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# A Preliminary Analysis of the Palm Flora of the Philippine Islands

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## ABSTRACT

An account of the status of the taxonomy and phytogeography of the palms in the Philippine Islands is presented. There are 20 genera and about 135 species of palms thus far described and reported from the islands. The Philippine palm flora indicates distinct affinities with that of Sundaic Malesia.

The Philippines, as are other areas in the tropical Far East, are well-represented with palms. The palms are often prominent in the vegetation of almost all the islands. Botanically they have been worked out whole or in part by various authors including Blanco, Beccari, Merrill, and Brown in several papers. The work by Beccari of 1919, however, remains until today, as the most useful treatment of the Philippine palms.

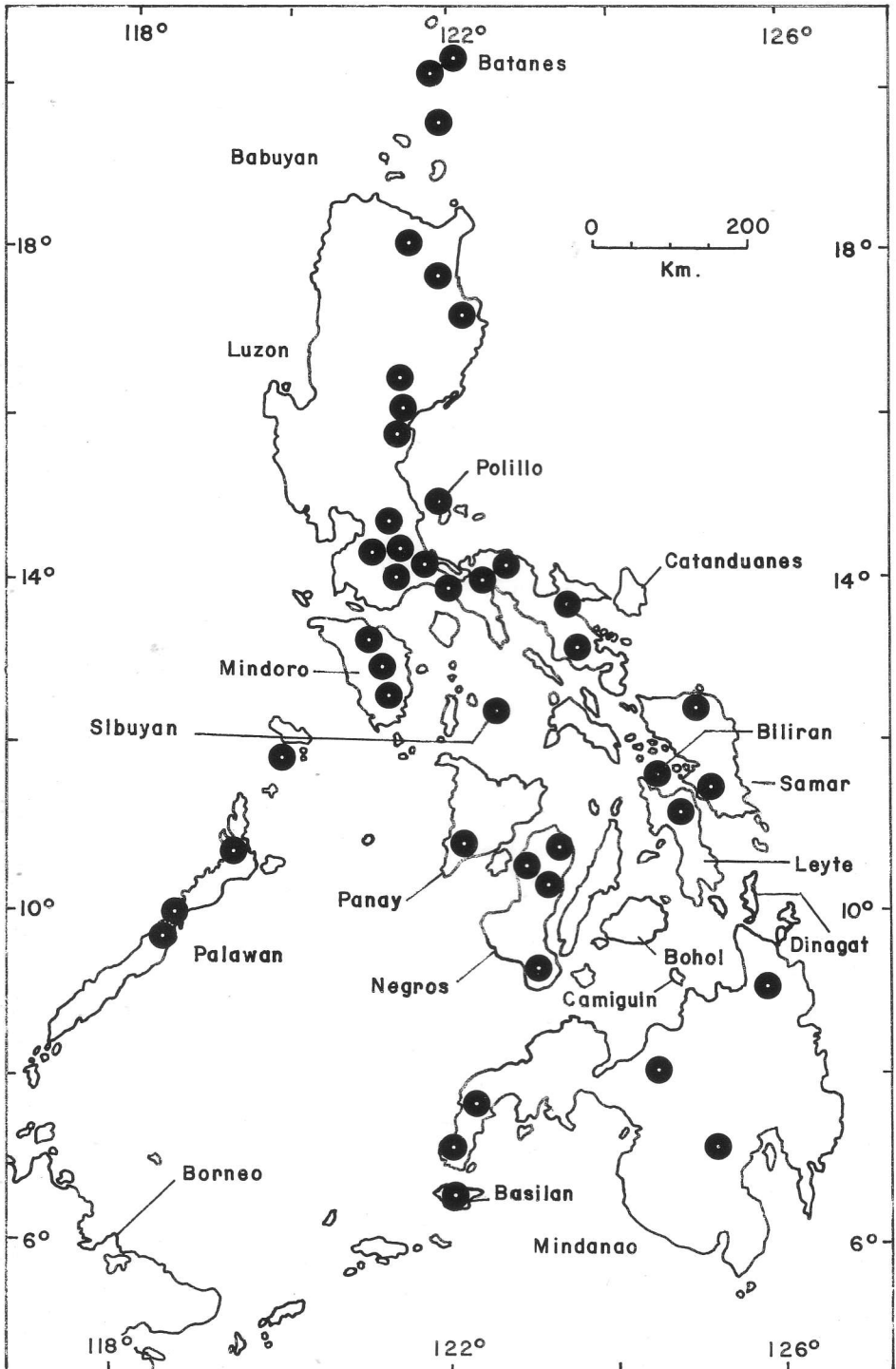
The present paper is largely an account of the status of palm taxonomy and phytogeography in the Philippines based on information from the literature and supplemented by my own herbarium studies and field observations.

The first indigenous palms reported from the Philippines were probably those by Samuel Perrottet in his catalogue published in 1824. Perrottet credited the islands with six palm species, including one described as new and two rattans by common names only (Robinson 1908). Fr. Manuel Blanco later in his *Flora de Filipinas* (first published in 1837) described 14 species and one variety of palms, all except two species, as new. Blanco, unfortunately, did not preserve any herbarium material for the palms he described (Merrill

1903, 1918). Subsequently Martius in 1849 described a few other Philippine species, mostly rattans, in his *Historia Naturalis Palmarum*. One of the species described by Martius was *Calamus siphonospathus* based on a specimen collected by Perrottet near Manila in 1819. Perrottet's collection, preserved in Geneva, is probably the oldest extant herbarium specimen of a palm from the Philippines.

Knowledge of Philippine palms, however, owes much to Odoardo Beccari, the Italian palmologist based in Florence. Beccari first worked on some of the Philippine palm material collected by Hugh Cuming between 1836-1840 and by Sebastian Vidal between 1876-1889 and initially described about eight new species of mostly rattans (Beccari 1885, 1886, 1889, 1902).

With the advent of the Americans in the islands in the early 1900's, Elmer D. Merrill, designated botanist with the then Bureaus of Agriculture and Forestry, initiated extensive botanical explorations in various parts of the archipelago. This brought to light many new forms in the Philippine palm flora. Between 1904 to 1919, Beccari, working on Philippine material sent to him in Florence, described nearly 90 species and several varieties. These were based mostly on collections by E. D. Merrill (ca. 15 types), the Forestry Bureau (ca. 31 types), the Bureau of Science (ca. 20 types) and A. D. E. Elmer (ca. 26 types) (Fig. 1). A few collections by A. Loher, E. Copeland, and M. S. Cle-



1. Type localities of Philippine palms.

mens also served as types for new species described by Beccari. By 1919, Beccari's account of the indigenous Philippine palms showed a total of about 120 species in 20 genera excluding *Cocos*. Shortly before his death in 1920, Beccari added one endemic species to the Philippine list.

The many uses and products derived from the Philippine palms were later summarized by Brown and Merrill (1920) and Brown (1951).

### The Palm Flora Since Beccari

For more than half a century since Beccari's work, no new taxa or new records of palms have been reported for the Philippines. In 1979, Dr. John Dransfield, palm specialist of Kew, made his first but short visit to the Philippines and added four new records of rattans from Palawan (Dransfield 1980). Madulid (1981) later described one new endemic variety in *Plectocomia*.

In 1984 a botanical expedition to Palawan yielded several new records (Hillesloh 1985). *Cocos nucifera* is also now generally regarded as a native of the western Pacific including the Philippines (Harries 1978, Gruezo and Harries 1984, Uhl and Dransfield 1987). A second species in *Salacca* has also been added to the Philippine list (Mogea 1986).

The visit of Dr. Dransfield to the Philippines in 1979 has since stimulated further study and more field work on the Philippine palms. Thus far no less than 14 new species and three new varieties belonging to five genera have been discovered mostly from Mindanao and from the southern end of the Sierra Madre Mountain Range along the east coast of Luzon. Nine of these taxa have recently been described (Fernando 1988*a, b*, in press).

