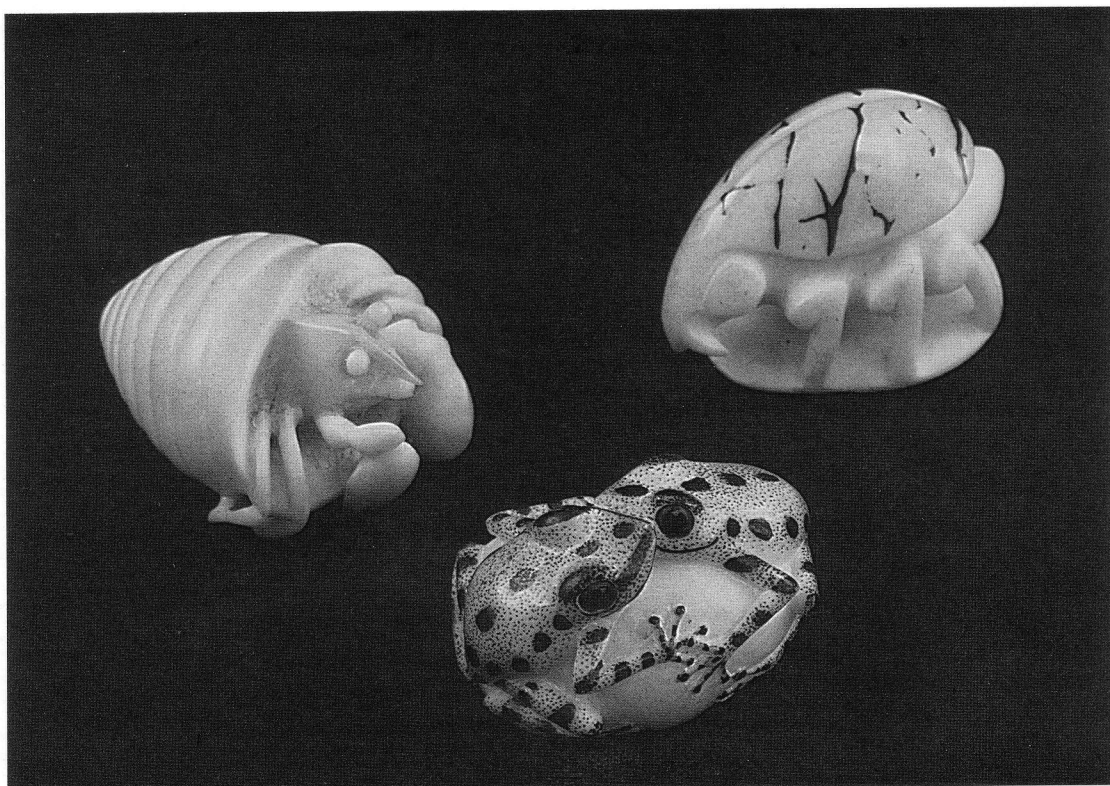
china"). Individual pieces of tagua carvings sell in Panamá City for between \$10 and \$40 U.S.

Future of *P. seemannii* exploitation in Panamá

One primary objective of this paper is to highlight the scarcity of information on the natural history, regeneration, and exploitation of *P. seemannii*, and its implications for the sustainable management of this species. As yet, no estimate exists for current tagua production in Panamá; however, at any one time approximately 1,000–2,000 pieces are on sale in Panamá City; an additional, unknown number may be directly exported from Panamá. The sustainability of tagua exploitation in Panamá is a matter of concern for several reasons. First, *P. seemannii* appears to have a restricted range within the Darién, and many communities in that part of the country are dependent on seeds extracted from populations within the Darién National Park. Second, tagua



4. Map of the Darién, Panamá.



5. Figures carved from tagua. Photo by Marcos A. Guerra.

nuts of the related species, *P. aequatorialis*, take between four and seven years to mature (Borgtoft Pedersen 1993). It seems unlikely that seed maturation times for *P. seemannii* would be much different, and actual per annum fruit production from the population we investigated would therefore be quite low. Finally, if the market for carved tagua continues to increase, e.g., as Barfod et al. (1990) predicted for Ecuadorian tagua, the pressure on existing exploited *P. seemannii* populations will increase.

At present, populations of *P. seemannii* that we have observed at the edge of the Darién National Park do not appear to be suffering from over-exploitation (seedlings were abundant, and mature seeds were found scattered around several trees); this may in part be due to a responsible ethic by the tagua craftsmen towards their resource, and in part due to the short number of years during which tagua has been carved in Panamá.

P. seemannii is not yet cultivated or actively managed in Panamá, in contrast to the Ecuador situation, where *P. aequatorialis* once was, and may be still, found as part of small-scale agrofore-

stry plots (Barfod et al. 1990). *Aphandra natalia* (also a phytelephantoid palm) has been planted successfully in plantations in Ecuador (Barfod 1991b). The time is ripe for agroforestry projects in the Darién to incorporate *P. seemannii*.

At this stage we strongly advocate detailed, long-term field studies of the production and demographic parameters of *P. seemannii* (e.g., population densities, growth rates, sex-ratios, seed maturation times, and duration of seed dormancy¹). Such work will complement recent investigations by R. Bernal on *P. seemannii* in Colombia. These studies will also be of value in allowing comparisons to be made with *P. aequatorialis* in Ecuador, recently under investigation by Borgtoft Pedersen (1993) and currently under investigation by Julie Velásquez in collaboration with the Tagua Initiative of the Ecuadorian Foundation for Socio-Environmental Training, Research, and Development

¹ We would especially appreciate information from readers with *P. seemannii* in cultivation, and who might have information on some of these parameters.

(CIDESA) and Conservation International (C.I.) (J. Velásquez, pers. comm.). Without this information, the sustainability of harvesting regimes from wild populations cannot be assessed. Furthermore, *P. seemannii* should probably be brought into cultivation sooner rather than later. The short stature of this palm, and the consequent ease with which both fruits and thatch can be harvested make it suitable for establishment as the understory component of a small-scale, multi-purpose plantation or agroforestry system, perhaps incorporating an overstory of the hardwood tree species also utilized by craftsmen (e.g., *Dalbergia*). Borgtoft Pedersen (1993) has shown that a heavy overstory reduces growth and fruit yield and that leaf harvest reduces seed production in *P. aequatorialis*. If the same is true for *P. seemannii*, care must be taken to insure sufficient light levels in an understory overtopped by *Dalbergia*. Once the palms have reached reproductive size, females could be retained for fruit production, while the majority of male palms could provide the principal source of thatch, taking care not to overharvest leaves on female or male individuals.

Acknowledgments

We thank George Angehr and Stanley Heckadon for advice and encouragement during the early stages of this investigation, and Oxford Scientific Films for financial support. Gómez Membache and the community of Vista Alegre, Agustín Zuñiga and Meyo Dogiramá kindly provided information on the natural history and uses of tagua. We also thank Anders Barfod, Rodrigo Bernal, John Cubit, Dan Johnson, Enrique Ortiz, Julie Velásquez, and Stephen Wood for providing further information and suggestions. Finally, thanks to the staff of INRENARE for logistic support and access to the Darién National Park.

LITERATURE CITED

- ACOSTA SOLÍS, M. 1944. La Tagua. Editorial Ecuador. Quito.
- BARFOD, A. 1989. The rise and fall of vegetable ivory. *Principes* 33: 181-190.
- . 1991a. A monographic study of the subfamily Phytelphantoideae (Arecaceae). *Opera Botanica* 105: 1-73.
- . 1991b. Usos pasados, presentes y futuros de las palmas Phytelphantoideae (Arecaceae). In: M. Ríos and H. Borgtoft (eds.). *Las Plantas y El Hombre*. Herbario QCA and ABYA-YALA, Quito. 437 pp.
- , B. Bergmann, and H. B. Pedersen. 1990. The vegetable ivory industry: surviving and doing well in Ecuador. *Economic Botany* 44: 293-300.
- , A. Henderson, and H. Balslev. 1987. A note on the pollination of *Phytelphas microcarpa* (Palmae). *Biotropica* 19: 191-192.
- BERNAL, R. G. 1992. Colombian palm products. In: M. Plotkin and L. Famolare (eds.). *Sustainable harvest and marketing of rain forest products*. Island Press, Washington, D.C., pp. 158-172.
- BORGTOT PEDERSEN, HENRIK. 1993. Ivory nut, fruits, and thatch: use and management of *Phytelphas aequatorialis* (Palmae) in Ecuador. Ph.D. Dissertation, Institute of Biology, University of Aarhus, Denmark.
- . 1995. Predation of *Phytelphas aequatorialis* seeds ("vegetable ivory") by the bruchid beetle *Caryoborus chiriquensis*. *Principes* 39(2): 89-94.
- BRIGHT, D. E. 1981. Eye reduction in a cavernicolous population of *Coccotrypes dactyliperda* Fabricius (Coleoptera: Scolytidae). *The Coleopterists' Bull.* 35: 117-120.
- DUKE, J. A. 1986. Isthmian ethnobotanical dictionary. Scientific Pubs. Jodhpur.
- ERVIK, F. 1993. Notes on the phenology and pollination of the dioecious palms *Mauritia flexuosa* (Calamoideae) and *Aphandra natalia* (Phytelphantoideae) in Ecuador. In: W. Barthlott, C. M. Nuamann, and K. L. Schuchmann (eds.). *Animal-plant interactions in tropical environments*. Alexander Koenig Zoological Research Institute and Zoological Museum, pp. 7-12.
- HENDERSON, A. 1986. A review of pollination studies in the Palmae. *Bot. Rev.* 52: 221-259.
- JOHNSON, C. D., S. ZONA, AND J. A. NILSSON. 1995. Bruchid beetles and palms seeds: recorded relationships. *Principes* 39(1): 25-35.
- SMYTHE, N. 1989. Seed survival in the palm *A. standleyana*: evidence for dependence upon its seed dispersers. *Biotropica* 21: 50-56.
- TORRES DE ARAUZ, REINA. 1975. Darién: Etnoecología de una Región Histórica. Instituto Nacional de Cultura, Panamá.
- WOOD, STEPHEN L. 1982. The bark and ambrosia beetles of North and Central America (Coleoptera: Scolytidae), a taxonomic monograph. *Great Basin Naturalist Memoirs* 6: 1-1359.
- WRIGHT, S. JOSEPH. 1983. The dispersion of eggs by a bruchid beetle among *Scheelea* palm seeds and the effect of distance to the parent palm. *Ecology* 64: 1016-1021.
- . 1990. Cumulative satiation of a seed predator over the fruiting season of its host. *Oikos* 58: 272-276.
- ZONA, SCOTT AND ANDREW HENDERSON. 1989. A review of animal-mediated seed dispersal of palms. *Selbyana* 11: 6-21.

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Principes, 40(1), 1996, pp. 24–26

The Red Sea *Hyphaene* of Saudi Arabia

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Hot, baking deserts, nomadic bedouin with camel caravans and sporadic oases dotted with date palms are typical stereotypes that characterize our awareness of Saudi Arabia. These desert scenes from the past still occasionally permeate contemporary Saudi Arabia.

Fortunately for the palm enthusiast, exotic palm trees occupy certain geographical pockets of Saudi Arabia with greater frequency than the apparently ubiquitous date palm. Recently, I travelled to the Red Sea town of Shuqayq and documented *Hyphaene* there (Fig. 1). Even among this unusual genus of multi-trunked palms, the variety that is found along the Red Sea and in neighboring “wadis,” i.e., valleys, is a particularly alluring species (Fig. 2).

The excursion to the Red Sea is as much an adventure as documenting the *Hyphaene*. The point of embarkation to the Red Sea was Khamis Mushayt, once reputed as a trading terminal along the Frankincense Road. The distance from Khamis Mushayt to Shuqayq is only 90 miles. The diversity of landscape and vegetation en route, however, is astonishing. Khamis Mushayt is located at 7,000 feet and Shuqayq is at sea level. In contrast to coastal Saudi Arabia, Khamis Mushayt resembles the American Southwest. Weathered granite buttes and plateaus abound in the area with nearby mountain peaks soaring to 9,500 feet.

A dramatic change in scenery occurs not far outside Khamis. After a brief placid drive through the countryside, the road suddenly dives serpentine-fashion from the precipice of an escarpment. The journey continues to be a breathtaking experience until the road reaches sea level. Along the way, sheer canyon walls give way to wide valleys. Road and bridge construction crews wage an ongoing attempt to repair the damage caused by rogue flash floods. Towards the bottom of the escarpment, meadows appear. Occasional banana plantations offer passersby unexpected tropical viewing

pleasures in this climatic anomaly. The geographical and climatic variety provide enough diversity to sustain one for the remaining barren drive to Shuqayq.

The typically hum-drum drive from Shuqayq to the remote beach area is now punctuated by sand drifts that present themselves as respectable road barriers. This is the season for the “Kama-seen” winds which originate in eastern Africa. These formidable winds wreak havoc from the western Saudi coast to Yemen. It is common to see brown skies and then have a downpour of mud-rain which results from airborne dust mixing with humid coastal air. The early morning hours, however, provide excellent opportunities to view the *Hyphaene* (Figs. 3–5).

Hyphaene sp. extend for miles and thrive in this Red Sea region. The coastal *Hyphaene* are extremely salt tolerant and maintain lush fronds (Fig. 6). With ready access to saline water sources the adult palms are usually encircled by healthy progeny. The palm foliage is so thick, that close inspection is necessary to detect the bifurcated trunks.

The *Hyphaene* found in the wadis, on the other hand, often appear as solitary specimens with few progeny surrounding them. They are self-cleaning and leave a stark silhouette of their bare multi-stemmed trunks against the skyline, especially the ones which have reached a stately height of 25 feet or more.

The fronds of this *Hyphaene* sp. are a glossy green. The palm has orange-green petioles. These petioles are well-armored with black razor-sharp thorns that can tax the motivation of the most ardent seed collector.

The mature fruit of this *Hyphaene* sp. have a muted black hue. They are usually 2–3½ inches in length and 2–2½ inches in diameter. Mature fruit often weigh four ounces (Fig. 7).

A primary factor in selecting fruit with viable



1. Mature *Hyphaene* in the background with juveniles in the foreground. 2. A 20' high *Hyphaene*, a nice specimen palm. 3. A group of healthy, thick-trunked individuals. 4. A number of *Hyphaene* enjoying close proximity.

seed seems to be the degree to which the spongy husk surrounding the hard seed case is impregnated with oils. The less mature fruit or older dehydrated ones lack a high oil content and are dry. The husks of the mature fruit with viable seed are impregnated with oils to such a degree that cutting away the pliable husk results in sticky pruning blades. Removing the husk from the seed releases the fragrant gingerbread aroma that has aptly earned this palm its nickname of the "gingerbread" palm.

