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Current Status of Mexican Palms

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Mexico is a country of approximately 2 million square kilometers. It has one of the world's richest floras due to the great diversity of environmental conditions determined by several factors such as latitude, altitude, and topography, that produce several well defined physiographic regions: Western Sierra Madre, Eastern Sierra Madre, Trans-volcanic Belt, Southern Sierra Madre, High Mexican Plateau, Coastal Plains along both the Pacific and the Gulf of Mexico, and the Lowlands and Plains of the Yucatan Peninsula.

Twenty-two genera of native palms have been recorded from Mexico. It is not possible, however, to give an accurate estimate of the total number of species because some genera are still under revision and there are some nomenclatural and taxonomic problems. It is probable that there are about 100 species in Mexico.

Some of the genera occurring in Mexico are typically Mexican, for all or most of their species are present in Mexico, such as *Brahea*, *Erythea*, *Washingtonia*, and *Sabal*. Some other species are South American, having Mexico as their northernmost distribution limit and being represented there by a few species, as is the case with *Scheelea*, *Orbignya*, *Geonoma*, *Bactris*, and *Acrocomia*. Other genera are mainly Central American, such as *Cryosophila* and *Synechanthus*; while others are typically Antillean, such as *Pseudophoenix*, *Coccothrinax*, *Thrinax*, *Roystonea*, and *Acoelorraphe*, and a few others, such as *Chamaedorea*, have a wide distribution in Tropical America.

Following the classification of Dransfield and Uhl (1986), three of the six subfamilies (Figs. 1–3); six of the 14 tribes, seven of the 36 subtribes, and 22 of the 200 genera for the world occur in Mexico. Each genus is discussed briefly and the ecology of the palms considered in a separate section.

Cryosophila (Fig. 4)

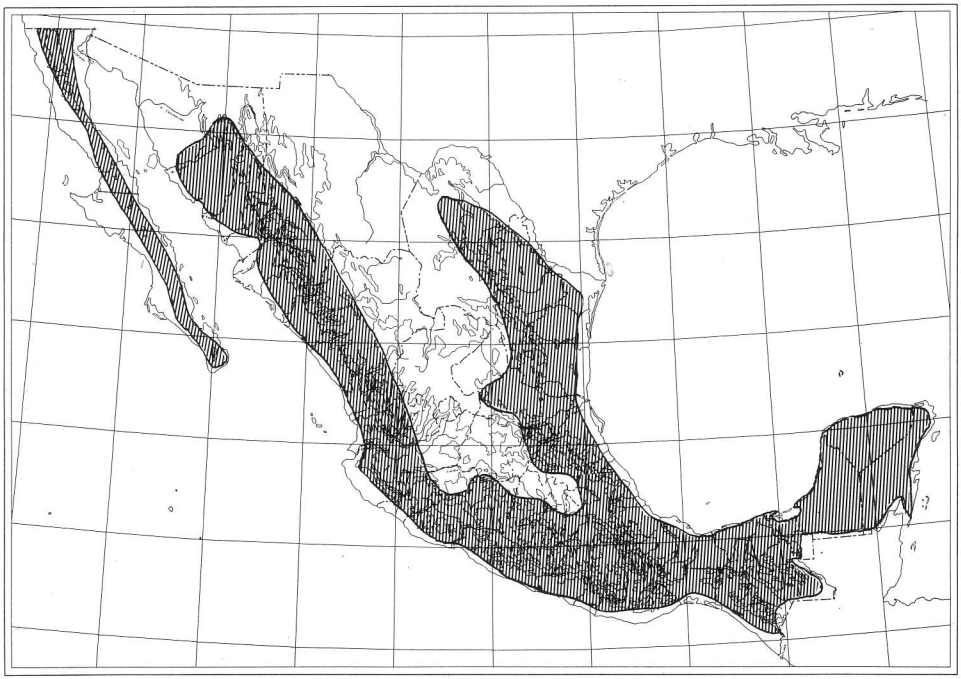
This Central American genus is represented in Mexico by two species: *C. argentea* H. Bartlett and *C. nana* (Kunth) Blume. The former grows in the Yucatan Peninsula and in the states of Tabasco and Chiapas and is an important element of some median evergreen forests. *Cryosophila nana* grows on the Pacific slopes in median evergreen and deciduous forests, as well as in pine-oak forest from Chiapas to Nayarit.

The leaves of both species are used to make brooms.