In all, the Philippine palm flora since Beccari has increased in number of species by about 14 percent. The growth is contributed mainly by the new records from

Palawan and by the recently published new taxa, but excluding the still undescribed ones. While new records and new taxa have been discovered, some taxa in Beccari's (1919) work have also now been reduced to synonymy.

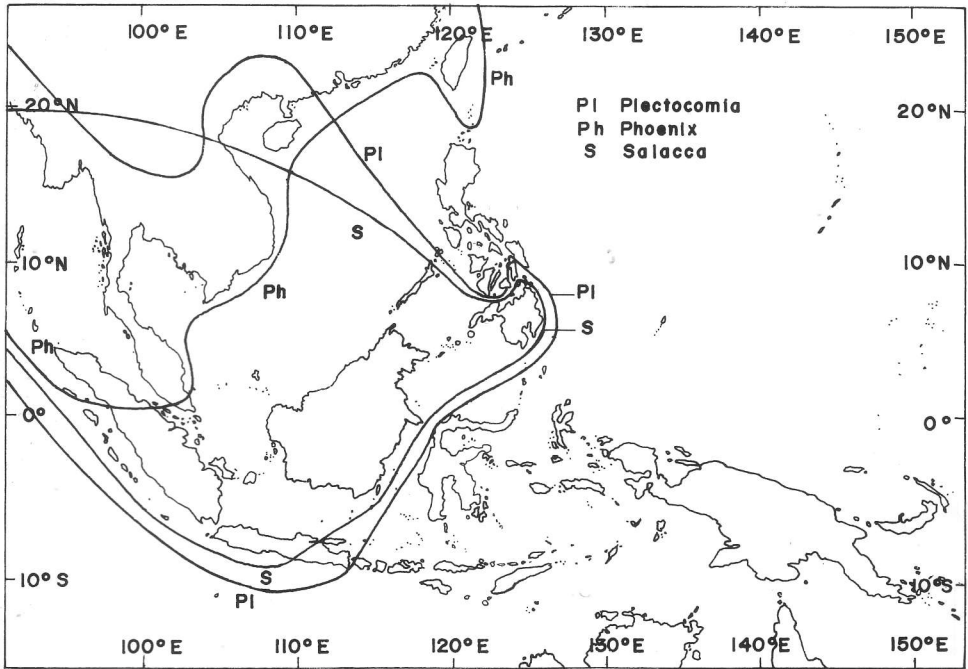
There still remain some undercollected areas in the Philippines as far as palms are concerned. These include the central and northern parts of the Sierra Madre Mountain Range in Luzon, the entire island of Samar, the central and eastern parts of Mindanao, and southern Palawan.

### The Palm Flora Today

This paper now puts the Philippine palm flora at 135 species belonging to 20 genera. The figure excludes about 6 species that still need to be formally described and published. No genus is exclusive to the islands, but over 70 percent of the known species are endemic.

Four of the six palm subfamilies (Dransfield and Uhl 1986, Uhl and Dransfield 1987) are represented in the Philippines, viz., Coryphoideae, Calamoideae, Nypoideae, and Arecoideae. Subfamily Coryphoideae has two tribes and four genera represented; Calamoideae, one tribe and six genera; Nypoideae, monotypic; and Arecoideae, three tribes and nine genera. In the list provided (see Appendix 1), the genera and species are arranged by subfamilies and tribes with notes as to number of tribes and genera in subfamilies, and of species in genera in parentheses following the appropriate categories. Distribution outside the Philippine Islands is indicated in brackets. Undescribed and unpublished taxa have been included in the list and are preceded by numbers enclosed in brackets. The list is only preliminary and tentative.

At least three genera, viz., *Phoenix*, *Plectocomia*, and *Salacca* of the Asiatic and West Malesian flora find their eastern limit in the Philippines (Fig. 2). Another genus, *Heterospatha*, of the Papuanian



2. The eastern limit of the ranges of the genera *Phoenix*, *Plectocomia*, and *Salacca* in the Philippines.

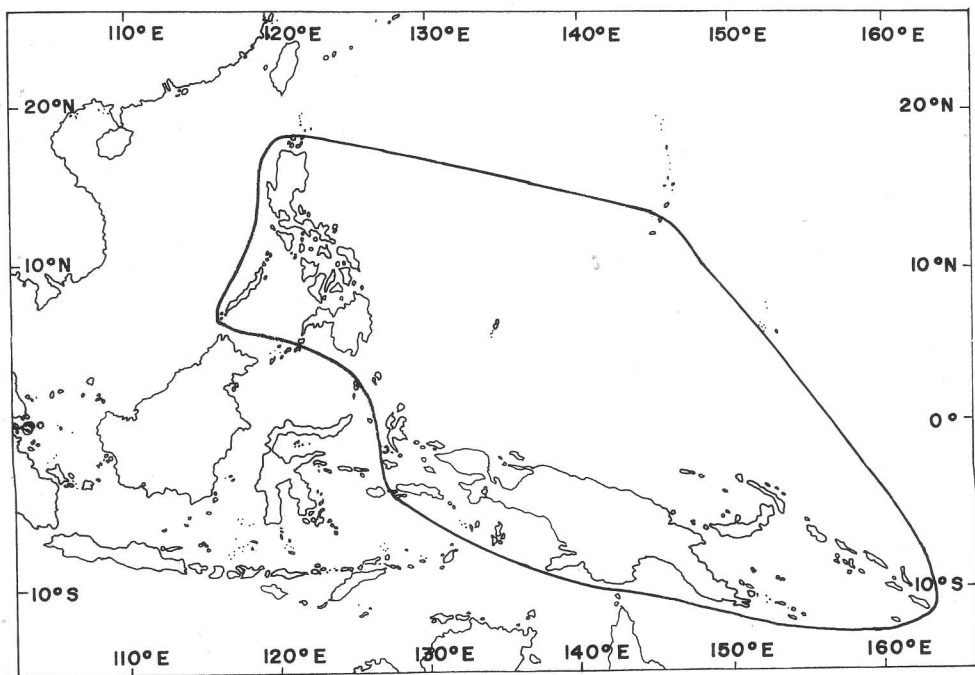
flora has its western limit in the archipelago (Fig. 3). *Veitchia*, on the other hand, which is almost entirely western Pacific in distribution, has one species represented (Fig. 4): *Cocos*, with a single widely cultivated species of western Pacific origin (Harries 1978, Uhl and Dransfield 1987) is represented by wild-types in the Philippines (Gruezo and Harries 1984).

All the other 14 genera represented are centered largely throughout Malesia. Four of these, *Calamus* and *Daemonorops* among the calamoids, and *Areca* and *Pinanga* among the arecoids composed about two-thirds of the known palms indigenous to the islands. The rattans (i.e., *Calamus*, *Daemonorops*, *Korthalsia*, and *Plectocomia*) altogether comprise nearly half of the entire Philippine palm flora, a pattern also observed in most other parts of Malesia (Dransfield 1981).

### Affinity of the Philippine Palm Flora

The affinity of the palm flora of the Philippine Islands is shown in Table 1 illustrating the approximate number of genera and species shared and unshared with adjacent areas. It is apparent that the palm flora of the Philippine Islands is essentially Sundaic with strongest affinity with that of Celebes. This striking Philippine-Celebes floristic pattern has also been noted earlier for several other genera and species of flowering plants (Merrill 1926, Dickerson 1928).