Saudi Arabia hosts a surprising diversity of palms. *Hyphaene* are certainly flourishing along the coastal area near Shuqayq and in outlying

wadis. These exotic and robust Red Sea *Hyphaene* sp. are attractive specimen palms that would certainly enhance the reserve of *Hyphaene* that are currently available to palm enthusiasts.

(Editorial Comment:

Hyphaene is a very confusing genus. The main problem is that many of the species described in the past were based on fruits alone—in some instances, fruits imported into Europe as samples of vegetable ivory for the button trade. Botanists such as Beccari, without seeing the plants in the field, were faced with a difficult problem—how to provide reference points for doum palms, when all that were available were separate fruits. Fortunately Beccari described his new species in minute



5. A juvenile specimen. 6. A group of Red Sea *Hyphaene*. 7. A fruit and seed with tape to show size.

detail and discussed them at length. Furthermore, nearly all his types, and a few others too, are still to be found in the Herbarium of the Istituto Botanico in Firenze, Italy. So, armed with some understanding of the variation that occurs in the wild, the taxonomist can then interpret the type collections. When I prepared the account of *Hyphaene* for the Flora of Tropical East Africa, I was fortunate to spend some time in Kenya and Tanzania. This allowed me to see that one could sometimes find up to six "species" of *Hyphaene* in the same infructescence—in other words, fruits that matched six different type specimens could be found on the same tree. Fruit shape varies a great deal, and so species based on fruit shape are very often merely variants of a previously described species.

The nomenclatural jungle of over 40 odd names in the East African region could be reduced to a mere four names, which I believe are the names for four "good" species. Unfortunately the doum palms of the Horn of Africa and the Red Sea coast of Arabia remain poorly known, and so I do not feel confident to make the synonymies that are undoubtedly necessary in this region and I am thus reluctant to name the beautiful doum palms in Michael Otiér's article. The fruits appear to be unlike those of true *H. thebaica* and more like those of Indian *H. dichotoma*. What is needed is a good survey of doum palms throughout the region.

JOHN DRANSFIELD

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Principes, 40(1), 1996, pp. 27–30

Some Observations on the Growing of the Chonta Palm *Juania australis*

DICK ENDT

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Those who need the challenge of growing a palm frustratingly difficult to propagate should try the Chonta palm *Juania australis*, a rare species native to the Juan Fernandez Islands 600 km off the Chilean coast. The seeds are difficult to obtain, and once obtained the trouble really starts.

A number of articles have appeared over the years all expressing difficulty in growing this species. As far as I know there are only a very few mature chonta palms growing outside their native habitat. I am hoping to attract the attention of readers of this journal to obtain information from those people who have been successful in raising this palm to maturity. As the Chonta palm is in danger of extinction it will be of importance to gain all useful information from those who have been successful.

Background

The Juan Fernandez Islands, better known as the Robinson Crusoe Islands, lie in the Eastern Pacific Ocean, 600 km off the coast of Chile. The group consists of three islands situated at 33°S. The islands have a unique native flora, undisturbed until the arrival of man 400 years ago. The human impact has been drastic to the vegetation. The introduction of browsing animals and the need to provide pasture for these animals has caused mass destruction of the flora. The remaining forest has been eaten by goats. As for the chonta palm the trees were cut down for the "cabbage," also the trunks were used in the making of ornamental walking sticks.

The islands were made a national park in 1935. This in itself did not stop the destruction of the palm. Not until 1977 were the islands declared a Reserva de Biosfera. No further destruction of the palms or other vegetation is permitted.

Regeneration of palm seedlings is occurring in

the remaining populations of the chonta palm. When considering growing the chonta palm outside habitat its climate requirement should be understood. The islands have a mild oceanic climate with an annual average temperature of 15.3° C. There are no extremes in temperatures. The natural habitat is between 200 to 800 m and characterized by 1,000 mm of precipitation per annum with frequent mists.

The Chonta Palm *Juania australis*

This palm reaches a height of 15 m. The trunk is slender, smooth, and bright green. It has distinct annular markings caused by leaf scars. The leaves reach about 2 m in length. The palm is dioecious, meaning there are separate male and female trees. The fruits may be described as berries, the size of a cherry. At maturity the fruits are orange in color. A thin layer of edible pulp surrounds a rather large hard seed. It has been noted that the chonta palm is exacting in its growing requirement. The palm occurs in some botanic gardens in Europe.

New Zealand Experience

I have little information on previous attempts to grow the chonta palm in New Zealand. I do know that no mature *Juania* grow in New Zealand (please prove me wrong if you happen to know of one). I was introduced to this palm in 1987 when I received a few seeds from Easter Island. None germinated. Determined as ever I visited Chile in 1988. I was introduced to the private botanic garden known as the Edwards Estate at Reñaca where I was first introduced to the chonta palm—there were two mature chonta palms both about 10 m tall, one a male and the other a female, a very fortunate combination. The latter palm I was



told is the only seed-bearing chonta palm on the Chilean mainland. My visit coincided with a crop of ripe seeds, of which I was able to obtain a number. A small nursery on the estate grew a number of small seedlings of the chonta; further, some seeds had germinated around the base of the female palm convincing me that these seeds were likely to be viable.

Our nursery in New Zealand is situated on the foothills of the forest-clad ranges west of Auckland city. The latitude at this point is about 37°S, and the climate oceanic with an average mean temp of about 16° C, high humidity, and rainfall of about 1,200 mm per annum. Climatically our nursery appears to be well matched with the Juan Fernandez Islands.

Nursery Experience

The chonta seeds were taken to New Zealand and sown less than a week from the time of harvesting. The fleshy mesocarp was removed from the seeds, which were then stored in a plastic bag containing damp sawdust. The chonta seeds germinated within one month. Germinated seeds were potted in a soilless media, a peat/pumice mix (plus added nutrients). Apart from a few losses the seedlings grew rapidly into strong healthy plants. In the nursery the plants were held outdoors the year round under 50% shadecloth. As the palm seedlings grew they were potted into larger containers. It was not until about four years after sowing, when the plants reached a height of one meter, that field planting was attempted. The number of plants held in pots was about 80, an important factor as I thus had enough plants to take risks by planting them in different localities. I realized that during the planting, losses were likely to occur. Sites chosen for planting were:

- Full sun/low humidity
- Shade to full sun/high humidity
- Shaded/forest understorey.

The fourth year seemed to be critical in that losses started to occur in large numbers. All palms were affected, irrespective of where they were growing, including those held in pots in the nurs-

ery. The immediate noticeable symptoms were the sudden browning and dying off of the mature outer leaves. As time went on the inner leaves progressively died, and finally the center spear collapsed and on removal the base had rotted. All this occurred in a matter of a few weeks. It was noticed when the palms were removed from their pots that in some plants many roots had died for no apparent reason. The upper part of the palm appeared healthy, but soon after the whole palm died. The symptoms, therefore, start at the roots which rapidly die, followed by dieback of the leaves. All the palms that died, did so in an identical fashion. These deaths did not occur in other palm species held in the same area in the nursery. Peak losses occurred in the warmer summer period. Death did not occur in all palms but about 50% have died. During the following season after the first series of losses, a second spate of losses occurred in similar fashion. The ultimate results we cannot foresee. Perhaps it will be survival of the fittest. Those palms that have survived to the present day look normal.

Some palms seem to suffer from a yellowing of leaves, similar to symptoms I have seen in Chile on young plants. In the past the rate of growth of the seedling was rapid. At this time, five years after sowing, the growth rate is strongly reduced. As my experience with *Juania* does not extend past five years I have no idea why this should happen.

Note: I do have more experience growing the related *Ceroxylon* palms from Colombia. These palms too slowed down in growth in the fourth year, and not until several years later did rapid growth resume. My explanation was that the root system in the early phase of the plant's growth was the 'primary rootsystem' but these roots are not designed to support the stem structure of the palm. The early stem descends in the ground and later re-emerges. When this happens a rapid increase in the size of the leaves occurs, root development takes place, and the stem later to develop into the trunk enlarges. I should add that the losses which occurred in the *Juania* did not occur with the *Ceroxylon*.

It is hoped that following the slowdown of growth

←
1. *Juania australis*, approximately 12 years old. Reñaca, Chile 1993. 2. *Juania australis*, 4 years old growing in a shady high humidity environment in good health 1994. 3. *Juania australis* initial die back of outer leaves, the central leaves still healthy. This is not the same specimen palm as either photo 2 or 4. Growing in shady high humidity. 1994. 4. *Juania australis* 4 years old. In final stages of dying. The central spear is still alive 1994.

in the *Juania*, rapid growth will resume. A ten year-old *Juania* growing in Reñaca showed a spectacularly fast growth rate. Conclusions: The Chonta palm is difficult to grow, and susceptible to an

unknown fungus disease, symptoms of which do not affect other palms. Presently the surviving chonta palms grow in a wide range of soils and microclimates.

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Principes, 40(1), 1996, p. 30

CHAPTER NEWS AND EVENTS

Greetings to a New IPS Affiliate—The Southeastern Palm & Exotic Plant Society

The IPS Board of Directors granted formal affiliation to the Southeastern Palm and Exotic Plant Society. This group of about 100 members has been in existence since October 1992 to promote the cultivation of palms and other subtropical plants in the southeastern U.S. (outside of Florida). Meetings are generally held four times a year and are moved around the area. Meetings usually draw 20–30 members. The Society also publishes a quarterly newsletter, *Rhapidophyllum*.

To avoid confusion with other IPS chapters already in existence within the southeastern U.S., this group will be known as the "Southeastern USA Chapter (non-Florida)" on various IPS listings, directories, etc. The President of the group is Tom McClendon (Georgia); the Secretary is Alan Bills (South Carolina); and the Treasurer is Will

Roberds (Georgia). Membership is open to the public and annual dues are US\$10, which includes the newsletter and other chapter publications. Interested persons should contact the Southeastern Palm and Exotic Plant Society, % Tom McClendon, 1581 Fuller Road, Greensboro, Georgia 30642 USA or post a note to Will Roberds at his email address: Gypsy@mindspring.com if you prefer.

Fous de Palmiers of France Attends Florida Meeting

A large contingent of members of Fous de Palmiers, the French Chapter of the IPS, attended the World Palm Symposium at Fairchild Tropical Garden in October. The group of over 30 palm enthusiasts also took the opportunity to visit numerous palm gardens in south Florida. See separate article for further details.

Principes, 40(1), 1996, pp. 31-35

Miriam L. Bomhard's Contributions to the Study of Palms

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Geographic happenstance can influence the specialty of a botanist, and Miriam Bomhard represents one such example. Born in Bellevue, Kentucky, 24 July 1898, her family moved to the Pittsburgh area in 1907. Bomhard graduated from Sharpsburgh, PA, High School in 1917 and won an honor scholarship to the University of Pittsburgh. She graduated with a B.S. degree cum laude in February 1921 and received her M.A. just four months later in June 1921. Continuing her studies at the same university, she was awarded a doctoral degree in biology in 1926, the first woman to receive a Ph.D. from the University of Pittsburgh. Her doctoral dissertation dealt with the taxonomy of seeds of selected plant groups in western Pennsylvania (1926a); a summary of the results were published the same year (1926b). That she became a palm specialist is directly attributable to her taking a teaching position in New Orleans.

The purpose of this article is to document the contributions Miriam Bomhard made to the study of palms, as well as her research on forage range species in the United States. Dr. Bomhard died of cancer 16 December 1952 in Glenshaw, PA. Information for this article was gathered from a detailed obituary by W. A. Dayton (1953), supplemented with documentation at the Bailey Hortorium, Cornell University, Ithaca, NY, which has an uncatalogued collection of Bomhard's professional papers, photographs and field notebooks dealing with palms; the National Agricultural Library, Beltsville, MD; Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA; the American Association for the Advancement of Science, Washington, D.C.; and Tulane University, New Orleans, LA.

A photograph (Fig. 1), likely dating to the 1930s, shows Miriam Bomhard pursuing her palm research in Audubon Park, New Orleans and in a formal portrait photograph (Fig. 2) probably from the 1940s.

New Orleans 1926-1932

Dr. Bomhard joined the faculty of Newcomb College, Tulane University in the fall of 1926 as an instructor in zoology. The following year her title was changed to instructor in biology and in late 1927 she was advanced in rank to assistant professor of biology. In addition to teaching zoology and botany, and reclassifying the herbarium, she began field work on the native and introduced palms of Louisiana, and on local vegetation in general. Research on palms was, at the start, logistically easy. There were a number of palm species growing on the Tulane campus, and Bomhard lived just a block away from Audubon Park, which had many convenient specimens for study.

To learn more about the diversity of palms growing within the United States, Bomhard took a driving trip to southern Florida to study and photograph palms in the wild and in cultivation. In the summer of 1930, Bomhard went to Europe where she attended the International Botanical Congress at Cambridge, England and spent time in Britain and on the continent visiting botanical gardens and herbaria gathering information on palms. Her initial research on palms in Louisiana was presented in papers given at two sessions of the American Association for the Advancement of Science Annual Meeting in New Orleans (1931a, b). At the same meeting, she also gave a paper on successional vegetation in areas of pine timber harvest (1931c). Sometime during this time period, Bomhard visited the Panama Canal Zone where she made note of coconut palms.

Hiatus 1932-1933

Miriam Bomhard resigned from the faculty of Newcomb College in June 1932 for personal reasons. The following information is derived from her papers and notebooks at Cornell. While attending the International Botanical Congress in England July 1930, she met Frederick S. Ward,



1. Miriam L. Bomhard doing field research (1930s?). The following notation is inscribed on the reverse of the original photograph "Dr. Bomhard pursuing her researches in the top of palm tree in Audubon Park."

who was then apparently pursuing graduate work at Cambridge. Details of the subsequent romance are unknown but progressed to the point that in April 1932 their engagement was announced. At that time, Ward was employed as a mycologist with the British Department of Agriculture in Kuala Lumpur, Malaya. The wedding was to take place in Kuala Lumpur in August where the couple apparently intended to live.