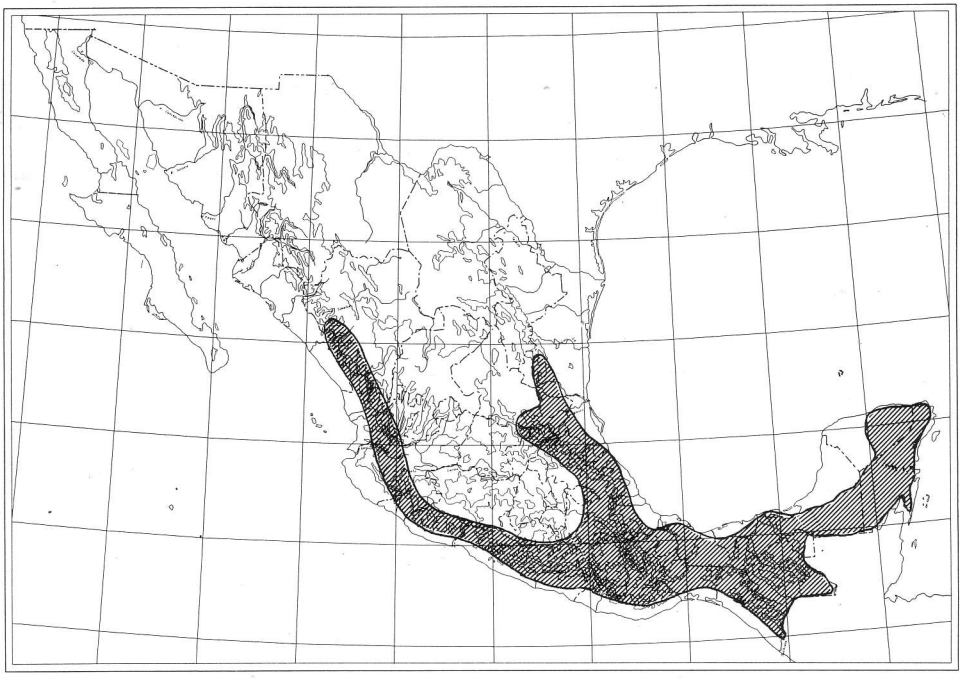
Thrinax (Figs. 5,6)

This Antillean genus has only one species in Mexico: *T. radiata* Lodd. ex J. A. and J. H. Schult., growing only in the Yucatan Peninsula in median evergreen forest of the state of Quintana Roo and in sand dunes forests of Quintana Roo and Yucatan. The former individuals can reach heights of up to 15 m, while in the dunes individuals are no more than 3 m tall.

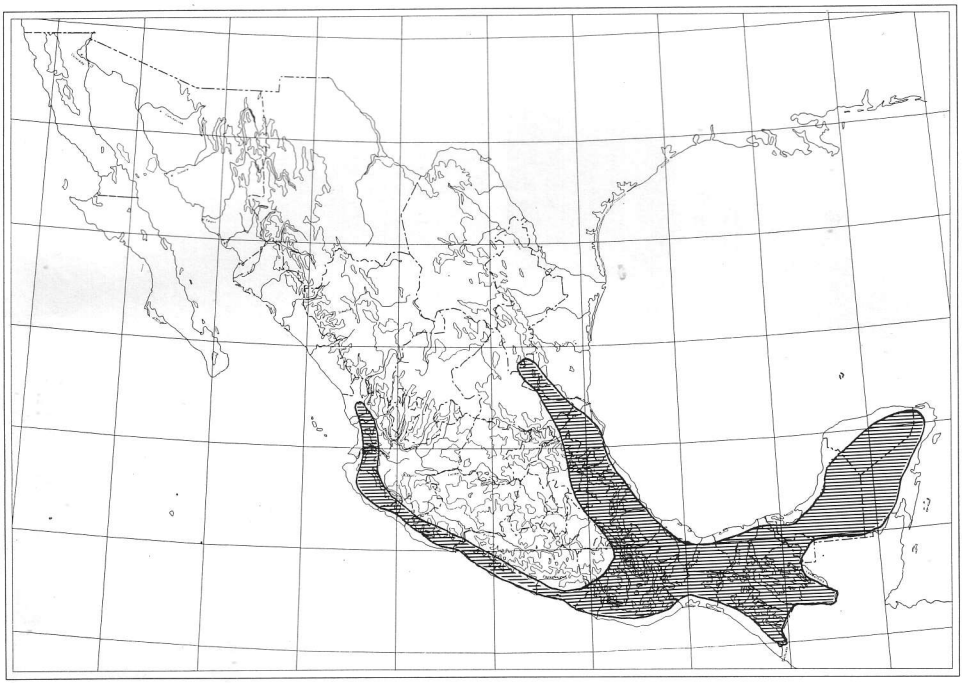
The common name of this species is "chit." Its leaves are used to make brooms and to thatch beach houses, while the trunk is used in the construction of rustic houses and to make lobster traps.