There is also close affinity with Malay Peninsula and Borneo. Of the genera shared at least three have their eastern limits in the Philippines. The other genera tend to have greater representation in Malay Peninsula and Borneo and decreasing towards



3. Distribution of the genus *Heterospathe* (after Fernando, in press).

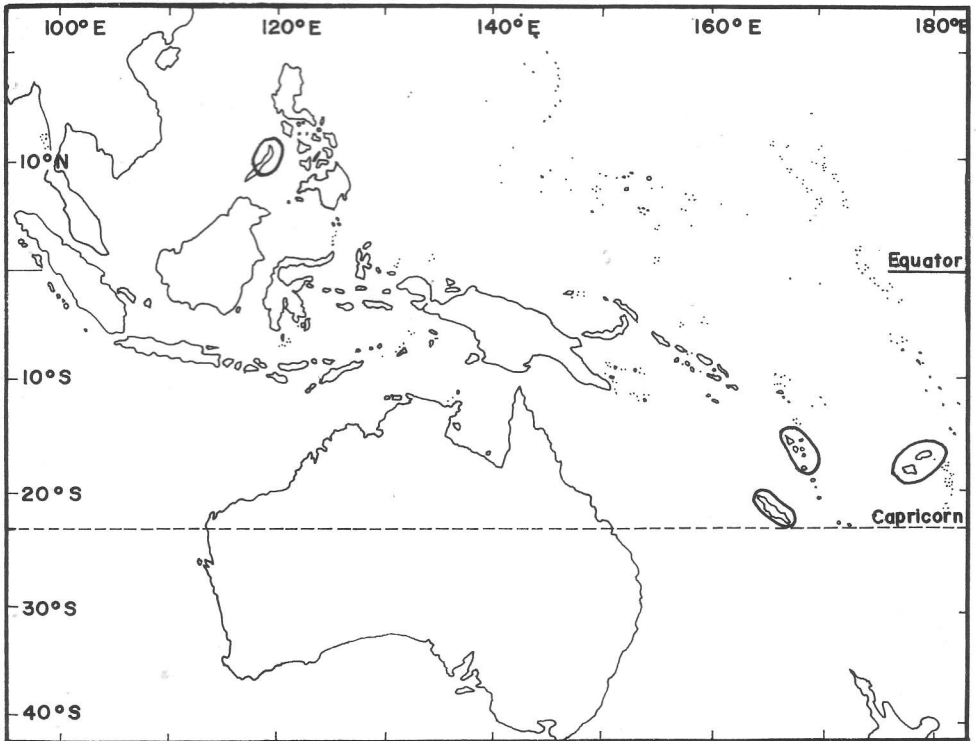
the Philippines and farther eastwards to New Guinea. There are in these two Sundaic areas certain genera that are surprisingly unrepresented in the Philippines, even in Palawan, the island with strongest Sundaic affinity. Some of these unexpectedly absent genera include *Nenga*, *Eugeissona*, *Ceratolobus*, *Plectocomiopsis*, and *Iguanura*.

Taiwan appears to have an almost equal degree of affinity at the genus level with the Philippine palm flora as Malay Peninsula despite its poor palm flora. Except perhaps for *Phoenix*, the shared taxa with Taiwan are, however, either direct extensions of the Philippine palm flora or have their closest relatives in the Philippines. In fact, there is no genus of palms in Taiwan that does not also occur in the Philippines.

Between New Guinea and the Philippines the affinity decreases. There are, however, at least two genera with almost equal representation in both areas. *Het-*

*erospathe*, for example, is represented by 16 species in New Guinea (Essig 1977) and about 11 species in the Philippines (Fernando, in press). In *Areca* there are 11 species in New Guinea (Essig 1977) and 10 species in the Philippines. Majority of the New Guinean *Areca* species (at least 6) belong to Furtado's sect. *Axonianthe* (Furtado 1933) with a distribution limited from the eastern parts of the Philippines (3 species), Moluccas (1 species) to New Guinea, and the Solomon Islands (3 species) (Fig. 5).

*Heterospathe* and *Veitchia* are clear exceptions to the West Malesian or Sundaic pattern of the Philippine palm flora. *Heterospathe* is generally regarded as Papuanian, with most generic relatives there. *Veitchia*, on the other hand, has a very odd distribution with the rest of the species in the South Pacific (Fig. 4) and generic relatives in New Guinea and Australia. The case of *Cocos* has already been



4. Distribution of the genus *Veitchia* (after Dransfield 1981).

mentioned earlier; elsewhere wild-types of coconut have so far been found only in Australia (Buckley and Harries 1984).

On the whole the Philippine palm flora indicates distinct affinities with that of Sundaic Malesia. Only two genera represent the Papuan element. Like Celebes, there are no endemic genera in the Philippines.

### Ecology and Distribution of the Palms in the Philippines

The palms of the Philippine Islands form important components in most forest types occurring from sea level in mangrove swamps up to 2,200 m alt. in mossy forests. In mangrove swamps *Nypa fruticans* often forms dense and extensive colonies. In settled areas palms are usually conspicuous by their size (*Corypha utan*) or

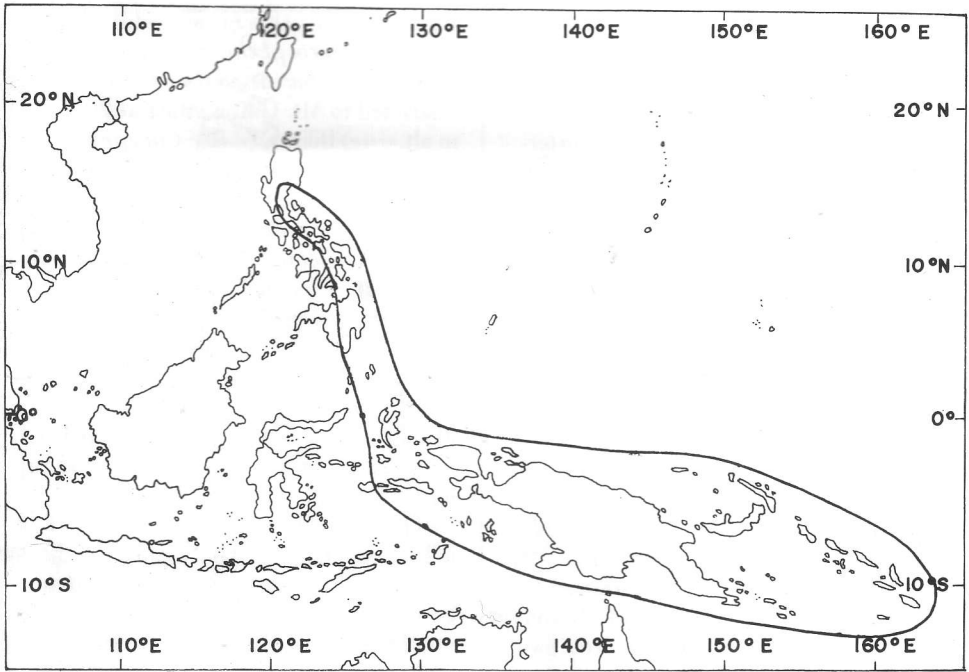
their frequent cultivation (*Areca catechu*). In lowland to mid-elevation humid forests, rattans, mostly of the genera *Calamus* and *Daemonorops*, are generally prominent and abundant except where they have been extensively exploited for commercial use. Seedlings and specimens of rattans at their rosette stages are frequently common on the forest floor. The erect, undergrowth palms, such as species of *Pinanga*, *Areca* and *Heterospatha* are usually of local occurrence, but in certain areas, especially dense and humid forests where they grow, they sometimes form large populations. Certain species of *Areca*, like *A. whitfordii* and *A. parens* prefer rather swampy portions of the forest. *Livistona saribus* also prefers swampy but open areas at low altitudes and grows gregariously in large numbers in northeastern Luzon. Most species

Table 1. Affinity of the *Philippine palm flora*.