Travelling by sea to Britain in July, Bomhard embarked on another ship in Southampton bound for Malaya. Enroute the vessel called at Algiers and Port Said, where Bomhard was able to see date palms, proceeded through the Suez Canal and stopped in Colombo. She made inquiries about visiting Peradeniya Botanic Garden at Kandy, but there was insufficient time in port to permit such an excursion. In late August, Bomhard arrived in Penang, Malaya. Her notes from that period comment on coconuts, arecanut, and *Phoenix paludosa* palms seen on excursions out of Kuala Lumpur and Penang, but there is only a single reference to the fact that the wedding did not take place.

No explanation for this abrupt change of plans is found among her papers.

Bomhard decided to return to the United States by sailing eastward to complete a circumnavigation of the world. First she went to Sumatra in September and made several excursions into the forest, arranged by local Dutch scientists, in the area around Medan. Her notes contain references to the following palms and their utility: coconut, sago (*Metroxylon sagu*), numerous kinds of rattan, sugar palm (*Arenga saccharifera*), *Caryota rumphiana*, *Salacca conferta* and nipa (*Nypa fruticans*). On one field trip Bomhard even saw *Johannestijsmannia altifrons* in its habitat.

From Sumatra, Bomhard journeyed on to Singapore, where she visited the Botanic Gardens, and sailed from there to the Philippines. In Manila she ate a palm heart salad and became familiar with the buri palm (*Corphyra elata*) and its use in making hats. Travelling on she went to Hong Kong, Shanghai, and Japan, where she noticed the attractive landscape use of *Trachycarpus fortunei*. Crossing the Pacific Ocean, Bomhard made



2. A portrait photograph of Miriam L. Bomhard (1940s?).

a stop in Honolulu and reached California early in 1933. While in California she made a side-trip to see *Washingtonia filifera* in its native habitat near Palm Springs.

In spite of the personal disappointment she likely felt (she never married), Bomhard turned the experiences of a round-the-world trip (as she would later refer to this event in her life) to good professional advantage. She had gained first-hand knowledge that she drew upon to establish a reputation as an authority on palms and, presumably, inspired her to continue to research and write about the Palmae.

Washington, D.C. 1933–1952

Upon her return to the United States, Bomhard made contact with Tulane University and in the summer of 1933 was engaged to complete a classification of a herbarium collection. Later that year she moved to Washington, D.C., where she took a position as a pathologist in the Bureau of Plant

Industry, Department of Agriculture, and the following year transferred to the Forest Service to a research appointment in what later became the Division of Dendrology and Range Forage Investigations. Dr. Bomhard lived in Washington, D.C., until shortly before her death.

In her new position, Bomhard was able to reactivate her study of native and introduced Louisiana palms. She gave a presentation on the morphology of the Louisiana palmetto (*Sabal minor*) at a scientific meeting held at her alma mater in December 1934 (1934). This was followed the next year with the description of a new species, *Sabal louisiana* (Darby) Bomhard, which recognized the arborescent form of *S. minor* as a distinct species, based upon original work by William Darby in 1816, J. K. Small in 1926, and supplemented with her own field work in 1933 (1935a). The new species was recognized by Dahlgren (1936). Over the following decade, on regular trips to Louisiana, Bomhard continued to collect field data on *S. louisiana*, which led to another publication on the subject (1943b). A year later, however, Bailey (1944), apparently without knowledge of Bomhard's new publication, reduced *S. louisiana* to synonymy with *S. minor*. Glassman (1972) followed Bailey and considered *S. louisiana* a synonym and so it has remained.

In the mid 1930s, Bomhard moved ahead with a project to produce a larger study of all of the native and introduced palms in Louisiana. She had completed a survey of more than 25 palm species successfully grown in the state (1935b), and interested the Louisiana State Department of Conservation in publishing the results. Bomhard drew up a two-page conspectus of a book to be entitled "Palms in Louisiana"; its publication to be preceded by a series of articles in the *Louisiana Conservation Review*. With some delays, the articles were printed (1935c, d; 1935 a, b; 1939a, b, c; 1940a; 1941), but the book was never published.

Research on the genus *Butia* for part four of the series on palms in Louisiana led Bomhard to describe a new taxon, *Butia eriospatha* ssp. *punctata* (1938b), based on plants cultivated in different locations in New Orleans which bore fruits with distinctly pitted skin. According to a footnote (p. 42) a formal description of the subspecies was to be published in the *Journal of the Washington Academy of Sciences* in October 1938, but for reasons unknown never appeared. In a listing of palm genera Bomhard compiled (1942) the bino-

mial *Butia punctata* is included. Given that neither the trinomial nor the binomial were validly published, both names will be designated as *nomen nudum* in the revision of the genus *Butia* in preparation by S. F. Glassman (pers. comm.).

Bomhard took up the subject of wax palms in the late 1930s, and produced an excellent historical account of the *Ceroxylon* spp. of the Northern Andes (1937b). A Spanish translation of the article was published in Colombia (1940b). Additional research on the subject led to an article validating the species *Ceroxylon ferrugineum* André (1943a). Combining the subjects of palm oils and waxes, Bomhard (1945) contributed a chapter in a book assessing potential new crops in the Americas. A general article on Brazilian oil palms appeared the next year (1946) and in 1948 she served as the taxonomist for a vegetable oil-seed mission (palms were a major focus) to Venezuela (see Jenkins et al. 1949). Bomhard apparently did not travel to Latin America in relation to any of the foregoing research.

Two other publications round out Miriam Bomhard's contributions to palms. A booklet entitled *Palms in the United States*, the palm work for which she is best known, appeared (1950). In it she was able to use some of the material assembled for the aborted book on Louisiana palms. The booklet was popular and was slightly revised and reissued in 1953, after her death. The second publication, a leaflet describing building uses of palms, appeared posthumously (1955). It too generated enough interest to justify a slight revision and reissue in 1964.

Apart from palms, Miriam Bomhard was a recognized expert on range forage plants of the United States. She was a contributor to a handbook on range plants (1937a) and at the end of her life co-authored a study of forage plants in Louisiana (Langdon et al. 1952).

Conclusion

Foreshortened though it was, Miriam L. Bomhard lived a full and accomplished life. Newspaper obituaries (five were found), published in Washington, D.C., and Pittsburgh, all referred to her as an authority on palms. By specializing in palms early in her professional career, occasioned by the move to New Orleans, a lifelong interest in and appreciation for this group of plants resulted. Bomhard's greatest contribution to the study of palms was to raise the level of awareness in the United

States about their varied and widespread utility. In her own words from an interview: "If it became necessary to choose the most important tree in the world for preservation, the coconut palm would be the obvious choice" (*Washington Star*, 10 April 1950).

Acknowledgments

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LITERATURE CITED

- BAILEY, L. H. 1944. Revision of the palmettoes. *Gent. Herb.* 6(7): 365-459.
- BOMHARD, M. L. 1926a. Taxonomic studies of seeds of selected groups of the plants of western Pennsylvania with keys and descriptions. Unpub. Ph.D. diss., Univ. Pittsburgh, Pittsburgh, PA. (A copy is in the National Agriculture Library).
- . 1926b. Taxonomic studies of seeds of selected groups of the plants of western Pennsylvania with keys and descriptions. *Univ. Pitts. Bull.* 22(31): 19-27.
- . 1931a. Palms in New Orleans. Paper—Symposium on Southern Vegetation, Bot. Soc. Amer., Amer. Ass. Adv. Sci. 89th Ann. Meet., New Orleans, LA, 28 Dec 1931-2 Jan 1932.
- . 1931b. The palms of New Orleans. Paper—Amer. Nat. Study Soc. 24th Ann. Meet., Amer. Ass. Adv. Sci. 89th Ann. Meet., New Orleans, LA, 28 Dec 1931-2 Jan 1932.
- . 1931c. The vegetation of a cut-over pine area in Louisiana. Paper—Amer. Ass. Adv. Sci. 89th Ann. Meet., New Orleans, LA, 28 Dec 1931-2 Jan 1932.
- . 1934. The polymorphism of the native Louisiana palmetto. *Bull. Ecol. Soc. Amer.* 15(4): 34-35. Abstr. Paper—20th Ann. Meet. Ecol. Soc., Pittsburgh, PA, 27-29 Dec 1934.
- . 1935a. *Sabal louisiana*, the correct name for the polymorphic palmetto of Louisiana. *J. Wash. Acad. Sci.* 25(1): 35-44.
- . 1935b. Recent palm discoveries in Louisiana. *J. Wash. Acad. Sci.* 25(2): 93-94. Abstr. Paper—256th meet., Wash. Acad. Sci., 6 Mar 1934.
- . 1937a. (Contributor) Range Plant Handbook. U.S. Dept. Agr., Washington, D.C.
- . 1937b. The wax palms. *Ann. Rep. Smith. Inst., Pub.* 3405: 303-324, Washington, DC. 4 pls., 2 figs.
- . 1937c,d; 1938b; 1939a,b,c; 1940a; 1941. What palms grow in Louisiana? *La. Cons. Rev.* 1: 36-42, Autumn 1937; 2: 56-58, Winter 1937-38; 3: 48-

- 51, Spring 1938; 4: 39-42, Summer 1938; 5: 38-40, Winter 1939; 6: 35-39, Summer 1939; 7: 40-42, Autumn 1939; 8: 43-47, Autumn 1940; 9: 40-42, Summer 1941. 68 figs.
- . 1940b. Las palmeras de cera. Bol. Soc. Geog. Colombia 6(4): 250-273. 3 pls.
- . 1942. Palm genera. Pages 444-452. In: H. P. Kelsey and W. A. Dayton (eds.). Standardized Plant Names. 2d. ed. J. Horace McFarland Co., Harrisburg, PA.
- . 1943a. *Ceroxylon ferrugineum* André, the Salento waxpalm. J. Wash. Acad. Sci. 33(1): 1-8. 1 fig.
- . 1943b. Distribution and character of *Sabal louisiana*. J. Wash. Acad. Sci. 33(6): 170-182. 2 pls, 1 fig.
- . 1945. Palm oils and waxes. In: C. M. Wilson (ed). New crops for the New World. Macmillan, New York, NY. pp. 59-79.
- . 1946. Brazil's oil-yielding palms. Agr. Amer. 6(1): 6-9, 14-15. 6 figs.
- . 1950. Palm trees in the United States. Agr. Inf. Bull. 22, U.S. Dept. Agr., For. Serv. Washington, DC. 26 pp. 19 figs. Rev. ed. 1963.
- . 1955. Palms—their use in building. Leaf. No. 2, Housing and Home Finance Agency, Off. Intern. Housing, Washington, D.C. 26 pp. Rev. ed. 1964.
- DAHLGREN, B. E. 1936. Index of American Palms. Field Mus. of Nat. Hist, Vol. 44, Pub. 355, Chicago, IL.
- DAYTON, W. A. 1953. Obituary (Miriam Lucile Bomhard). J. Wash. Acad. Sci. 43(4): 136.
- GLASSMAN, S. F. 1972. A Revision of B. E. Dahlgren's Index of American Palms. Verlag von J. Cramer, Lehre, Germany.
- JENKINS, D. W., C. E. CLAASSEN AND K. S. MARKLEY. 1949. FAO Oilseed Mission for Venezuela. Report. FAO, Washington/Rome.
- LANGDON, O. G., M. L. BOMHARD AND J. T. CASSADY. 1952. Field book of forage plants on Longleaf Pine—Bluestem ranges of Louisiana. U.S. For. Serv., South. Exp. Sta., Occ. Pap. 127, New Orleans, LA.

LETTERS

Dear Editors,

I live on the island of Curacao about 120 km North of the Venezuelan coast. In Curacao we find the palm *Copernicia tectorum*, the Venezuelan "palma llanera." This palm usually occurs in man-made reservoirs which are flooded once or twice every few years and also at the edge of some salinas. In Curacao these are dry floodplains near the sea which can flood with fresh water during the rainy seasons. It has always been assumed that this palm has been introduced to the island by man, and is dispersed by man. Lately I have been wondering whether this may have been an indigenous palm after all and whether it is being dispersed by waterfowl such as ducks or by fruit-eating doves, parrots, or bats. It seems unlikely that these palms would have been planted by man in all the different locations where they are found. The palms are not being used and there would be

no economic incentive to plant them, although there may have been such an incentive in former colonial times. Since maize stalks were used for roofing material, the palms were not used as roofing material. Another possibility is that they were in fact introduced by man and are now being dispersed by goats.

In pre-Columbian times *Copernicia tectorum* might have occurred in a few places where water was found standing during the rainy season. If it is dispersed by ducks one would expect it to occur over a much larger range including the West Indies where it does not occur. This would argue in favor of a relatively short-range flying animal that could cross over from Venezuela, but would not range much farther. A parrot, the Yellow-shouldered Amazon parrot (*Amazona barbadensis*), could be a possible candidate.

GERARD VAN BUURT

Principes, 40(1), 1996, pp. 36-38

Melvin W. Sneed

LEONARD H. GOLDSTEIN

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A number of talented individuals died in Miami on February 8, 1995. One had been the quarterback and captain of his Missouri high school football team. Another was a musician who spent Depression-era summers playing trumpet with a touring dance band to help finance his college education. A third began a long career in the nation's capital as a research staff member of the esteemed Brookings Institution.

These able and versatile "men" were, in truth, one man, Mel Sneed. Armed with a master's degree and state government experience as a statistician, Mel left his home state of Missouri for Washington, D.C., in 1940. From that time forward—with interruptions only for a brief return to his home state and for wartime service in the U.S. Navy—he worked in the federal government in a variety of challenging jobs involving legislation affecting education, labor, welfare, and health. His last assignment was as clerk of the Joint Committee on the Reorganization of Congress. Mel and wife Phyllis raised four children during those years.

Nothing in Mel's busy work life pointed to a passion for tropical plants until someone gave him a gift of McCurrach's *Palms of the World*. But, ever the scholar, he made up for lost time with a period of intensive learning, and in 1968 he and Phyllis moved to a two-acre homesite overlooking Montego Bay, Jamaica. In one whirlwind decade, the Sneeds developed their private botanical garden, hosted a post-Biennial trip, and scoured the tropics in a quest for palm seeds, which they generously shared with the Palm Society Seed Bank and botanical gardens.

To understand the depth of Mel's commitment to his new hobby, a closer look at his so-called retirement years is in order. I suspect that meticulous preparation was a lifelong trait that continued to serve him well even outside the Washington maelstrom. Careful advance planning enriched the Sneeds' journeys and led to many warm friendships and noteworthy accomplishments around the world.