	Malay Peninsula (Whitmore 1973, Uhl and Dransfield 1987)		Borneo (Uhl and Dransfield 1987)		Celebes (Dransfield 1981, Uhl and Dransfield 1987)		New Guinea (Essig 1977, Uhl and Dransfield 1987)		Taiwan (Li 1978)	
	Shared	Unshared <sup>b</sup>	Shared	Unshared	Shared	Unshared	Shared	Unshared	Shared	Unshared
Philippines										
20 genera	16	13/4	15	12/4	13	4/7	14	17/6	6	0/14
Kroeber's percent similarity <sup>a</sup>	65.8%		65.2%		70.7%		57.5%		65.0%	
135 species	19	201/116	26	no data	10	no data	4	268/131	2	4/133
Kroeber's percent similarity	11.3%		no data		13.5%		2.2%		17.4%	

<sup>a</sup> Kroeber's similarity =  $C(A + B)/2AB \times 100$ , where A = no. of taxa present in the first area under comparison, B = no. of taxa present in the second area under comparison, and C = no. of taxa common in both A and B areas (after van Balgooy 1971).

<sup>b</sup> The numerator indicates the no. of taxa present in the area under comparison but not in the Philippines; the denominator indicates the taxa present in the Philippines but absent in the area under comparison.



5. Distribution of the genus *Areca* L. sect. *Axonianthe* Scheff. sensu Furtado (1933).

of *Arenga* and *Caryota* are characteristic of light gaps and disturbed portions of forests. In Palawan, *Veitchia merrillii* occurs on sandy soils and limestone formations. A few species such as *Calamus dimorphacanthus* and *Pinanga philippinensis* can occur in mossy forests up to 2,200 m alt.

About half of the known species of Philippine palms occur on the large, main island of Luzon, although only 15 species are strictly confined to the island, excluding the still undescribed ones. Mindanao, the second largest island, has 63 species with 14 endemics. Palawan has 37 species, but only eight are truly endemic; most are Bornean elements that do not extend farther into the archipelago proper.

Available information and recent collections indicate particular distributional patterns of the palms in the archipelago. These are but tentative as some known species may actually be more widespread than they appear to be. The apparent pat-

terns of distribution may be distinguished as follows:

1. **Widespread throughout the Islands.**—*Calamus usitatus*, *C. merrillii*, *Daemonorops mollis* (Fig. 6A), *D. ochrolepis*, *Heterospathe elata*, *Pinanga insignis*, and *P. philippinensis*.

2. **Luzon Pattern** (mostly along the eastern side of the island).—*Calamus arugda*, *C. balerensis*, *C. discolor*, *Daemonorops loheriana*, *Livistona saribus*, *Orania rubiginosa* (Fig. 6B), and *Pinanga isabelensis*.

2a. **N. Luzon-Batanes/Babuyan Pattern.**—*Calamus mitis* (Fig. 6C), and *Pinanga urosperma*.

2b. **E. Luzon-Polillo Pattern.**—*Areca ipot* (Fig. 6D), *Livistona robinsoniana*, and an undescribed species of *Pinanga*.

3. **Luzon-Mindanao Pattern.**—*Calamus cumingianus*, *C. elmerianus*, *C. manillensis* (Fig. 7A), and another undescribed species of *Calamus*.



4. **Luzon-Mindoro Pattern.**—*Areca whitfordii* (Fig. 7B), *Pinanga geonomiformis*, and *Calamus mindorensis*.

5. **Mindanao-Leyte-Samar-S.E. Luzon Pattern.**—*Heterospathe intermedia* (Fig. 7C), *Areca caliso*, and *Calamus aidae*.

6. **Negros-Masbate-S. Luzon Pattern.**—*Heterospathe negrosensis* (Fig. 7D), *Pinanga heterophylla*, and *P. rigida*.

7. **Palawan Pattern.**—*Korthalsia merrillii* (Fig. 8A), *Daemonorops curranii*, *D. gracilis*, and *Orania paraguayensis*.

8. **Mindanao-Basilan Pattern.**—*Areca hutchinsoniana*, *Calamus moseleyanus*, *Pinanga basilanensis*, *P. modesta*, and *P. speciosa* (Fig. 6B).

9. **Narrow Endemics** (restricted to very particular localities).—(a) Luzon: *Areca camarinensis*, known only from two adjacent localities in Camarines Prov.; *Areca parens*, known only from two collections, possibly from same locality in semi-swampy forests, Camarines Prov.; *Pinanga bicolorana*, known only from two localities in lowland forests also in Camarines Prov.; several undescribed species of *Pinanga* have also been observed to be very local and restricted to certain localities in Luzon, mostly along the east coast.—(b) Batan Island: *Pinanga batanensis*, localized on the lower slopes of Mt. Iraya along mountain streams.—(c) Mindoro: *Calamus jenningsianus* and *Pinanga sclerophylla*, known only from Mt.

Halcon at 1,500 m alt.—(d) Sibuyan Island: *Heterospathe sibuyanensis* and *Pinanga sibuyanensis*, both species restricted to Mt. Giting-giting at 200–600 m alt.—(e) Biliran Island: *Corypha microclada* (Fig. 8C), known only from a single collection from the island.—(f) Samar: *Pinanga samarana*, still known only from the type collected on Mt. Cauayan.—(g) Mindanao: *Plectocomia elmeri* (Fig. 8D), very localized on Mt. Apo and still known only from the type (Madulid 1981) collected at 900 m alt. along streams in dense forest; *Calamus vinosus*, known only from Mt. Hilong-hilong (Mt. Urdaneta) at 1,450 m alt. on deep forested and sheltered ravines.

This account of the palms of the Philippine Islands is certainly not an exhaustive one and is clearly preliminary in nature. Some new taxa need to be described and published, while a number of varieties and perhaps some other species may eventually be reduced to synonymy. Surely, the list will change in time. More complete collections from the currently inaccessible and less-explored areas of the archipelago and specialist study in the field and herbarium is certain to expand our present knowledge of the taxonomy and phytogeography of the palms, provide more details, and maybe even change others.

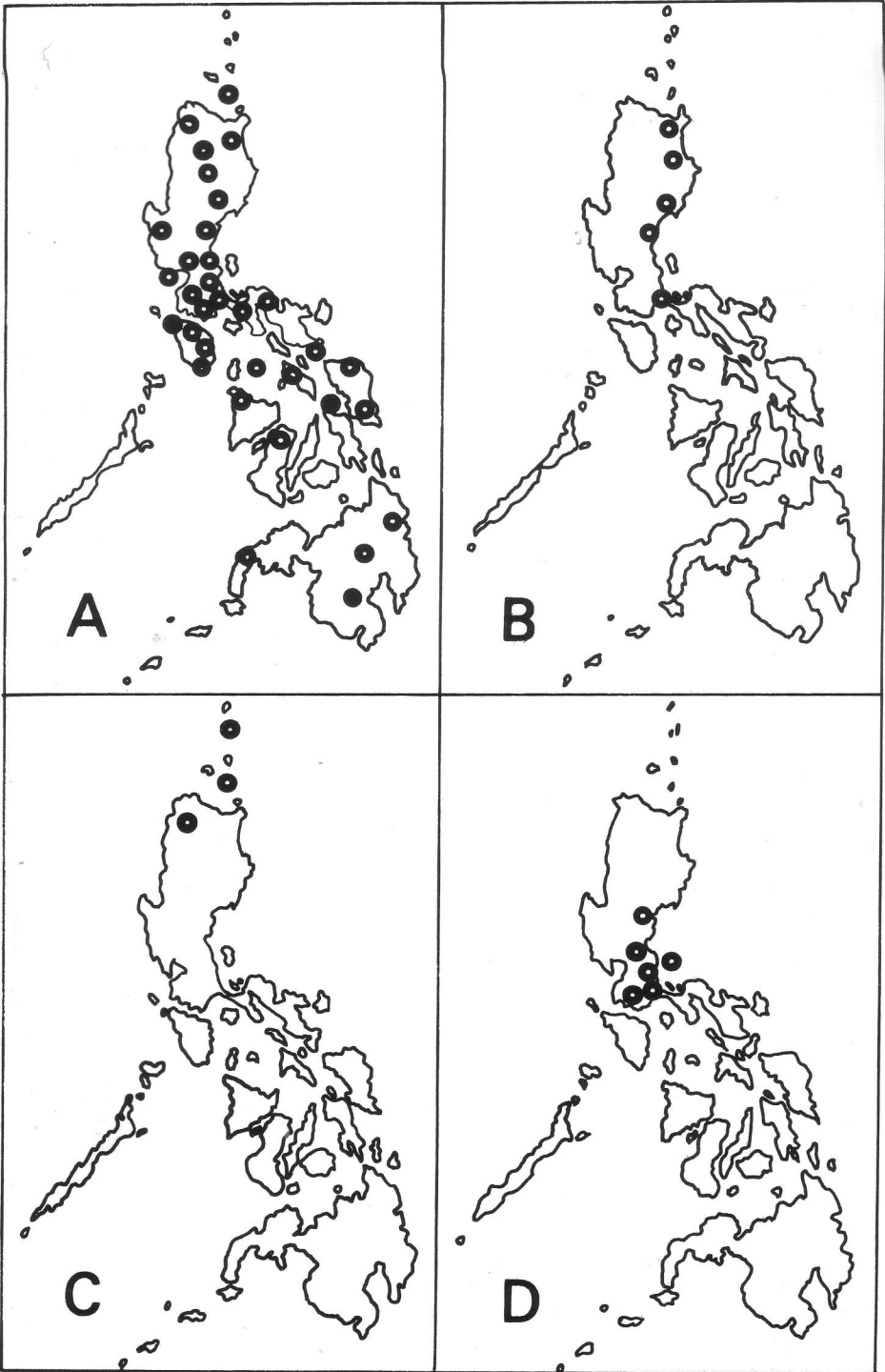
### Acknowledgments

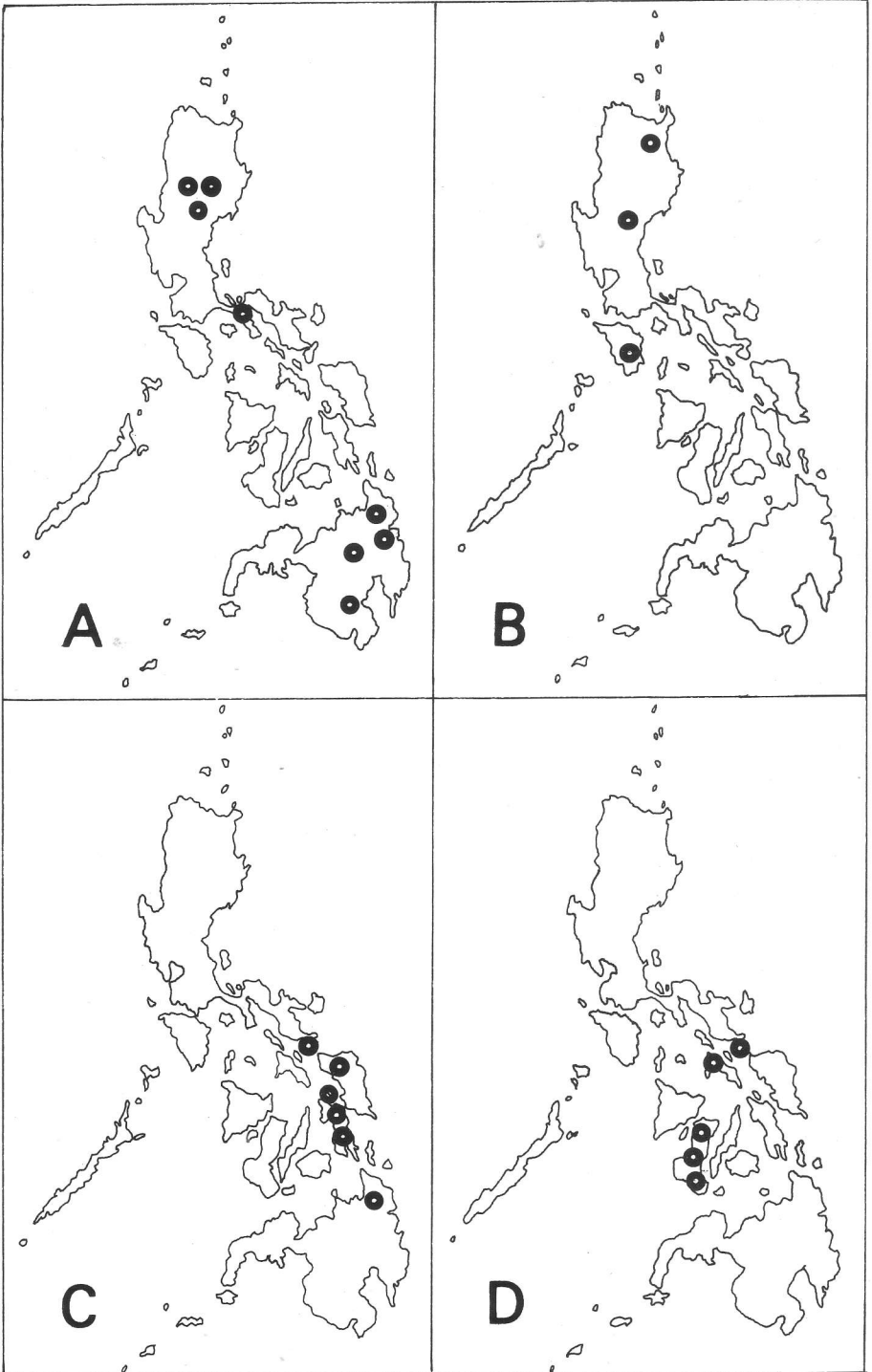
It is with great pleasure to acknowledge my sincere indebtedness to Dr. John

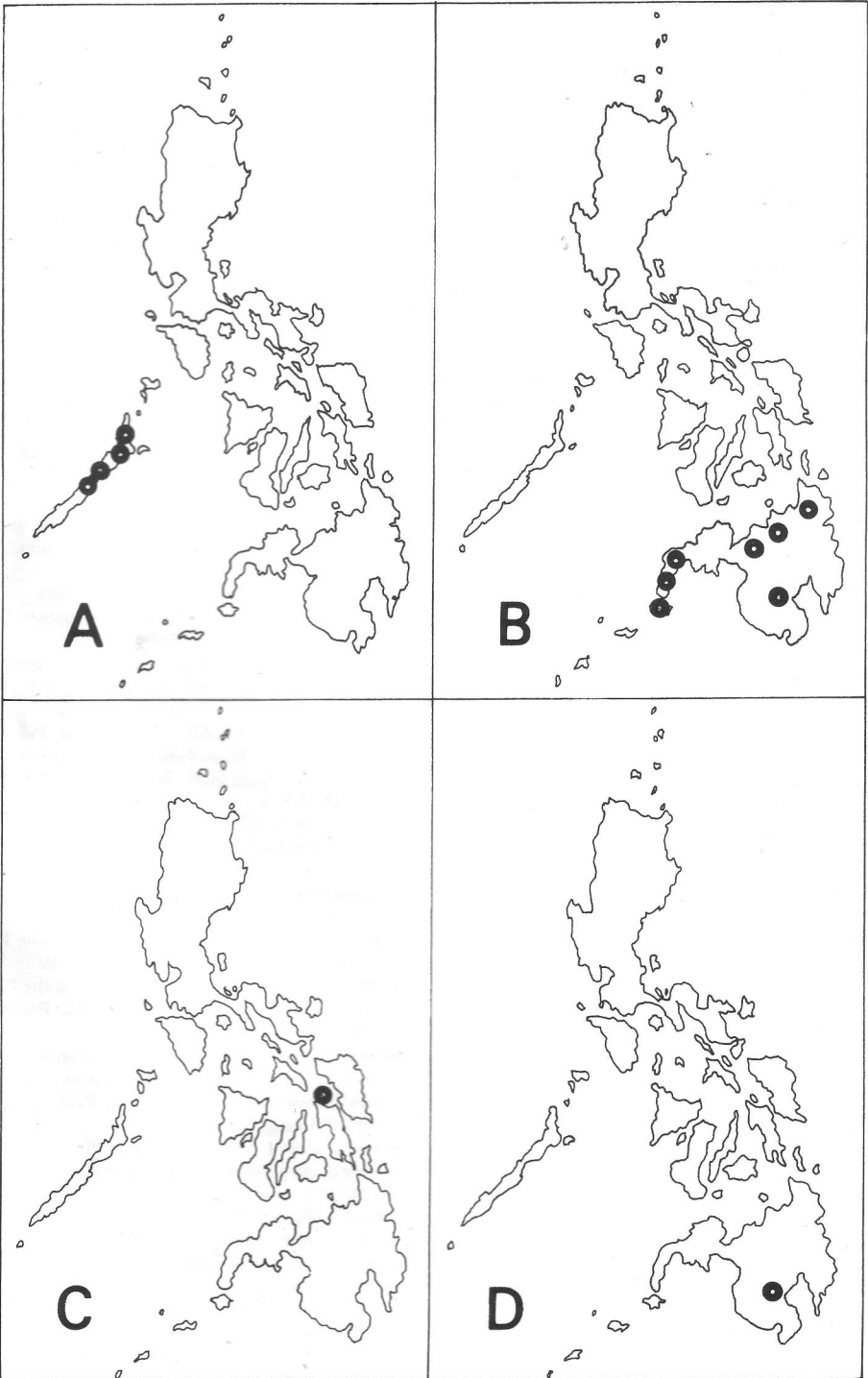
6. Distribution patterns of Philippine palms: A. Widespread throughout the islands (*Daemonorops mollis*). B. Luzon pattern (*Orania rubiginosa*). C. Northern Luzon-Batanes/Babuyan pattern (*Calamus mitis*). D. Eastern Luzon-Polillo pattern (*Areca ipot*).