In June 1975, following the Palm Society's Biennial Meeting on the campus of Florida Institute of Technology in the east coast city of Melbourne, nearly 40 members and guests continued on to Jamaica for a visit hosted by the Sneeds. What the group encountered at Sneedview was a hilltop site blessed with a 270° view of the waters of Montego Bay. To this grand natural setting the Sneeds had added a vast diversity of palms grown mostly from Seed Bank distributions, but also from the literal fruits of their own travels. Teddie Buhler, writing a post-Biennial summary in *Principes* several months later, described the palms as "the start of a truly magnificent collection."

As coordinator of the Jamaican excursion, Mel contacted a local tour company for transportation and also invited Dr. Robert Read to organize the itineraries for two separate tour groups. The travelers saw many of the delightful features of the lush, mountainous island, including Castleton, Hope and Bath botanical gardens. And palms were not their only discoveries: In a quaint episode during a tour of Castleton, longtime garden employee Uriah Bennett introduced the group to a resident spider. As Gertrude Cole drolly reported the encounter in *Principes*, "[O]ld Uriah's cane opened the door of a trap-door spider. I knew it was there, he said modestly."

Bob Read, who had earned his doctorate at the University of the West Indies, was an excellent choice for chief guide, knowing as he did the whereabouts of troves of botanical treasure. He impressed the visitors with not only his informative commentary, but also an impromptu fan dance using two of the huge round leaves of a *Thrinax radiata*. (Post-Biennial tours are nothing if not educational.) In all seriousness, the trip to Jamaica was very well received and long remembered.

Notwithstanding the beauty of Sneedview and environs, however, Mel educated and entertained even more palm lovers through a long series of travelogues which demonstrated his skill with both the written word and the camera. The trip that



1. Mel in 1973, at Sneedview, Jamaica. 2. Mel and Phyllis in Africa with Victoria Falls in the background.

impressed me particularly for its arduousness was a 1984 venture under the auspices of Lindblad Tours, a company willing to conduct excursions custom-designed by the travelers themselves. The 4,000-mile voyage west from Papua, New Guinea included a long stretch of the southwestern coast of Irian Jaya, the Indonesian half of the large island.

Because of the isolated and primitive nature of this territory, there was no dockage for the Lindblad vessel. Access to villages was achieved by rafting and sometimes by wading. To reach the Asmat coast, for instance, the travel party had to raft from six miles offshore. Having been led to expect a friendly greeting at sea as per local custom, the group instead gradually perceived that it was being approached by war canoes bearing villagers whose dress—bodies and faces painted, heads adorned with feathers—must have inspired at least some concern that they were less a welcoming committee than a hunting party. Mel described the encounter as “startling, if not frightening,” and Phyllis to this day regards the episode as very intimidating. Fortunately, though the Asmat villagers were still active headhunters, their gaudy display proved no more than a sign of curiosity over a rare appearance by westerners.

A less threatening, but equally surprising, botanical event awaited the Sneeds further along the coast of Irian Jaya. Returning to rafts at Triton Bay, the party navigated numerous limestone islets which seemed almost totally covered by a single, beautiful palm species. (John Dransfield later

inferred that the Sneeds had rediscovered *Gronophyllum procerum*, a species described in 1843, then “lost” for over 140 years.) Even after the adventures on New Guinea, much remained to be seen in the long voyage west. I commend to your reading this and the rest of Mel’s accounts.

It was clear from these articles that Mel and Phyllis tolerated rain, mud and diverse means of transportation—including elephants—to optimize their travel goals. When hot on the trail of palm seeds, Mel even suspended his abiding aversion to climbing any kind of hill. By the time his last account appeared in *Principes*, he had reported to a generation of palm enthusiasts about venues from China to New Zealand, in numerous Indian Ocean locales, and throughout tropical Asia.

And while all these accomplishments are clear testimony to Mel’s thorough embrace of palms, nevertheless his farthest-reaching influence on the International Palm Society occurred during eight years as a member of the Board of Directors. Perhaps three decades of observing the processes of and refinements in government allowed him to gaze into the future and identify the needs of our own growing organization. At his urging, even insistence, the Board not only established a permanent endowment for the Society, but created the Revolving Publications Fund. Since 1987 the fund has helped the Society publish three books, including the recent *Palms of Madagascar*.

We shall miss Mel Sneed’s enthusiasm and his counsel.

Mel Sneed

When Dr. Moore died suddenly on October 17, 1980, the editing of *Principes* became John’s and my responsibility. Shortly thereafter an agreement was reached for us to go ahead on “*Genera Palmarum*.” A visit to Fairchild Tropical Garden would provide an opportunity to work on palms. Paul Drummond was president of the Society at the time and early in 1981, Charles and I traveled to Miami to meet and stay with the Society’s treasurer, the late Ruth Shatz. My introduction to Phyllis and Mel and Paul occurred in her lovely home when she prepared a gourmet loin of pork and invited us all to partake. Mel impressed me as rather reserved, and obviously sagacious. He had a wry sense of humor and was devoted to The Palm Society and to *Principes*. His support took many forms. He wanted *Principes* to be a scholarly journal, but he had little sympathy for certain scientific articles especially those about “chromosomes!” One way he supported the journal was by writing for it. His travelogues were popular. We always knew that complaints about overly technical content would not arise if the issue contained one of his articles. Altogether he contributed 15 articles. You can find them in volumes 20–28. They are carefully prepared and provide a pleasant introduction to both the palms and many different tropical areas of the world where palms occur.

In talking with Phyllis I have learned that the Sneeds’ travel in search of palms amounted to as much as three complete round-the-world trips. It was a source of much satisfaction to Mel to meet

people, often in very isolated places, and spread the word about The Palm Society and its Seed Bank. Both for natives and for people living in foreign countries such friendships are very important. Visitors are welcome and often royally entertained. Mel and Phyllis searched the tropics for seeds of palms, which they provided to botanic gardens and to the Seed Bank for distribution to other society members. The ambassadorial role that they undertook did much to establish The Palm Society as an international organization. Furthermore Mel frequently thanked his hosts for their hospitality by giving them memberships in the Society, some years providing as many as 200 such gifts.

In the late summer of 1991 when I was recovering from surgery in the Blue Ridge mountains, I was delighted one day to get a call from Mel. We spent a pleasant half hour talking about palms, about *Principes*, and about Mel's other goal, a permanent endowment for the IPS. Perhaps his greatest legacy is the IPS endowment fund which he worked to establish during his years as a director.

NATALIE W. UHL

Mel Sneed

I first met Mel and Phyllis in 1974 in Bogor in Indonesia. At the time, I was working in the Herbarium Bogoriense and the Kebun Raya on a British Government aid project and, in those days of isolation, any visitors to Bogor were a cause of some excitement. But when the visitors were also members of the Palm Society, their visit became special. Mel and Phyllis were two such visitors, arriving late one morning in the Gardens. They enthused about palms, dutifully admired my personal favorites, and gently pulled my leg. This was the beginning of a correspondence that lasted almost 20 years. When Natalie and I took over the editorship of *Principes* in 1981, we soon realized that we had the strong support of the members of the Board of Directors. One person in particular was always keen to ring us or write to us to tell us what he thought of the journal and what we could do to improve the content and make it accessible to as wide a range of the membership as possible. This was Mel Sneed. Mel was passionately concerned about *Principes* and the importance of guaranteeing its future. Mel's concern was to ensure that *Principes*, the official organ of the society that reaches every member, should always have sufficient funds for it to be published to a high standard, and that it should appeal to the entire membership. He was also concerned that the contents of *Principes* should be scientifically accurate, whether the article was a popular travelogue or a scientific report. We knew we could rely on Mel's support, and we could also rely on him to write us a travelogue. His articles required a minimum of editing and were always fun to receive. We knew, also, that if we included an article that was too obscurely written or of very limited appeal (especially something to do with chromosomes), he would be more than likely to telephone and growl (in a friendly way) at us. In fact we valued his input greatly. This advice came at a crucial time for us, supporting us when we needed it, and reminding us of the need to cater to the entire membership.

JOHN DRANSFIELD

Melvin Sneed

Can any one of us who attended the Biennial in Jamaica ever forget Mel's enthusiasm for his palm collection? He and Phyllis traveled extensively while living in Washington, D.C. and had decided to retire to Jamaica. They lived on a rocky point with a breathtaking view of the sea. There he planted palms.

In August 1975, the Sneeds traveled to Asia. Reread of their palm seed collecting adventures in *Principes* 21 issues 1-4.

GERTRUDE COLE

Principes, 40(1), 1996, pp. 40-45

Lucita Hardie Wait

DEARMAND L. HULL

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April 19, 1995, sitting by the pool in my garden in Miami, listening to my chattering lories, I realize that Lucita Wait would have been 92 today. Her *Ptychosperma waitianum* survived Hurricane Andrew and has an emergent new red leaf that is gorgeous. I know that I must get this article done for our editors, Natalie Uhl and John Dransfield, and also realize it is one of the most difficult tasks that I have ever attempted.

Lucita Wait's love of palms came from her Brazilian childhood. Her father was a Presbyterian minister in Brazil and her mother's family was part of the movement of southerners, who, loving plantation style living, left the United States for Brazil after the Civil War. She came to the United States to attend college in the 1920s. Her southern English was influenced heavily by Portuguese. I will never forget the Sunday morning when I arrived to help with the Palm Society Seed Bank and heard her speaking Portuguese to her friend, Roberto Burle Marx, the world famous Brazilian landscape architect.

I first came to Lucita's door in January 1969 as a graduate student, a Longwood Fellow at the University of Delaware's Longwood Garden graduate program in ornamental horticulture and botanical garden management. Since I wanted to work on the palms horticulturally, Hal Moore of the Bailey Hortorium, who served as a special advisor on my Master's thesis program, suggested a taxonomic study at the subfamily level on the palm seed proteins. He told me to go to Miami and see Lucita Wait, the seed lady. Miami in 1969 was spectacular, especially in January in comparison to icy and snowy Philadelphia. The skies were clear and blue and the streets were lined with thousands of coconuts. Arriving there was like landing in paradise. When Lucita answered the door at her home in South Miami where she had lived for nearly 30 years, she was visible through the screen, a thick-set woman with lovely white hair and a floral print dress, somewhat reserved but friendly (Fig. 1). She gave me seeds of several palms and suggested several places to

obtain more, including Fairchild Tropical Garden. She arranged for my stay at the Kampong, David Fairchild's summer residence in Coconut Grove and introduced me to Kay Sweeney, whose dedicated efforts preserved the Kampong. These experiences were living a part of Miami's history. I returned to the frozen north and finished my work and then moved in June 1970 to attend the University of Miami and was employed as a lab technician at Fairchild Tropical Garden. Through Lucita's help and extensive correspondence, palm seed continued to come my way, so naturally Sunday mornings became a time of seed bank work and breakfast with Lucita.

I still see Miami through Lucita's eyes, not a bustling crowded community but a lovely paradise of dooryard gardens of Cabada palms, flowering poincianas, and jaboticabas.

Lucita chuckled when the lovely *Ptychosperma* from New Guinea, described by Fred Essig, was named after her. Although she loved the thin-stemmed understory gem *Ptychosperma waitianum* (Fig. 2), she was proud of her stoutness and thought that perhaps a much thicker trunked palm would have been more appropriate.

Her Stories

Lucita was a storyteller. She loved to entertain with stories and she had many. Fortunately for me, she entered my life at a very pivotal time—the beginning of my career in south Florida as an extension agent. Lucita introduced me to Dade County and to south Florida. I saw the beauty of the dooryard gardens described by David Fairchild. She showed me the flowering poincianas blooming in June, the jaboticaba introduced and grown by her mother, and the lovely palms from which she collected seeds.

During our Sunday mornings together, we visited some of Miami's greatest past. Stories abounded about Dent Smith, David Fairchild, Colonel Robert Montgomery, Liberty Hyde Bailey, and Arthur and Wumpsie Langlois. They all came to life through Lucita. Scientists and horticulturists



1. Lucita Wait

from around the world appeared at her door seeking seeds. Professor Anthony Davis visited from Calcutta, Alfred Razafindratsira came from Tananarive, and we begged him for seeds from Madagascar. Roberto Burle Marx was a frequent visitor.

I remember in particular one story about Dent Smith who founded the Palm Society, approaching Lucita one day in the mid 1950s at Fairchild Tropical Garden, he said "Lucita, we have societies for all sorts of plants, we need one for palms." Lucita Wait thus became the third member of the Palm Society. Nell Montgomery became the fourth. Lucita's favorite story about Dent Smith concerned his magical salesmanship. He had the proverbial gift of gab and could sell anything. According to Lucita, his first foray into selling was during the Great Depression when he was hired to sell life insurance. As he left his new employer's building he sold a policy to the elevator man, the janitor, and the doorman—three policies sold within 15 minutes of employment. Lucita admired Dent's ability in forming and promoting the Palm Society. She also told the story about Colonel Montgomery, founder of Fairchild Tropical Garden and their book about the first 10 years of the Garden. Nixon Smiley, a past Director of the Garden and Miami Herald Garden Editor, often appeared in her conversations, which covered a Who's Who of Dade County. Our Sunday morning forays many times included visits to Nell Montgomery Jennings to collect seeds, to the Von Paulsen's Orchid Nursery in the Redland in south Dade County, to Marge Corbin or Isabelle Krome (founder of the Mary Krome's Bird Sanctuary in the Redland). Lucita knew the location of every fruiting palm tree in Miami and when to collect the seed. Her favorite Nell Montgomery Jennings story was of Nell's search for the largest *Washingtonia* in the state to present to her husband as a birthday present. It took yards and yards of red ribbon to decorate it!

Lucita also loved to listen. I shared with Lucita my own stories coming from the prairie state, of my relatives going to school with Abraham Lincoln at New Salem and other stories concerning our fifth generation family farms. I told her how startling it was to discover that during the last glacial age, according to a favorite geology professor at the University of Illinois, a glacier descended down the state leaving its terminal moraine on my Uncle Albert's farm, creating some of the best "bottom land" for farming in the state.