7. Distribution patterns of Philippine palms. A. Luzon-Mindanao pattern (*Calamus manillensis*). B. Luzon-Mindoro pattern (*Areca whitfordii*). C. Mindanao-Leyte-Samar-S.E. Luzon pattern (*Heterospathe intermedia*). D. Negros-Masbate-S. Luzon pattern (*Heterospathe negrosensis*).

8. Distribution patterns of Philippine palms. A. Palawan pattern (*Korthalsia merrillii*). B. Mindanao-Basilan pattern (*Pinanga speciosa*). C. Narrow endemic (*Corypha microclada*). D. Narrow endemic (*Plectocomia elmeri*).







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### Appendix 1. Updated Checklist of Indigenous Philippine Palms

#### I. Subfamily CORYPHOIDEAE (4 of 38 genera and 2 of 3 tribes represented)

##### Tribe Corypheae

1. *Livistona* (ca. 28 spp. S.E. Asia to Australia and Solomon Is.; 4 spp. in the Philippines, 2 endemic)
  1. *L. merrillii* Becc.—Luzon
  2. *L. robinsoniana* Becc.—Luzon, Polillo
  3. *L. rotundifolia* (Lam.) Mart.—[Java, Celebes, Moluccas; 3 varieties in the Philippines]
    - 3a. var. *luzonensis* Becc.—Luzon, Negros, Mindanao
    - 3b. var. *microcarpa* Becc.—Palawan, Mindanao
    - 3c. var. *mindorensis* Becc.—Mindoro
  4. *L. saribus* (Lour.) Merr. ex A. Chev.—Luzon [Indo-China, Malay Peninsula, Java, Borneo]
2. *Licuala* (ca. 108 spp., S.E. Asia to Pacific, 1 sp. in the Philippines)
  5. *L. spinosa* Wurmb.—Culion, Palawan, Balabac [Andamans, Malay Peninsula, Burma, Thailand, Indo-China, Sumatra, Java, Borneo]
3. *Corypha* (ca. 6-8 spp., India to N. Australia; 2 spp. in the Philippines, 1 endemic)
  6. *C. utan* Lam.—throughout the Philippines [S. India, Sri Lanka, Andamans, S.E. Asia, N. Australia]
  7. *C. microclada* Becc.—Biliran

##### Tribe Phoeniceae

4. *Phoenix* (ca. 12 spp., Canary Is., Africa, continental Asia to S. China, Malay Peninsula, Sumatra, Taiwan; 1 variety in the Philippines)
  8. *P. hanceana* Naud. var. *philippinensis* Becc.—Batanes Is. [The variety endemic, the species in S.E. China]

#### II. Subfamily CALAMOIDEAE (6 of 22 genera and 1 of 2 tribes represented)

##### Tribe Calameae

5. *Metroxylon* (5 spp., Sumatra, Borneo to New Guinea and Pacific; 1 sp. in the Philippines)
  9. *M. sagu* Rottb.—Mindanao [Sumatra, Borneo, New Guinea; 2 of 4 formas in the Philippines]
    - 9a. forma *sagu*—Mindanao
    - 9b. forma *longispinum* (Giseke) Rauwerdink—Mindanao
6. *Korthalsia* (ca. 25 spp., Andamans to Burma, Indo-China, Thailand and through Malesia, 5 spp. in the Philippines, 2 endemic)
  10. *K. laciniosa* (Griff.) Mart.—Luzon, Polillo, Catanduanes, Leyte, Panay, Mindanao [Andaman and Nicobar Islands, Burma, Thailand, Indo-China, Malay Peninsula, Sumatra, Java]
  11. *K. merrillii* Becc.—Palawan
  12. *K. rigida* Blume—Palawan [S. Thailand, Malay Peninsula, Sumatra, Borneo]
  13. *K. robusta* Blume—Palawan, Balabac [Sumatra, Borneo]
  14. *K. scaphigeroides* Becc.—Mindanao, Basilan
7. *Salacca* (ca. 18 spp., S. China, Burma, Thailand, Malay Peninsula, Sumatra, Java, Borneo; 2 spp. in the Philippines)
  15. *S. clemensiana* Becc.—Mindanao [Borneo]
  16. *S. ramosiana* Mogege—Palawan, Tawi-Tawi [Borneo]
8. *Daemonorops* (ca. 114 spp., N.E. Indian to S. China, through Malesia; ca. 13 spp. and 1 var. in the Philippines, all endemic except 1 sp.)
  17. *D. affinis* Becc.—Mindanao
  18. *D. clemensiana* Becc.—Mindanao
  19. *D. curranii* Becc.—Palawan

20. *D. gracilis* Becc.—Palawan
21. *D. longipes* (Griff.) Mart.—Palawan [Malay Peninsula, Sumatra, Borneo]
22. *D. loheriana* Becc.—Luzon
23. *D. margaritae* (Hance) Becc. var. *palawanica* Becc.—Palawan [The variety endemic, the species in S. China]
24. *D. mollis* (Blco.) Merr.—throughout the Philippines
25. *D. ochrolepis* Becc.—Luzon, Polillo, Biliran, Catanduanes, Panay, Leyte, Mindanao
26. *D. oligolepis* Becc.—Mindanao
27. *D. pannosa* Becc.—Mindanao
28. *D. pedicellaris* Becc.—Leyte, Mindanao
29. *D. polita* Fernando—Mindanao
30. *D. urdanetana* Becc.—Mindanao
9. *Calamus* (ca. 370 spp., Africa, India and S. China, through Malesia to New Guinea, N. Australia and Fiji; ca. 45 spp. in the Philippines, including 2 new spp. and 1 new var., 33 spp. endemic)
  31. *C. aidae* Fernando—Luzon, Samar, Biliran, Dinagat, Mindanao
  32. *C. arugda* Becc.—Luzon
  33. *C. balerensis* Fernando—Luzon
  34. *C. batanensis* (Becc.) Baja-Lapis—Batanes Is.
  35. *C. bicolor* Becc.—Mindanao
  36. *C. caesius* Blume—Palawan [Sumatra, Malay Peninsula, Borneo]
  37. *C. cumingianus* Becc.—Luzon, Mindanao
  38. *C. diepenhorstii* Mig. var. *exulans* Becc.—Palawan, Luzon, Polillo [The variety endemic, the species in Malay Peninsula, Sumatra and Borneo]
  39. *C. dimorphacanthus* Becc.
    - 39a. var. *dimorphacanthus*—Luzon, Sibuyan, Panay
    - 39b. var. *montalbanicus* Becc.—Luzon
    - 39c. var. *zambalensis* Becc.—Luzon, Mindoro, Leyte
    - 39d. var. *benguetensis* Baja-Lapis—Luzon
    - 39e. var. *halconensis* (Becc.) Baja-Lapis—Luzon, Mindoro, Panay, Mindanao
  40. *C. discolor* Mart.
    - 40a. var. *discolor*—Luzon
    - 40b. var. *negrosensis* Becc.—Negros, Siargao, Mindanao
  41. *C. elmerianus* Becc.—Luzon, Dinagat, Mindanao
  42. *C. erinaceus* (Becc.) Dransf.
    - 42a. var. *erinaceus*—Palawan [S. Thailand, Malay Peninsula, Sumatra, Borneo]
    - [42b.] var. nov. (ined.)—Palawan
  43. *C. filispadix* Becc.—Luzon, Polillo, Catanduanes, Masbate, Samar, Palawan, Mindanao
  44. *C. foxworthyi* Becc.—Palawan
  45. *C. grandifolius* Becc.—Luzon, Catanduanes
  46. *C. javensis* Blume—Palawan [S. Thailand, Malay Peninsula, Sumatra, Borneo, Java]
  47. *C. jenningsianus* Becc.—Mindoro
  48. *C. malawaliensis* J. Dransf.—Palawan [Malawali]
  49. *C. manillensis* (Mart.) H. A. Wendl.—Luzon, Dinagat, Mindanao
  50. *C. marginatus* (Blume) Mart.—Palawan [Sumatra, Borneo]
  51. *C. megaphyllus* Becc.—Leyte, Mindanao
  52. *C. melanorhynchus* Becc.—Mindanao
  53. *C. merrillii* Becc.
    - 53a. var. *merrillii*—Luzon, Masbate, Palawan, Panay, Mindanao, Basilan
    - 53b. var. *merrittianus* (Becc.) Becc.—Mindoro
    - 53c. var. *nanga* Becc.—Mindanao
  54. *C. microcarpus* Becc.
    - 54a. var. *microcarpus*—Luzon, Polillo, Mindoro, Leyte, Mindanao
    - 54b. var. *diminutus* Becc.—Luzon
    - 54c. var. *longiocrea* Baja-Lapis—Luzon
  55. *C. microsphaerion* Becc.
    - 55a. var. *microsphaerion*—Luzon, Culion, Palawan [Borneo]
    - 55b. var. *spinosior* Becc.—Palawan
  56. *C. mindorensis* Becc.—Luzon, Mindoro
  57. *C. mitis* Becc.—Batanes, Babuyan, Luzon
  58. *C. moseleyanus* Becc.—Mindanao, Basilan, Malanipa

59. *C. multinervis* Becc.—Mindanao  
 60. *C. ornatus* Blume  
     60a. var. *philippinensis* Becc.—Luzon, Polillo, Mindoro, Negros, Panay, Leyte, Mindanao, Basilan  
     60b. var. *pulverulentus* Fernando—Palawan, Mindanao  
 61. *C. ramulosus* Becc.—Luzon  
 62. *C. reyesianus* Becc.—Luzon, Mindoro, Mindanao  
 63. *C. samian* Becc.—Luzon, Leyte, Mindanao  
 64. *C. scipionum* Lour.—Palawan [S. Thailand, Malay Peninsula, Sumatra, Borneo]  
 65. *C. siphonospathus* Mart.  
     65a. var. *siphonospathus*—Luzon  
     65b. var. *dransfieldii* Baja-Lapis—Mindanao [Celebes]  
     65c. var. *farinosus* Becc.—Luzon  
     65d. var. *oligolepis* Becc.—Luzon  
     65e. var. *polylepis* Becc.—Luzon  
     65f. var. *sublevis* Becc.—Luzon, Mindanao  
 66. *C. spinifolius* Becc.—Luzon, Panay, Mindanao  
 67. *C. subinermis* H. A. Wendl. ex. Becc.—Palawan [Borneo]  
 68. *C. symphysipus* Mart.—Luzon, Catanduanes, Bucas Grande, Mindanao [Celebes]  
 69. *C. trispermus* Becc.—Luzon  
 70. *C. usitatus* Blco.—throughout the Philippines [Borneo]  
 71. *C. vidalianus* Becc.—Luzon, Panay  
 72. *C. vinosus* Becc.—Mindanao  
 73. *C. viridissimus* Becc.—Mindanao  
 [74.] *C. sp. nov. (ined.)*—Luzon, Mindanao  
 [75.] *C. sp. nov. (ined.)*—Masbate  
 10. *Plectocomia* (ca. 16 spp., India to S. China, Malay Peninsula, Sumatra, Borneo; 1 sp. and 1 var. in the Philippines, both endemic)  
     76. *P. elmeri* Becc.—Mindanao  
     77. *P. elongata* Mart. ex Blume var. *philippinensis* Madulid—Palawan, Mindanao, Leyte, Biliran [The variety endemic, the species in Thailand, Malay Peninsula, Sumatra, Borneo]

### III. Subfamily NYPOIDEAE

11. *Nypa* (monotypic, India through Malesia, N. Australia, Micronesia, and Melanesia)  
 78. *N. fruticans* Wurm. — throughout the Philippines

### IV. Subfamily ARECOIDEAE (9 of 124 genera and 3 of 6 tribes represented)

#### Tribe Caryoteae

12. *Arenga* (ca. 21 spp., India to S. China and Ryukyus, through Malesia and N. Australia; 4 spp. in the Philippines, 1 endemic)  
 79. *A. brevipes* Becc.—Palawan [Sumatra, Borneo]  
 80. *A. pinnata* (Wurm.) Merr.—Luzon, Polillo, Biliran, Mindanao [Malay Peninsula, Sumatra, Java, Celebes]  
 81. *A. tremula* (Blco.) Becc.—Luzon, Mindoro  
 82. *A. undulatifolia* Becc.—Luzon, Palawan, Mindanao, Sulu [Borneo, Celebes]  
 13. *Caryota* (ca. 12 spp., India to S. China, through Malesia to N. Australia; 3 spp. and 1 var. in the Philippines, 1 species endemic)  
 83. *C. cumingii* Lodd. ex Mart.—Luzon, Mindoro, Panay, Palawan, Mindanao  
 84. *C. mitis* Lour.—Palawan [Burma, Indo-China, Malay Peninsula, Sumatra, Borneo, Java]  
 85. *C. rumphiana* Mart.  
     85a. var. *philippinensis* Becc.—Luzon, Mindoro, Negros, Mindanao  
     85b. var. *oxyodonta* Becc.—Luzon

#### Tribe Areceae

14. *Orania* (ca. 17 spp., Madagascar, S. Thailand through Malesia to New Guinea; 4 spp. and 3 varieties in the Philippines, all endemic)  
 86. *O. decipiens* Becc.  
     86a. var. *decipiens*—Mindoro  
     86b. var. *mindanaoensis* Becc.—Mindanao  
     86c. var. *montana* Becc.—Mindanao  
 87. *O. palindan* (Blco.) Merr.  
     87a. var. *palindan*—Luzon, Samar  
     87b. var. *sibuyanensis* (Becc.) Merr.—Sibuyan