Perhaps Lucita's favorite story was of our trip to the extraordinary Seychelles, the land of the double coconut, *Lodoicea maldivica*. In April 1985, the Royal Horticulture Society advertised a tour of the Seychelles led by John Dransfield. The trip was a must for palm-ophiles and the trip was magic. It was fall in the southern hemisphere and all the Seychelles palms were in fruit. We enjoyed the Vallée de Mai, walking under the forest giants, especially with John Dransfield and his wife telling the story of the magnificent double coconut. I spent three days arranging for the permits to ship 34 viable seed and was able to handpick each seed. Lucita was enthralled not only to see the palms, but to find that seed was available. The foresters, while scouring the forest for the seed, found five just starting to germinate and, of course, offered them to me. Aware of the delicate nature of the coco-de-mer's borassoid palm root, I knew that these five would have to be carefully packed and hand-carried. As leader of the tour, John Dransfield was aghast, afraid that members of the group would be asked to assist me carrying these enormous 50 pound giants onto the plane. Lucita heard his comments and just winked at me and said "Don't worry, De, we will handle it when we get to the airport." At the airport in Mahé, she ordered a wheelchair, promptly sat down in it, and loaded the sides of the chair and her lap with double coconuts. She winked at me again and said "Age has its privileges." I never heard another comment from John during the 14 hour flight back to London. Lucita's fondest memories from this trip also included the sunset of Bird Island in which she viewed thousands of fairy terns seen with South Florida Palm Society members Libby Besse and David Hertzberg.

One of my favorite Lucita stories was her "birding" expedition to the Galapagos Islands where, during a boating mishap, she and her friend Ruth Shatz were lost overboard and bobbed in the water for nearly three hours before they were rescued. She said her thoughts were pleasant "Won't it be nice, my nieces and nephews will talk about their Aunt Lucita who was lost in the Galapagos." Needless to say, both women survived but at the time I knew that Lucita had recognized her own mortality and had accepted it with grace and dignity.

The Palm Society Seed Bank

Lucita Wait took charge of the Palm Society seed bank from Nat DeLeon in the early 1960s

and for the next 20 years, she was the source of seeds for most of the palms available to Palm Society members and botanical gardens around the world. Palm seeds were distributed to members in South Africa, Thailand, Japan, Central and South America, Australia, and the United States. Due to David Fairchild's and Colonel Robert Montgomery's efforts, Miami had become one of the "palmiest" cities of the world. Lucita distributed the treasures that the two men introduced.

Lethal Yellowing

In July 1971, a serious disease called Lethal Yellowing was found to be killing over 50 coconut palms in a Coral Gables neighborhood. This was the beginning of a terrible plague that has killed over five million palms in south Florida. Lucita realized from the beginning the need for many new palms and greater diversity in germ plasm. She served on advisory committees and her background work resulted in funding for a research program. The Seed Bank hummed as the Society stepped up its efforts to obtain more palms from around the world. Madame Ganna Walska chided us, but nevertheless, sent \$10,000.00 to the Seed Bank to honor her beloved California nurseryman, Otto Martens. Lucita was especially pleased to help sponsor numerous scientists in their field work, the late Harold E. Moore, Jr., above all. Hal Moore, who originally considered Lucita just another garden club lady, sent seeds from New Caledonia; John Dransfield sent seeds from Asia. Several hundred seed accessions were shipped out during these heady times.

Palm Beach County Chapter

Lucita helped with the inaugural meeting of the Palm Beach County Chapter of the Palm Society in 1972, drawing over 300 members from the Palm Beach area. She was excited about seeing so many new members and the lovely palms for which the area is named. She and Ruth Shatz, during their travels, always brought along a roster of Palm Society members so that they could visit the proud members' "children," meaning the palms, of course.

Freeze of 1977

On January 20, 1977, the day on which President Carter was inaugurated, snow fell in Miami.

For four consecutive nights, temperatures ranged from near freezing to the mid-20s. It was a tremendous jolt to see all the "fried" landscapes and rotting vegetation. Lucita helped deal with the shock. She said "it will all come back; always has." And it did. She said that Liberty Hyde Bailey's advice after visiting south Florida during a similar freeze in the 1940s was to "Wait, Watch and Water." It worked in 1977, as a good portion of the plant material did grow back after we recommended pruning once the resprouting had occurred.

Hurricane Andrew

In the early morning hours of Monday, August 24, 1992, a devastating category four hurricane visited south Florida with 160 mile per hour winds cutting a swath through south Dade, from Killian Drive south some 20 miles through Homestead and Florida City. Over 50,000 homes were badly damaged or destroyed and 803 nurseries were flattened and mangled. My home along Killian Drive was heavily damaged, and the palm garden was destroyed with nearly 500 palms twisted, torqued, and snapped. Lucita's advice buoyed my spirits again. She arrived with her brother-in-law, Bill Smith, carrying food for my parrots, and helped me survey the damage. Having experienced numerous storms, she predicted that the landscape would come back. Once more, she was right; it has.

It is now September 26, 1995, and the family farm is gone as my father, nearing 80, has retired. The occasion is the Broward Palm Society Show at Flamingo Gardens, a site featuring lovely century old oaks, palms, and peacocks. It is hot and sticky but thousands of palms, of perhaps 400 species, were available at incredibly reasonable prices. Long-time member, Gertrude Cole, is there looking as spry as ever. Of course, Teddie Buhler and Phyllis Sneed came seeking goodies for their gardens. I expect Lucita to arrive any moment as this show is her heritage. I am shocked to realize how few of the new members know of Lucita and how important it is to make her seem alive again through memories of this extraordinary woman.

So how do I tell all of the stories of her grace, dignity, and serenity; the stories of simple pleasure with palms and birds; the story of the Lucita palm; the story of her 90th birthday (Fig. 3), her sister Helen and brother-in-law Bill's house shared with Lucita, a warm family home filled with flowers



2. *Ptychosperma waitianum* photographed in the wild by Ken Foster. 3. DeArmand Hull and Lucita celebrating her 90th birthday.



and 150 cards from Palm Society members from around the world; and the story of Lucita Hardie Wait Day proclaimed by the Mayor of Miami on May 13, 1993. I last saw Lucita at our regular Sunday morning breakfast in early July, 1993. She was excited about visiting her brother, Charles, in Montreat, North Carolina. She left the next week and enjoyed a week with him before suffering a series of debilitating strokes. Her memorial service was held in Miami's First Presbyterian Church on March 22, 1995. Her ashes were scattered among the grove of *Ptychosperma waitianum* at Fairchild Tropical Garden by her loving family of nieces and nephews, sister and brother. Her last

wish was to spend eternity among the palms at David Fairchild's and Colonel Montgomery's Fairchild Tropical Garden.

It is still possible to see Miami through Lucita's eyes, a paradise, a lovely community of dooryard palms and flowering poincianas. Lucita's generosity and public service can best be described by the famous story of San Michelle where Axel Munthe says "what you keep yourself, you lose; what you give away, you keep forever." Her legacy is the thousands of dooryard palms that grow around the world. She made the world her garden. I shall miss Lucita Hardie Wait for as long as I shall live.

Memories of Lucita Wait and Mel Sneed

Lucita Wait was one of my first contacts within the Palm Society. She had a very strong influence on me and my early love of palms. I joined the IPS about 1970, while Lucita was managing the Seed Bank for the Palm Society. I was a new member from Texas with only a very limited number of species available locally. I remember that she was very courteous and helpful to this Palm Society neophyte and got me enthusiastic about growing palms from seeds (which she generally supplied). Lucita had served Fairchild Tropical Garden as Librarian and Curator of the Fairchild Library and Palm Products Museum during the early years of the garden, so she also provided a knowledgeable introduction to that wonderful garden for me.

My first attendance to a Palm Society Biennial meeting was in 1974 in Florida, where I met Lucita in person for the first time. I obtained a copy of Lucita's earlier book "Fairchild Tropical Gardens—the First Ten Years," published in 1948 by the Roland Press in New York. It was fascinating reading, as was her later article on Fairchild Tropical Garden history published in the January 1967 issue of *Principes*. [Lucita's January 1967 *Principes* article is available as a

text file on the InterNet by anonymous ftp from RTP.PALMS.ORG by any Palm Society member or GENie users can also get it from the GENie PALM RT Software Library. The file is entitled FAIRCHIL.HIS].

Early biennial meetings were also where I met Mel Sneed. My primary memory of Mel is him roaming the grounds, examining as many palms as possible. He did that at most, if not all, of the biennials I attended until just a few years ago. He was always enthusiastic and quick to share his extensive travel and palm experiences with me and others in the Society. A quick browse through earlier issues of *Principes* will provide newer members with insight into many of his palm explorations, captured in the journal. Those trip reports make for fascinating reading. Mel's wife Phyllis and daughters, Sally Betts and Sarah Morlang, remain palm enthusiasts. They are each active in their respective IPS chapter activities.

Both Lucita and Mel will be much missed by those who were lucky enough to know them. I'm glad I can count myself amongst that number!

JIM CAIN

LETTERS

Lucita Wait

Lucita had invited me to see the palms at Chapman Field in South Miami. I could only accept the invitation in July—before air-conditioning in cars (probably about 1954–1955). So it was on a hot humid day that we found ourselves giving blood to the ravenous mosquitoes that inhabit the area. But Lucita insisted I see each and every palm. We went on to her garden where she had a fine “Cabadae.” Then she served a tasty roast chicken dinner.

I have a *Ptychosperma waitianum*, but I don't need it to remind me of the long friendship that began on that muggy day.

GERTURDE COLE

23 August 1995

Dear Dr. Uhl,

Lucita H. Wait's passing, noted in *Principes*, July 1995, saddened me very much. I was on a first name basis with her for years. I originally met her at Fairchild Tropical Garden when I purchased one of Dr. David Fairchild's books and left it with her for him to autograph. I still have the book. Also she knew of the then new Palm Society and I signed up as a charter member. I have a complete set of original copies of *Principes*, as well as other early palm publications. Since then I have added many books and papers on palms, many autographed by the authors. . . .

DILLWYN W. PAXSON

Dr. Uhl:

You will want to know: Lucita Hardie Wait died Feb. 21, 1995. Her leaving was as she lived, with grace, dignity, serenity, and with little pain.

Our sister's greatest pleasure was the world of plants and birds.

—A charter member of Fairchild Tropical Garden, she wrote “Fairchild Tropical Garden—the First Ten Years.”

—Charter member of the International Palm society, she was its executive secretary and seed distributor for many years.

—She was thrilled to have a palm named for her: *Ptychosperma waitianum* (from New Guinea) See p. 39 and back cover.

—She traveled the world to visit famous gardens and to catch a glimpse of rare birds, large and small.

Her 90th birthday in 1993 was celebrated by birthday cards—yours and 150+ others! The house was filled with flowers from De and David. Besides a Biscayne Study club luncheon at Betty Kaynor's in Coconut Grove, she was honored by AAUW Tamiami Branch and a City of Miami PROCLAMATION by the Mayor, LUCITA HARDIE WAIT DAY, May 13, 1993.

A memorial service was held at First Presbyterian Church of Miami where family and friends gathered to celebrate her life.

HELEN HARDIE SMITH, Miami, FL
CHARLES ALVA HARDIE, Montreat, NC

Lucita H. Wait

Lucita Wait had been a resident of Coconut Grove for some years when Fairchild Tropical Garden was formed. She knew many, if not all, of those who came together at the dedication of the Garden in March of 1938. Her name appears on the list of those signing that day. She had surely been involved with the work that had gone on for some years to make the Garden a reality. She seemed an integral part of the group of those I recall from those early years—Col. and Mrs. Robert Montgomery, Dr. and Mrs. David Fairchild, and many others. She wrote a book “Fairchild Tropical Garden, the First Ten Years” in collaboration with Col. Montgomery detailing the early days, knowing that often there is little record of such beginnings.

A popular and early project of the Garden was the yearly distribution of plants. They had been propagated from varieties not to be found at local nurseries, many of them introduced by Dr. Fairchild. Among the ones I got in the 40's were palms. Not all lived, of course, but among my favorites were *Heterospathe elata*, *Veitchia merillii*, *Caryota mitis*, and several *Chamaedorea* spp. Lucita could answer questions about the plants for she had grown up in the tropics and knew so much more than those of us who had grown up in cold climates. She was always helpful. I remember her telling me to be patient, my *Heterospathe* really would, in time, form a trunk. And it did!

One of the people drawn to the Garden was Dent Smith of Daytona Beach, Florida. He had a property in a warm area surrounded by water. He had fallen in love with palms and when he came to Miami, Lucita and he looked at Fairchild's ever-growing collection of palms. He asked her "Why is there not a society for those of us interested in palms? There are Rose, African Violet and Orchid societies, yet the noblest plants of all, the princes of the plant kingdom, have no society of their own." Lucita suggested that he start such a society. She was instrumental in helping him do so. The Palm Society was established in 1956. Unfortunately, few of those who joined back then are still alive, but all of us saw much of Lucita and Dent. Nat DeLeon was the first Seed Bank Chairman. He was the Horticulturist at the Parrot Jungle in Miami and had been sending away for palm seeds for some time. He soon asked Lucita to relieve him of that chore although she was already the Executive Secretary of the fledgling society.

I remember well going to see Lucita and entering the former garage, which had become her guest house, but in time turned into the Seed Bank Room. Scattered about on any flat surface were dishes and trays of all kinds holding the seeds Lucita had carefully cleaned to ready them to be sent out. At least two fat looseleaf notebooks were lying there with the names of those members who had requested seeds from the list Lucita had compiled and sent to all members. The requests of each member had been carefully noted and in another notebook were the lists of palms that had appeared on the ever-lengthening list of what was potentially available. Then she matched the seeds with the requests; if 50 seeds had become available (from Fairchild Garden or members who had mature plants) she apportioned them as fairly as possible. The work became ever more time-consuming and finally, in 1972, Lucita asked me to relieve her of being Executive Secretary. My first reaction was that I could not possibly handle so important a position that carried much responsibility. She insisted and promised to help me. At that time there were only about 600 members and the society had a Corporate Secretary, so at least the minutes were not included among my duties. Otherwise I handled everything in the way of secretarial work now done by Allen Press. Lucita was ever ready to come to my rescue. In time I enjoyed my job and also grew to know and appreciate Lucita better. Once when I had gone to see her, she invited me to stay to lunch, which she

was about to prepare. I knew she was an excellent cook for when we had meetings at her house she always had unusual dishes using the tropical fruits or vegetables with which she was familiar. I still vividly recall that lunch of delicious sandwiches of cold tongue on rye, and the red bananas from her garden she had sauteed to go with them.

Once she had some extra *Zombia antillarum* seed, so she threw the box containing them over the railing of her little back porch. Sometime later she went to retrieve the box; the seeds had sprouted under it, to her amazement.

Lucita and her friend and society member Ruth Shatz often traveled together. As soon as they arrived at their destination, Lucita would find a public telephone, and with a purse full of change, call any Palm Society member nearby, asking about their palms, their gardens, and thus making each one feel a part of the society. Her heart was in the society, its members, and its doings. Her presence and dedication were of great help, especially in those early days.

Lucita was a gifted flower arranger. She often made stunning arrangements using some of the exotic flowers and palm parts that were available to her at Fairchild Garden.

Those of us in the Society today owe her a debt of gratitude for all she did to nurse along the infant society and to help it achieve the worldwide membership it now has.

TEDDY BUHLER

26 October 1995

Mr. Landon Lockett
3210 Stevenson Avenue
Austin
Texas 78703

Dear Mr. Lockett:

Thank you for your letter of August 22, 1995. I apologize for my delay in replying, but I was out of the country all of September, and am only just catching up with correspondence.

Firstly, you are quite right. In the treatment of *Sabal mexicana* in our book (A. Henderson, G. Galeano, and R. Bernal, 1995, *A Field Guide to the Palms of the Americas*, Princeton University Press) we misrepresented your 1991 article in *Principes*. Instead of "Lockett (1991) considered that palms in the lower Rio Grande in Texas were

hybrids between *S. minor* and *S. mexicana*" (p. 66), we should have written "... considered that palms north of the lower Rio Grande . . ." We apologize for this oversight. . . .

Second, you also point out in your letter that our map of the range of *Sabal mexicana* (Map 78 in our book) is incorrect, in that you discovered a population of this species 200 miles north of the lower Rio Grande. You published this discovery in an article in a paper in *Sida* in 1991. Unfortunately we were not aware of this paper, hence our incorrect map.

Thank you for pointing out these mistakes. I am sending a copy of this letter to the editors of *Principes*, Drs. Natalie Uhl and John Dransfield. Perhaps they will want to publish it. I hope so, because this will serve to rectify our errors, and bring attention to these interesting palms. I wish

you luck in your efforts to conserve *Sabal* in Texas.

Sincerely

ANDREW HENDERSON

Associate Curator

Institute of Systematic Botany

Editor's note: North of the Lower Rio Grande Valley there are three kinds of native palms: *Sabal mexicana*, *Sabal minor*, and the Brazoria palms. The latter, whatever they may be, occur in Brazoria County, Texas, some 240 miles northeast of the Lower Rio Grande Valley. As part of an effort to preserve these unusual palms, the IPS contributed \$1000 to help the Nature Conservancy of Texas purchase the site.

Principes, 40(1), 1996, pp. 48-58

CHAPTER NEWS AND EVENTS

European Palm Society News

The Spring 1995 issue of *Chamaerops*, journal of the European Palm Society, featured articles from around the globe. Authors from Austria, Australia, New Zealand, Germany, Spain, USA, and the United Kingdom supplied materials for this issue. Articles included palms and destinations in Australia (Royal Melbourne Botanic Garden), Portugal (Madeira), India (*Phoenix rupicola*), USA (*Rhapidophyllum hystrix* in Georgia), China (expeditions for new *Trachycarpus* species), Spain (a Malaga palm garden), Venezuela (in search of *Ceroxylon*), Germany (a Frankfurt garden), as well as growing experiences in Austria and the United Kingdom. Later issues also continue this international flavor, indicative of the wide international membership of the European Palm Society.

In early September, Martin Gibbons held an "open day" at his home garden in Stockwell (south London) for members of the European Palm Society. His garden features *Trithrinax acanthocoma*, *Parajubaea cocoides*, several *Chamaerops* and *Trachycarpus* spp., a small *Ceroxylon*, and numerous bamboos, ferns, and other plants.

News from New Zealand

The Palm & Cycad Society of New Zealand met in September 1995 for Gordon Waddel's presentation of slides from his recent Hawaii trip. At the October 3 meeting, Dick Endt gave a slide presentation on his recent trip to Bolivia, Argentina, Chile, and Peru. On November 7, Ron Goodwin of Wilbow Corporation spoke to the society on his involvement in the "Palms" subdivisions, showing his experience with the use of mature palms.

Society members were also invited to attend a meeting in Wellington hosted by the government MAF on September 14. This meeting was designed to brief the plant importing industry of MAF's new obligations under New Zealand's Biosecurity Act of 1993. Hopefully a second meeting in the Auckland area can be arranged.

Current officers for the Palm and Cycad Society of New Zealand are Steve Dodds (President), Gordon Waddel (Vice President), Kevin Johnston (Secretary, Editor, and Past President), John Lok (Treasurer), and Frank Seth (Librarian). In addition, Kevin, Frank, and Steve take care of the society's Seed Bank.

News from Southern California

The 20th Annual Banquet of the Southern California Chapter of the IPS will be held on January 20, 1996 at the Hyatt Newporter, 1107 Jamboree Road, Newport Beach. A garden tour will begin at 10 a.m. Cost for the banquet is \$30 per person, including parking.

This hotel will also be the host hotel for the 1996 IPS Biennial Meeting to be hosted by the Southern California Chapter on August 3–9, 1996. Tentative tour sites are Huntington Gardens, Sherman Garden, Los Angeles Arboretum, Lotusland, and many private gardens. More information will soon be forthcoming.

The September 1995 chapter meeting at the San Diego Zoo was a great success. John Tallman reported at least 183 attendees—a new record high. Ken Foster gave a very interesting presentation, “Twenty-Five Years of Palm Collecting in Jungles of the World,” leaving members with much historical information on some key people in the development of the Palm Society—as well as about the difficulties of collecting seed in remote places.

John Tallman has resigned as Chapter President effective January 31, 1996. John will be succeeded by Gary Wood, whose wife Lynette edits *The Palm Journal*. John will continue as Vice President until the next regular elections.

The Palm Journal continued its focus on a specific palm genus with each issue. The July 1995 issue's focus was *Licuala*, with the September focus on *Brahea* species. The November 1995 issue focused on *Coccothrinax* palms. Several other interesting articles were included in each issue.

Pacific Northwest Chapter News

The Pacific Northwest Palm & Exotic Plant Society (PNWP&EPS) met on September 18 for an interesting slide show on their recent trip to Scotland by Pat and Bill McEwan. The slides of the flora and ancient castles were great. Featured were the Glasgow Botanical Gardens, Younger Botanical Garden with rows of old California redwoods, Achamomre on the Isle of Gigha, Inverewe, Dunrobin Castle Garden, and the Royal Botanical Gardens of Edinburgh.

The November 27 meeting featured a talk by member Gerard Pury of Oakridge Landscaping on how to winterize your palm. Gerard has the distinction of planting more palms outdoors than anyone else in Canada starting from back in the

1960's. Gerard received his professional horticultural training in Switzerland, and is an expert on the palms of southern Switzerland. In addition, President Rudi Pinkowski gave a slide presentation of the history and plantings of exotic plants in southern Russia (e.g., Sochi by the Black Sea).

President Rudi Pinkowski announced an agreement by the chapter with the Vancouver Parks Board on a new joint venture to add another *Trachycarpus* palm planting at the corner of Denman Street and Beach Avenue by English Bay, for spring 1996 planting. This location is just north of the flagpoles right near this year's spring palm planting by the famous Sylvia Hotel. This will bring the number of public palm plantings between Beach and Pacific and Beach and Denman to well over 50 palms, not counting the ones planted by the commercial developers in that same area. This area along Beach Avenue, which draws lots of tourists, is becoming Canada's first palm drive. The PNWP&EPS is very thankful for a generally open-minded parks board that is willing to listen to a group of palm enthusiasts.

At the November meeting, a reliable source of alternate cold-hardy palms in Vancouver was announced. Terra Plants and Flowers of Vancouver has *Butia capitata*, *Jubaea chilensis*, *Sabal minor*, and *Trachycarpus wagnerianus* available in large-sized containers.

News from Southern Queensland

The Southern Queensland Group (SQG) of PACSOA met on September 18, with discussions on *Dioon* and *Encephalartos* cycad species. The meeting featured slides and talks on Madagascar from recently returned members. A guest speaker from D.P.I. was arranged by Nick Phillips. The November 20 meeting focused discussion on the palm genera *Chamaedorea*, *Geonoma*, *Synechanthus*, and *Phoelidostachys*.

The SQG held an outing on October 22 at the home of Rudy and Murial Meyer in Cashmere. This was an “open day” for members to view and discuss the garden and enjoy each other's company.

The group's 1995 Christmas Party was held on December 3 at the home of Peter and Nadia Beer in Foresdale. The Beers provided the luncheon meal, with each attending member bringing a salad. The swimming pool was open for all to enjoy.

News from South Australia Branch of PACSOA

The Palm and Cycad Society of South Australia (PACSOSA) branch of PACSOA met at the Waite Arboretum in Netherby on April 23, 1995. This meeting allowed members and guests to check on the performance of PACSOSA's past plantings at the Arboretum and add to those plantings. A field trip was held to the Adelaide Botanic Gardens on June 4.

The group met on September 2 at Peter Engel's Garden Center in Salisbury Plains. After a tour of the center, members departed to view the garden and plant collection of Bruce Mules. Plants were also offered for sale by Bruce. An extra bonus was the wonderful collection of orchids, as Bruce has one of the best collections of native orchids in South Australia, many of which were in full bloom at the time of the meeting. Tea and biscuits were supplied.

PACSOSA also met on October 22, 1995, at the Waite Arboretum, to again check on progress and add additional plants to the collection. The society held a BBQ after the planting, with meat, bread, sauces, and soft drinks supplied.

A Chinese banquet was tentatively scheduled for November 26.

News from the Sydney Branch, PACSOA, Chapter

The Sydney Branch of PACSOA and Chapter of the IPS met on July 18 at the Maiden Theatre, Royal Botanic Gardens, Sydney. John Reid gave a slide presentation on the trip to China that he made with his wife Judy. The usual palm and cycad auction was held after John's presentation.

On Sunday, September 17, the group visited the "Australia in Springtime" Flora Festival at Mt. Penang, Kariong near Gosford. The group met at the Impact Plants stand conducted by member Paul Anderson.

The September meeting featured slides of palms and cycads in France and Corsica by Peter Kristensen, and Paul Anderson showed slides of a recent trip to Lord Howe Island.

The Chapter's Christmas Party was planned as an informal BBQ at Paul and Elizabeth Anderson's at Empire Bay, starting at 4 p.m.

The International Palm Society has made an Endowment Fund grant of \$500 to the Sydney Chapter of the IPS for construction of interpretive

signs at three locations in New South Wales: Bass and Flinders Point, Hunter Region Botanic Garden, and the Joseph Banks Native Garden. This was in response to a letter request by Peter Kristensen to the IPS. The signs will hopefully better educate the public about palms.

Sunshine Coast (Australia) News

The Palm & Cycad Society, Sunshine Coast Group of Queensland, Australia, met on October 2 at the Nambour Band Hall. The theme for this meeting was "Madagascar night," with display, discussion, and identification of many different palms native to Madagascar. Stan Walkley presented slides taken on his recent trip to Madagascar. Even palm sales for the evening focused on Malagasy palms, with a selection of rare Madagascar palms offered as raffle prizes. An array of *Dioon* leaves was also displayed for the cycad enthusiasts.

The October 1995 issue of the brief chapter newsletter featured a very informative article by Michael Ferrero on the New Guinea palm species *Calyptrocalyx polyphyllus*. A nice photograph by David Warmington of the palm, showing the very attractive maroon new leaves, was also enclosed in the newsletter.

The Palm & Cycad Society of Mackay (Queensland, Australia)

The Palm & Cycad Society of Mackay (branch of PACSOA) met on August 27 at the home of Keith and Ailsa Boyden in Farleigh. They have made full use of their block, which slopes down to a valley below. Palms, native plants, and exotics all blend in perfect harmony. Meetings were also held on September 24 at the Lew and Betty Dovey garden in Mackay; on October 22 hosted by Dwayne and Michelle Shea at Coral Coast Nursery, Cape Hillsborough Road, Seaforth; and on November 26 at the Farleigh Mill Palm Gardens.

News from Gold Coast—Tweed (Australia)

The Gold Coast—Tweed Palm & Cycad Society of PACSOA met on October 15 at the property of Sue Rice in Runaway Bay. After a potluck lunch, the group visited several local nurseries specializing in palms and cycads. A palm giveaway and raffle were held as well.

News from North Queensland

The North Queensland Palm Society (NQPS) met on July 10, 1995, at Tumbetin Lodge, The Palmetum. This meeting was an "in-house" night, featuring various slides on palms and cycads by members. This included a presentation by Lorraine Tooth on *Zamia* cycads, including *Z. neurophyllidia*, *Z. manicata*, *Z. muricata*, *Z. fischeri*, *Z. lindenii*, *Z. lucayana*, *Z. pumila*, and various forms of *Z. furfuracea*.

As mentioned earlier, the NQPS hosted various other groups on the Queen's Birthday Celebration, June 10–12. According to NQPS President Chris Gray, this was "the most successful weekend event that the NQPS has ever staged." Guests came from Rockhampton, Mackay, Cairns, Kuranda, Mission Beach, and El Arish. Frank and Lorraine Tooth get much of the credit for their long hours arranging the meals for Saturday and Sunday evening. The Goetz brought a truckload of rare palms and *Zamia* cycads for sale. Events kicked off on Saturday at Anderson Park, where John Dowe conducted a very comprehensive tour of the bush house, with its numerous cycads, palms, and other plants. Afternoon tea was served at Day Dawn Nursery, with dinner that evening at Brothers League Club, where local members were able to get to know the visitors.

Sunday was a full day, beginning at the Townsville Palmetum with John Dowe again being a stellar guide. Next visited was John Hayne's perfectly presented collection. His specimen of *Mauritia flexuosa* was absolutely stunning. Morning tea was held at Garden View Nursery, then onward to Jessie Robert's home featuring many ferns and shade-loving palms as well as lots of well-grown larger plants and palms. One of the highlights was a *Wodyetia bifurcata* (foxtail palm) in fruit at a young age. The group then visited, in sequence, the seven gardens of Jill Whalley, Barb Davies, the Byrnes, Anita's Nursery, Mark and Windy Crisp, Geoff Jones, and Chris Grey, with a brief lunch between Barb Davies and the Byrnes gardens. Each of these gardens offered some special features or ambiance. The weekend was topped off by a wonderful BBQ at the Tooths' home with her vast and varied collection of cycads. The meal was preceded by slide shows by Peter Gunmow and Peter Heibloen. This annual Field Day for the Queen's Birthday Weekend is already planned to be repeated in 1996!