88. *O. paraguensis* Becc.—Palawan  
 89. *O. rubiginosa* Becc.—Luzon
15. *Veitchia* (ca. 18 spp., New Hebrides, New Caledonia, Fiji; 1 sp. in the Philippines, endemic)  
 90. *V. merrillii* (Becc.) H. E. Moore—Palawan, Calamianes
16. *Pinanga* (ca. 120 spp., throughout Malesia; ca. 25 spp. in the Philippines, including 4 new species, all endemic except 1 sp.)  
 91. *P. basilanensis* Becc.—Mindanao, Basilan  
 92. *P. batanensis* Becc.—Batan Is.  
 93. *P. bicolorata* Fernando—Luzon  
 94. *P. copelandii* Becc.—Luzon, Panay, Negros, Bohol, Leyte, Mindanao, Basilan  
 95. *P. curranii* Becc.—Palawan, Dumarán, Busuanga  
 96. *P. geonomiformis* Becc.—Luzon, Polillo, Mindoro  
 97. *P. heterophylla* Becc.—Luzon, Rapu-Rapu, Negros  
 98. *P. insignis* Becc.  
 98a. var. *insignis* Becc.—Luzon, Mindoro, Leyte, Mindanao [Caroline Islands]  
 98b. var. *gasterocarpa* Becc.—Masbate, Negros  
 98c. var. *leptocarpa* Becc.—Negros  
 98d. ssp. *loheriana* Becc.—Luzon  
 99. *P. isabelensis* Becc.—Luzon
100. *P. maculata* Porte ex Lem.—Babuyan, Luzon, Polillo, Catanduanes, Mindoro, Panay, Siargao, Mindanao
101. *P. modesta* Becc.—Bucas Grande, Mindanao, Basilan  
 102. *P. negrosensis* Becc.—Negros  
 103. *P. philippinensis* Becc.—Luzon, Mindoro, Leyte, Negros, Panay, Mindanao  
 104. *P. rigida* Becc.—Luzon, Negros  
 105. *P. samarana* Becc.—Samar  
 106. *P. sclerophylla* Becc.—Mindoro  
 107. *P. sibuyanensis* Becc.—Sibuyan  
 108. *P. speciosa* Becc.—Mindanao, Basilan  
 109. *P. urdanetensis* Becc.—Mindanao  
 110. *P. urosperma* Becc.—Babuyan, Luzon  
 111. *P. woodiana* Becc.—Luzon, Mindoro, Mindanao
- [112.] *P.* sp. nov. (ined.)—Luzon  
 [113.] *P.* sp. nov. (ined.)—Luzon  
 [114.] *P.* sp. nov. (ined.)—Luzon  
 [115.] *P.* sp. nov. (ined.)—Luzon, Polillo
17. *Areca* (ca. 50 spp., India to S. China, through Malesia to the Solomon Islands; 10 spp. in the Philippines, including 1 new variety, all endemic except 2 spp.)  
 116. *A. caliso* Becc.  
 116a. var. *caliso*—Mindanao  
 [116b.] var. nov. (ined.)—Luzon, Biliran, Leyte, Mindanao
117. *A. camarinensis* Becc.—Luzon  
 118. *A. catechu* L.—throughout the Philippines, cultivated [widespread in the tropics]  
 119. *A. costulata* Becc.—Leyte, Dinagat  
 120. *A. hutchinsoniana* Becc.—Mindanao, Basilan, Siassi  
 121. *A. ipot* Becc.—Luzon, Polillo  
 122. *A. macrocarpa* Becc.—Mindanao  
 123. *A. parens* Becc.—Luzon  
 124. *A. vidaliana* Becc.—Palawan [Balembangan]  
 125. *A. whitfordii* Becc.  
 125a. var. *whitfordii*—Mindoro  
 125b. var. *luzonensis* Becc.—Luzon
18. *Heterospathe* (ca. 37 spp., Moluccas, New Guinea, Solomon Islands and Micronesia; ca. 11 spp. in the Philippines, all endemic except 1 sp.)  
 126. *H. brevicaulis* Fernando—Luzon  
 127. *H. cagayanensis* Becc.—Luzon  
 128. *H. dransfieldii* Fernando—Palawan  
 129. *H. elata* Scheff.—Luzon, Mindoro, Masbate, Cebu, Panay, Samar, Siquijor, Dinagat, Bucas Grande, Mindanao [Moluccas, Micronesia]

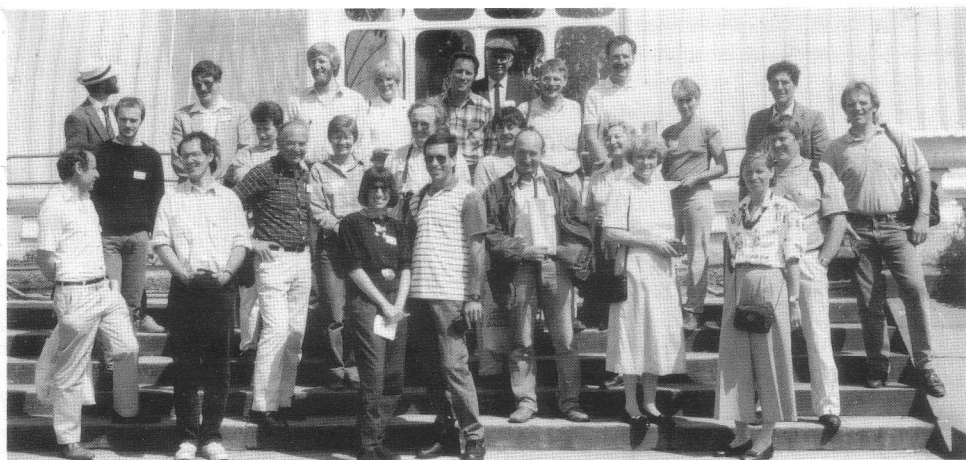
130. *H. elmeri* Becc.—Negros, Camiguin  
 131. *H. intermedia* (Becc.) Fernando—Luzon, Samar, Biliran, Leyte, Mindanao  
 132. *H. negrosensis* Becc.—Luzon, Sibuyan, Masbate, Negros, Panay  
 133. *H. philippinensis* (Becc.) Becc.—Luzon, Leyte, Dinagat, Bucas Grande  
 134. *H. scitula* Fernando—Luzon  
 135. *H. sibuyanensis* Becc.—Sibuyan  
 136. *H. trispatha* Fernando—Luzon  
 19. *Oncosperma* (ca. 5 spp., Ceylon to Malay Peninsula, Sumatra, Borneo, Java, Celebes; 4 spp. in the Philippines, 2 endemic)  
 137. *O. gracilis* Becc.—Luzon, Biliran  
 138. *O. horridum* (Griff.) Scheff.—Polillo, Mindanao [Malay Peninsula, Sumatra, Borneo, Celebes]  
 139. *O. platyphyllum* Becc.—Negros  
 140. *O. tigillarum* (Jack) Ridl.—Palawan [Indo-China, Malay Peninsula]
- Tribe Cocoeae  
 20. *Cocos* (monotypic, origin of Western Pacific, widely cultivated throughout tropics and subtropics)  
 141. *C. nucifera* L.—throughout the Philippines, cultivated; wild-types in eastern Samar [wild-types also in eastern Australia]

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## NEWS OF THE SOCIETY

Robert W. Read (phone: 813-793-1074), formerly Curator of Botany, The United States National Herbarium (US), Department of Botany, Smithsonian Institution, now Botanist Emeritus, has retired to Naples, Florida. After 22 years at the Smithsonian, the last 16 as a curator, Dr.

Read will continue his research on palms and bromeliads in association with The Fairchild Tropical Gardens and The Marie Selby Botanical Garden respectively. He plans to continue monographic studies on the palm genus *Pritchardia*, the native palms of the United States, palms of the Caribbean, and selected genera of palms for the Flora Mesoamerica and Flora Neotropicalia. Bromeliad research interests



1. European members of IPS stand in front of the main doors of the Palm House at Kew.