On August 27, the Seventh Annual Botanic

Gardens Plant Sale was conducted at the Anderson Park Botanic Gardens, Mundingburra. Friends of the Palmetum and the NQPS had booths and a book stall.

The NQPS met on September 11. It was announced that members Shane and Jill Whalley had won the Townsville and Thuringowa Garden Competition, winning both "Best Palm and Cycad Garden" and "Best Overall Garden."

News from Western Australia

The Palm & Cycad Society of Western Australia (PACSOWA) met on September 18 at the Leederville Town Hall for an "audience participation meeting." Members brought a favorite palm or cycad to be displayed, judged, and discussed. Prizes were given to George Sevastos and John Banasiewicz for the "best palm" and the "best cycad," respectively. Ken Lee presented a short talk on *Arenga engleri*, one of his favorite palms. A raffle was held following the meeting. This same meeting format was repeated for the November 20 meeting.

The October 16 meeting of PACSOWA featured a slide show extravaganza. Neil Jones obtained the full slide collection of the Townsville Palmetum, prepared by John Dowe, produced by the PACSOA Publication Fund, and scripted by Tom Turner. The collection consists of about 130 slides in two parts.

Work days on the palms of Gascoyne Park were held on September 23 and October 21, to help with weed spraying, planting, and fertilizing of plants to prepare for Spring visitors. Ten members turned up for the September work day and seven in October. New plantings included eight *Livistona rotundifolia*, one *Pritchardia hildebrandii*, two *Phoenix roebelenii*, one *Roystonea regia*, two *Encephalartos gratus*, and two *E. manikensis*. The group also reported that two medium-sized *Archontophoenix* palms had been stolen from near the margins of the park. BBQ with special sauce was provided to all workers. Another work day was planned for November 26.

About 20 members of the *Rhapis* Study Group of the society met on October 29 at the home of Norm and Gwen Patterson. This was an excellent opportunity to see Norm's collection, which includes many variegated *Rhapis*.

A Christmas Party was held at Gascoyne Park on December 9, *in lieu* of a December general meeting. The Society catered for 75 adults and

30 children. A magic show was given at the Tim Erceg Gazebo by James Sleight, one of Perth's leading magicians. A "monster" raffle followed with loads of prizes.

News from Central Florida Chapter

In late October, the Central Florida Palm Society hosted the International Palm Society Board Meeting in the Sarasota/Tampa area. Venues visited by the IPS Board included the home of Libby and Byron Besse, Marie Selby Botanical Gardens, and the Field Club in Sarasota, all prior to the weekend. Many thanks to Ed Hall and Libby Besse for their hard work in making the IPS Board Meeting such a success. Thanks also to the Central Florida Chapter for contributing the Friday evening meal at Selby Gardens for the IPS Board members and their guests. More about the IPS Board Meeting and directly associated events are provided elsewhere.

The Central Florida chapter also hosted the board at the chapter's regular fall meeting. This began on Saturday, October 28, at the Gizella Kopsick Arboretum in St. Petersburg, then moved onto the home of U. A. and Ben Young in Tampa. Following tours of these two gardens, an auction was held at the Young's, netting \$696 for the chapter coffers. Auctioneers were various IPS board members from California, Texas, and Florida. Items auctioned included palms, cycads, and a lovely palm carving by Bernie Peterson. Additional wood palm sculptures by Bernie and palm artwork by Lori Harrell were available for sale. Some rain fell during the auction, but not enough to dampen enthusiasm for the event. To cap the evening, Roy Works gave a presentation on the 1994 joint European Palm Society/French Palm Society Meeting in France and Italy and cycads of South Africa, and led a discussion on cycads used in the central Florida landscape.

On Sunday, the chapter meeting began with a tour of Roy Works' palm and cycad collection. The final stop of the palmy weekend was a tour of Ted Langley's collection in Lutz, just north of Tampa. As an added treat, Ted planned a fall-off-the-bone pig roast and full lunch for members' pleasure.

The Annual Fall Sale of the Central Florida chapter took place at the Harry P. Leu Gardens on November 11 and 12. Thanks to Hersh Womble for his efforts on the sale.

The Heathcote Botanical Gardens in Ft. Pierce held their Eighth Annual Garden Festival on November 18 and 19.

News from the Palm Beach (Florida) Chapter

On September 16, the Palm Beach Palm & Cycad Society held a picnic and giant auction at the Norton Sculpture Garden in downtown West Palm Beach. Chapter elections were also conducted. Paul Craft was elected President and Richard Radcliff is the new Secretary. All other officers (as listed in the 1995 IPS Membership Roster) remain in office for the upcoming term.

On October 4, the chapter met at Mounts Botanical Garden to hear Raymond Jungles, prominent south Florida landscape architect. He spoke on how to use palms and cycads in a natural-looking landscape. A plant auction followed. The group met again on November 1 to hear Richard Moyroud of Mesozoic Nursery. Richard spoke on the palms of the Amazon River region and his recent trips there.

The Palm Beach Chapter's annual palm sale was held on October 7 and 8 at Morikami Park in Del Ray. The event was a big success.

The World Palm Symposium 1995 held on October 20 and 21 was a big success, with about 180 palm enthusiasts gathering from around the globe for this event. Special thanks to Paul Craft and his helpers for producing and orchestrating such a fine gathering. About 150 people attended the buffet dinner and Dennis Johnson's wonderful talk on conservation. More about this event in a separate article.

The group held their Annual Christmas Party on December 6, with lots of holiday snacks and a good offering of auction plants.

News from Broward County, Florida

The Broward County Palm & Cycad Society (BCP&CS) met on September 28 to hear Dr. Terrence Walters of the Montgomery Foundation speak on "The Montgomery Foundation: the Past, the Present and the Future." His lecture discussed the beginnings of the Montgomery Foundation in 1959 and followed its growth through today.

The chapter has provided several palms and other plants to the Lighthouse for the Blind's Sensory Garden, located at 650 N. Andrews Avenue,

Ft. Lauderdale. If you stop in you can smell and feel a Teddy Bear Palm (*Dypsis lastelliana*), a Bottle Palm (*Hyophorbe lagenicaulis*), a Cardboard Plant (*Zamia furfuracea*), a *Coccothrinax alta* and a Ylang-Ylang or Perfume Tree (*Cananga odorata*). Many thanks to George Zamas, Jeff Searle, and Jack Miller for donating plants for this garden.

The Chapter's annual picnic and BBQ was hosted on October 28 by the Montgomery Foundation, located at 11901 Old Cutler Road in Miami. Dr. Terrence Walters, Larry Noblick, and Duane Willis were hosts for the Foundation, which has 120 acres of tropical plants with an emphasis on palms and cycads. Members of the French Palm Society were guests of the Broward Chapter at this event.

News from the South Florida Chapter of the IPS

The South Florida Chapter of the IPS held their annual sale on November 4 and 5, at Fairchild Tropical Garden. More details will follow later on this show and sale—always a unique event!

The Chapter met on October 24 at Fairchild Tropical Gardens to hear Nigel Harrison, University of Florida virologist and Lethal Yellow expert. An auction followed the meeting, with many palms available. Free seeds were also distributed.

Fairchild Tropical Garden held their 55th Annual "Ramble" on December 2 and 3, 1995. This popular garden festival offers information (and specimens) about all sorts of plants. In addition, there are children's activities, arts and crafts, entertainment, exhibitions and displays, garden gifts, books, and more. As always, the event was well attended.

The South Florida Chapter held a joint Holiday Season Celebration with the Tropical Flowering Tree Society on December 9. This gala event aptly took place in the "Party Room" of the Rosenstiel School of Marine and Atmospheric Science on Key Biscayne. This was a "Big Band Dinner Dance" featuring the Barry Mann Orchestra and a delicious holiday buffet.

A field trip will be held on January 27, offering a guided tour of several of the best gardens in South Dade County. The group will meet at Fairchild at 9 a.m. If interested, call Theresa Smith at 305-251-9318.

A general meeting is scheduled for February 27 at the Garden House of Fairchild Tropical Garden. Speaker will be Dr. Alan Meerow, pre-

sending "The Licury & Lears" or "The Palm & Parrot" or "Palms of Brazil."

News from the Florida First Coast Chapter

The Florida First Coast Chapter of the IPS held a joint meeting with the Southeast Palm & Exotic Plant Society on April 22, 1995. Participants gathered for a tour of the Palm and Cycad Garden of the Florida Community College, Jacksonville (FCCJ), then proceeded to the residence of Kyle and Jeanette Brown for the remainder of the day. Activities included a tour of the Browns' fine garden, a southern BBQ spread for lunch, and an afternoon of palm exchange and purchase.

The Chapter has continued its periodic maintenance of the palms at the Hart Bridge Expressway Project and at the FCCJ Garden. New 1995 additions at the FCCJ Garden include *Hyphaene coriacea*, several *Phoenix theophrasti*, *Syagrus romanzoffiana*, *Copernicia alba*, *Sabal dominicensis*, *Trithrinax* sp., and others. New labels for the garden palms are expected soon.

News from the Hawaii Island Chapter

The Hawaii Island Palm Society met in Hilo on October 16, 1995, to hear world-renowned palm authority John L. Dowe present a talk and slide show on the palms of Vanuatu. John Dowe is the Curator of the Townsville Palmetum in Australia and is the author of the book, "Palms of the Southwest Pacific." The island nation of Vanuatu is located north of New Caledonia and is known for the diversity of its palms. Door prizes and refreshments were served.

News from the Louisiana and Gulf Coast Chapters

The Louisiana Chapter and the Gulf Coast Chapter of the IPS met jointly on October 15, hosted by Maxwell Stewart and the Gulf Coast Chapter. The meeting began at noon at Maxwell's home in Mobile, Alabama. Following lunch, Maxwell conducted a tour of his extensive property, which is planted with many palms.

The Louisiana Chapter of the IPS was founded in 1987 with 13 charter members. As of August 20, 1995, the Chapter membership was announced as 64 members.

South Africa Palm Society News

The South African Palm Society journal, *The Palm Enthusiast*, states that progress is being made at the South African Palm Society's Palmetum in Hectorspruit. The pond site has been laid out and the road with a turning circle has been scraped to allow easy access to the palms. Areas have been allocated to various groups of palms. Almost 100 species of 48 palm genera are already available at the Palmetum. This is a big project and will take a lot of work by the Society. Steve Trollip also gave a brief report on the Palmetum to the IPS Board meeting in Sarasota, Florida, in October.

The South African Palm Society is in the process of publishing a book on "*Palms of South Africa*," written by member Philippe Cremer. The IPS board agreed to pre-purchase 200 copies of the book at their standard bookseller's price to provide the SAPS with advance cash to assist their publishing efforts.

News from the Texas Chapter

The Texas Chapter of the IPS met on October 7, 1995 at the home of Horace and Cynthia Ford Hobbs in south Houston for a tour of the Hobbs' garden and a "members only" palm sale. Horace was forced to give several tours to fill the curiosity of the large group of palm enthusiasts. The garden featured numerous palm species, both in the ground and in the greenhouse. Members took advantage of the many palms offered for sale, stocking up on the rare and unusual varieties offered. Cynthia served her now traditional "Mexican tamale dinner" to rave reviews as always.

News from the Venezuela Chapter

In early 1995, AVEPALMAS published their first newsletter, *Revista de Avepalmas*. The journal, published in Spanish, featured several interesting articles in its premier issue. Dr. Tobias Lasser wrote a nice general introduction to palms and long-time Venezuelan palm enthusiast Harry Gibson wrote on the "amazing and magic world of palms." President Jesús Hoyos F. wrote a detailed article on the peach palm or Pijiguo (*Bactris gasipaes*). Agronomist Javier Sobrevila presented an article on "Techniques for transplanting palms" and August Braun wrote on "Cul-

tivation of the *Ceroxylon*." Vice President Sven Nehlin wrote an article on the red palm, *Asterogyne spicata*. There were also several articles on the 1994 Caracas biennial, various palm enthusiasts participating in the biennial, and several other short articles, including a brief tribute to August Braun, who was elected a lifetime member of the International Palm Society during the biennial meeting. We look forward to more issues of this journal.

The annual Venezuelan botanical congress was held in mid-1995 in Ciudad Bolivar, and there were lectures on palms. In addition, the Botanical Garden of Ciudad Bolivar was inaugurated during this event. Many plants (including palms) typical to the Guayana region of Venezuela will be incorporated in this garden. Francisco Monaldi and others in AVEPALMAS donated many of the palms to the garden.

AVEPALMAS member Fred Stauffer has been named director of the Caracas Botanical Garden. This should help to assure continuation and care of the marvelous palm collection assembled in the garden by August Braun.

Vice President Sven Nehlin is involved in an interesting project. Sven has transcribed the notes of palm-related compositions to the digital score and converted the files in .MID files, readable by most programs that handle digital music. In the case of songs from the Venezuelan Indians, he has often put in clarinet, violin, pan flute, maraca and drums, which are the instruments those Indians have, and their sounds. Some instruments are difficult to imitate. Sven is interested in swapping with other musical files or papers, preferably related to music about palms or "nature conservation." He would also like to discuss further with others interested in "computer-generated" music. If anyone is interested, please contact him at snehlin@dino.conicit.ve by email.

1996 Biennial Meeting in California

Please make your plans for the 1996 Biennial Meeting of the IPS to be held at the Hyatt Newporter Hotel in Newport Beach, CA in August 1996. Official events will be held on August 3-9, with other related events before and after.

The Biennial will begin with the IPS Board of Directors meeting on Saturday, August 3, with most board members arriving on Friday. Saturday night will feature a 7 p.m. Welcome Dinner with

speaker at the hotel (cash bar). Sunday at 8 a.m., the group will depart by bus to Huntington Gardens (Library Annex), via commercial palm plantings near Corona Del Mar and Jamboree. Garden tour will be followed by a box lunch on the terrace and three academic speakers on palms, with departure for the hotel at 4 p.m. Dinner will be on one's own, with a continuation of the IPS Board meeting Sunday evening, if required.

Monday morning will feature a wonderful tour of Loren Whitelock's home and gardens near Pasadena, followed by a box lunch and tour at the Los Angeles Arboretum. Dinner will again be on one's own, with speakers in the evening, at the hotel.

Quail Gardens in Encinitas will be the first destination on Tuesday, followed by lunch at the Las Brisas Restaurant in Laguna Beach. The afternoon will feature home tours of Lois and Kurt Rossten and Ralph Velez. Dinner on your own, with speakers in the hotel at 8:30.

Wednesday will feature a tour of Lotusland in Santa Barbara. This will be followed by lunch and tour at Ventura College, then a tour of Pauleen Sullivan's garden. No events are scheduled in the evening.

Thursday morning will feature tours of Louis Hooper's garden in La Habra and the Cal State Fullerton Botanic Garden (with a box lunch at the garden). Lunch will be followed by a visit to Crystal Court in Costa Mesa. The IPS Biennial Banquet will take place Thursday evening at the hotel with an after-dinner speaker. This will mark the end of the scheduled biennial events, but a list of additional palm-viewing activities will be provided for those who wish to explore further on Friday and Saturday.

Cost for the above events is expected to be \$350 per person, exclusive of hotel lodging and the initial transportation of participants to and from the Hyatt Newporter. Hotel rates negotiated for the Biennial are \$125 per room, plus tax, double or single occupancy. Events for Tuesday and Thursday may be reversed and other minor changes may be made. However, all of the events and tours listed will be provided. Registration forms and additional information will soon be sent to all current IPS members.

The Post-Biennial Tour to Ecuador will depart the Hyatt at 9:30 Saturday evening, August 10, and is expected to run ten days/nine nights. The Post-Biennial tour will be offered on an all inclusive basis (including round trip airfares from Los Ange-

les). For further information on the optional Ecuador trip, contact Andrew Gilchrist at Lost World Adventures, 1189 Autumn Ridge Drive, Marietta, GA 30066, USA; fax 404-977-3095; or telephone 404-971-8586 (call tollfree from USA at 1-800-999-0558). More details will be provided soon.

Note that the Post-Biennial Tour's economical flight to Ecuador will not depart LAX until 1 a.m. Sunday morning, so members going on this trip should plan to spend Friday and Saturday touring the area on their own. As mentioned above, a list of suggested activities will be made available to all.

1995 Mid-term IPS Board Meeting via the 'FOUS DE PALMIERS' (The French Palm Society)

I was looking forward to my first mid-term Board of Directors' meeting in the Sarasota-Tampa, Florida area this year, and knew that I also wanted to get over to South Florida for palm viewing. The only problem was that I didn't know if I should go before or after the Board meeting and I didn't particularly want to go down there on my own. Quite fortunately, just about that time, Steve Swincoe, an American who is living in France, and a member of IPS and the French Palm Society, contacted me to invite me to accompany them on their second tour of the various palm capitals of the USA. I met them on their first tour to California last year. Steve called me several days before leaving and offered to pick us up at the airport and take my wife, Nilda, and me to the Dzerland Hotel in Miami Beach where the 'Fous de Palmiers' were going to stay. I really appreciated his generous offer. The hotel obviously caters to Europeans because I heard almost no English spoken by the various guests there. We arrived on Friday October 20 and got settled in. The next day, there was a bus waiting outside the hotel to take all of us to Fairchild Gardens. I had been there before, but for some reason never saw *Kerriodoxa elegans* and *Satakentia liukiensis*, both of which are marginal here in California. The *Kerriodoxa* was, for me, the most impressive, gorgeous-looking palm I saw that day. I have had a *Kerriodoxa* for years, but it has failed to do any significant growing. I would love to see someone else try to grow that palm in a warmer frost-

free area than that which I have. Ditto for the *Satakentia*.

Inasmuch as the Palm symposium was also being held at Fairchild that weekend, I sat in for one of the presentations. It was about Lord Howe Island and was most interesting. I asked the speaker (who lives on the island) whether or not he has ever seen what we call the 'Leaning *Howea* Syndrome' and to my surprise, he said he had. Even though it may be in the palm itself, and not necessarily a "sickness," I would still prefer that my *Howea* do not come down with it.

Fortunately for the non-English speaking members of the French Palm society, Peter Mayotte, an avid palm enthusiast and traveller, was on hand to translate what our tram driver had to say about the various trees planted at Fairchild. The Garden is recovering from Hurricane Andrew, and the rare tropical house is scheduled to be completed by next year.

The next day, Sunday, October 22, was a day of non-stop palm garden visitations arranged by Rick Leitner. The first garden was that of DeArmand Hull. De has travelled all over the tropical world and has been at it for over 30 years. Even with all the damage caused by Hurricane Andrew, his garden is absolutely outstanding. He was a most charming host and his indoor decor was as delightful to see as was his garden. The next home we saw was that of Paul Drummond, one of the very earliest collectors in the Miami area. How he takes care of his garden at his somewhat senior age by himself is inspiring to me, inasmuch as I am about 10 years his junior. Then, Rick Leitner took us over to a restaurant called Shorty's to give the French group an idea of lunch American style. It was great eating and the camaraderie was great also. After lunch, we continued on to Carol Graff's garden/nursery; Rick Leitner's own garden was next on the agenda. His garden is being featured in a national magazine. It's a relatively small garden located in a typical suburban neighborhood. Lester Pancoast, who lives right on Biscayne Bay, was the next garden to visit. He invited all of us into his home so we could view his watercolor paintings of palms at our leisure. It was quite a treat. Lester is an architect, and he designed his own home so that he does not encounter any flooding problems during storms. It was built up on stilts. Right on the bay were planted a large number of *Coccothrinax* and *Pseudophoenix*. Both grow naturally on the keys and make ideal plants to withstand hurricanes and

flooding. Almost right around the corner from Lester is the garden of Paul Fenster. It was just great to see the various tropical palms such as *Copernicia macroglossa*, *Heterospatha*, *Licuala grandis*, *Attalea* and so many of the other palms that do not do well in California. Everyone was so friendly and hospitable, so it wasn't only the palms that made the palm tours so enjoyable. Alain Jamet, the secretary from the Fous de Palmiers, was also quite gracious in that each of the hosts received a bottle of French wine as well as a bag with their logo printed on it.

Monday, October 22, we left bright and early for Fort Lauderdale. I can say bright, because the Miami areas had been seeing nothing but rain and more rain, so we were lucky on this day. First stop was the nursery of Jeff Searle. He had anticipated palm-buying fever, so he had a list available and small palms set aside for anyone who wished to buy. I could not resist. I learned a lesson on this trip. Inasmuch as we were staying in hotels all the time, I unfortunately found out that the air conditioning had a deleterious effect on at least two of the palms I got. Next time I will bring a large clear plastic bag and keep all the plants inside it instead of leaving them in just an open box where the cool drying effect of the air conditioner gets to them easily. After leaving Jeff Searle's nursery, we went to see the garden of Erik Beers. I certainly envy him or anyone having so much room to walk around in and to try out new plantings. Erik lives very far from the coast and informed us that his climate is closer to that of Central Florida and he can get severe damage from the occasional freezes. He has installed very tall sprinklers and turns them on when the temperature drops to freezing. Even so, his collection is fabulous and the palms look incredibly good. I was particularly struck by all his *Attalea*, *Coccothrinax crinita*, *Copernicia hospita*, the various *Licuala*, and I could go on and on. The sizes of the trees were impressive for the years they have been in the ground. From there, we went to have lunch at Flamingo Gardens, not too far away. This is an old garden with a wonderful canopy of huge oak trees. Lots and lots of palms have been planted there recently, and probably some of the really tropical palms will not endure, but the most spectacular palm there, which has been there as long as the one in Fairchild, is the *Lodoicea maldivica*, the "double coconut." It was a perfect specimen, which unfortunately could not be said about the one at Fairchild. This palm grows about

one leaf per year, which is slow. There is a fascinating story about this palm and others from the Seychelles in *Principes*, Vol. 7, No. 2. April 1963: "A visit to the Seychelles" by Count F. M. Knuth.

The following day, we left our hotel in North Miami to visit the Gemini Botanical Garden, in Palm Beach. After many years it is still being developed. According to Karl Smith, in-house horticulturist, the theme of the garden plantings is Floridian and Caribbean flora. William Smith, the owner of the 14-acre garden, seems to change his mind fairly frequently about how the dwelling and garden should be developed. Hence, no sooner do the palms begin to get established, than they are uprooted to be planted in another location. Many of the palms that we looked at were still in containers. The garden was right on the beach, and I got a kick out of seeing the members of the French Palm Society pulling up small coconuts that were just beginning to root out on the sands. "I remember doing that," I said to myself with a hidden chuckle. In the garden there were still some Jamaican tall coconuts, and one could see the holes where they had been injected with penicillin to control Lethal Yellowing. I was told that it was just a matter of time for them even with the treatments. From there, we headed for the Norton Sculpture Garden in Palm Beach. This is a relatively small garden with modern sculpture. A buffet lunch was provided, courtesy of the Palm Beach Chapter of the IPS. After lunch, we headed over to see Paul Crafts's nursery, Palm Nuts. Fortunately, the heavy rains that Florida had been receiving and that had flooded Paul out had receded enough so that we were able to walk around without a problem. As might be expected, collectors had a field day, including yours truly. We were there at the nursery, about an hour or so, and it wasn't nearly enough time to see it all. That evening we returned to the hotel around 11:00 p.m. I can hardly remember a more fun-filled day.

Wednesday, October 25, was a free day, so my wife and I just relaxed at the hotel and got ready to leave for the IPS Mid-term Board Meeting to be held in Sarasota the next day. Friday through Sunday, the French Palm Society was scheduled to visit other gardens in the South Florida area and the Keys, but as much as I wanted to go with them, duty called.

Thursday was the first day of the Board of Directors' meeting in Sarasota. Due to a late start, we pulled up to the hotel in a rented car just as others were leaving for the palm and cycad garden

of Libby and By Besse along little Sarasota Bay. My first reaction to the garden was that it was like the old genteel gardens of the deep South, aged and grand old native oaks, with the additions of magnificent palms and cycads. After an hour or so, we went to the Bayside Field Club for cocktails and dinner.

Friday, October 27, was a day set aside for the Board of Directors' Meeting. At 4:30 we left the hotel to go to the nearby delightful Selby Garden. I had been there once before, and this visit reconfirmed my belief that the exotic plant display in the conservatory is the most beautiful and delightful of any I have ever seen. Inside there were all kinds of orchids, ferns, calatheas, aroids, etc., and some palms, but I have not seen tropical plants look so well grown and cared for. Their cultural condition bears true testimony to expert care and maintenance. The sheer beauty of the individual plants was truly outstanding. After a tour of the palm garden and a delightful dinner, we were treated to a very fine talk and slide presentation by Scott Zona on his work with *Roystonea*.

Ed and Nancy Hall from Orlando (Central Florida Chapter) worked hand in hand with the I.P.S. to coordinate their local chapter with the mid-term Board meeting. We left the hotel in Sarasota at 8:30 a.m. to go for the day to St. Petersburg and Tampa, about 60 miles north of Sarasota. First stop of the day was the Gisella Kopsick Arboretum palm collection next to the St. Petersburg waterfront. The collection is a joint effort of the city of St. Petersburg and the Central Florida Chapter of the I.P.S. I was really impressed with what they have done. I have tried working with a local city in an effort to develop a palm garden in one of our parks, and unfortunately the whole venture turned out to be a colossal failure. When I found out about the efforts of the city and the chapter and saw the results that day, I was really envious. It makes all the difference in the world when there are people in the city council and in the parks department who are really interested in palms and are motivated to create a true palm garden. That's what happened in St. Petersburg. Dave Duran is a member of the Palm Society and has a newly appointed seat on the "City Beautiful Commission." That makes a total of four Palm Society members directly involved with the Commission/Arboretum of St. Petersburg. There was a photo in the Central Florida Palm Bulletin showing the city staff setting a large *Bismarckia nobilis* in the ground. I can't imagine any city here in

Orange County doing anything like that. Their occasional freezes are more severe than what we get in the milder areas of Orange County. The size, variety, and overall appearance of the palms in the park collection was really outstanding. I certainly applaud everyone involved in its development. After spending an hour or so at the city park, we left to go visit the garden of Ben and U. A. Young in Tampa. Although he presently has a wonderful palm and cycad garden, I was told that at one time his palm collection was much more extensive. The terrible freeze of 1989 took a toll. Something I found out that day was quite interesting. Every time they had a bad freeze, the outer layers of the trunk of his *Hyphaene* would fall off. Although the crown of his *H. natalensis* was full and gorgeous, the trunk has been damaged by the various freezes. Earlier that day I saw one trunk of *Dypsis decaryi* at the Gizella Kopsick Park, which had been eaten away so much by the freezes, that I was amazed it could still support a full crown of leaves.

U. A. Young has an enclosed two-story atrium that is home to a "double coconut" which he sprouted from seed more than 20 years ago. The older leaves were quite stretched out due to the darkening of the Fiberglass roof. They were touching the ceiling. He has replaced the panels and with the brighter light, the new fronds are still large, but the petioles are not as elongated, so it looks as if he may get another 20 years out of his palm. His enclosure gets by with the heat of the house in winter. What I was most interested

in seeing was his *Borassodendron*, probably from northern Thailand. It had survived that devastating freeze of '89, although it was burned almost down to the ground. I don't get the cold, but I don't get the warmth they have for much of the year. It will be an experiment, and that's half the fun. One never knows. Who would imagine Louie Hooper growing *Johannesteijsmannia altifrons* in La Habra, California?

A palm auction was held at the home of U. A. Young and the California guests did the honors of trying to get the most money possible from the members. A beautiful 15-gallon *Syagrus roman-zoffiana* × *Butia hybrid* brought in \$110.00 I believe. That's one I have wanted for years, but it was too big to bring back to California. We returned to our hotel in Sarasota that afternoon.

The following day, the Board of Directors finished up the business meeting. The central Florida Palm Chapter had scheduled for lunch a barbecue at the home of Ted Langley, just north of Tampa. When I heard it was going to be a fall-off-the-bone pig roast, I couldn't resist. We had a great time. Because I attended the Board of Directors' meeting in Sarasota, I missed out on the opportunity to go with the French Palm Society to the Florida Keys and the Montgomery Estate. Now I have a good reason to return to Florida as soon as possible, not only to see the palms there, but also to revisit and strengthen the many new friendships I made on the trip.

RALPH VELEZ

CLASSIFIED

Seeds of native palms of Turkey:

Phoenix theophrasti, *Phoenix* sp. "Gölköy"

5 seeds plus one photograph (natural habitat) of each for 10 US\$ or £7. Fund would contribute to create small palmetum.

Dr. Esener, PK.29, 55001 Samsun, Turkey.

BOOKSTORE UPDATE

NOVEMBER 1995



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Back Cover

Ptychosperma waitianum at Fairchild Tropical Garden on 26 December 1994. Photo by Kirsten Llamas. See pp. 40-45.