1. Map showing the distribution of subfamily *Coryphoideae* in Mexico.



2. Map showing the distribution of subfamily *Ceroxyloideae* in Mexico.



3. Map showing the distribution of subfamily *Arecoideae* in Mexico.

Coccothrinax (Figs. 6,12,19)

This genus is of Antillean origin, with *C. readii* Quero, the sole species occurring in Mexico and endemic to the Yucatan Peninsula. Curiously, its distribution coincides largely with that of *Thrinax radiata*. *C. readii* mainly grows near the coast, never more than 20 km inland. In the state of Quintana Roo it is found as an important element of the median evergreen forest, where it can attain heights of up to 5 m, and has very thin trunks. It also grows in sand dune vegetation in Quintana Roo and Yucatan, where its trunk is thick and no more than 2 m tall.

The species is known by the common name of "knakas." The trunks are used for making rustic constructions and the leaves to manufacture brooms.

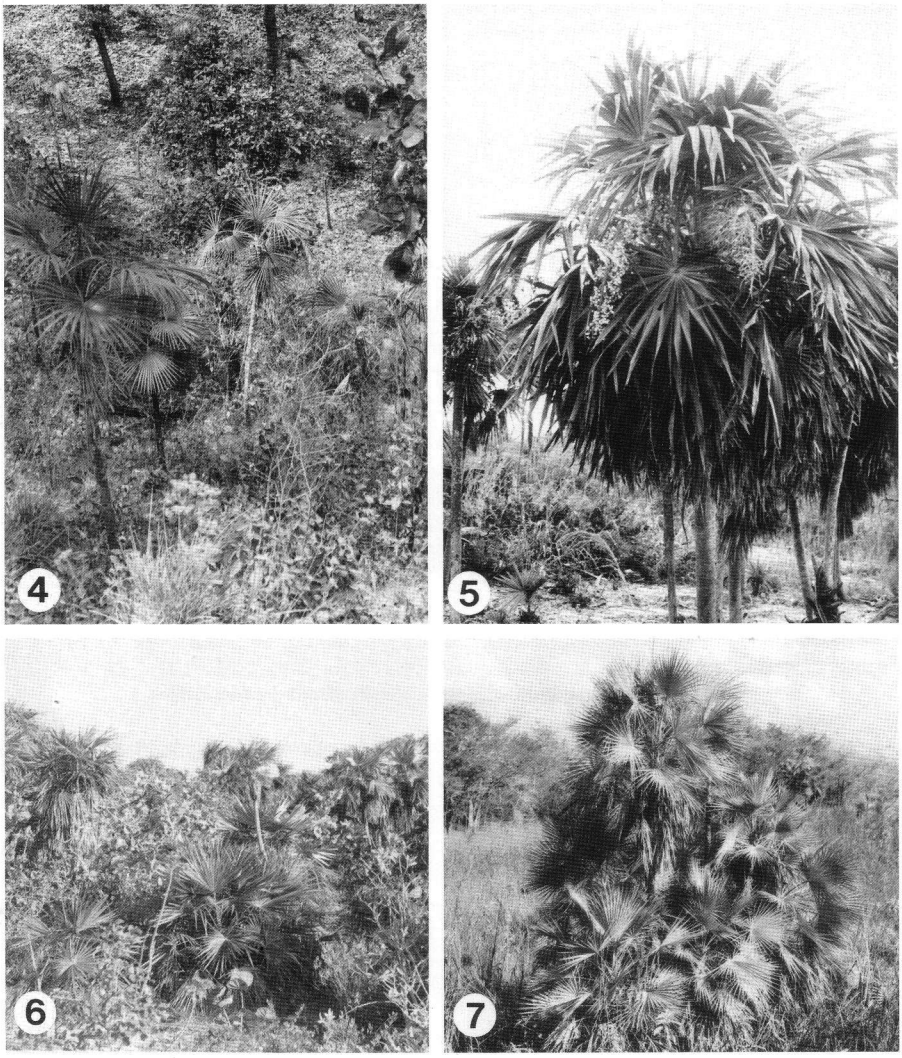
Acoelorraphe (Fig. 7)

A monospecific genus, very abundant in Mexico; *A. wrightii* H. Wendland, grows mainly on terrains flooded with either brackish or fresh water, in the Peninsula of Yucatan and in the states of Tabasco, Chiapas, and Veracruz. This palm grows in clusters. When it grows in soils with abundant water, the individuals are no more than 2 m tall, while in places with good soil and not much water, they can reach up to 4 m.

The common name is "tasiste" and the trunks are used to make rustic houses and fences.

Brahea (Fig. 8)

Typically a Mexican genus, all species growing in Mexico and only *B. dulcis* extending to Guatemala and Honduras. The species are: *Brahea berlandieri* H. Bartlett, in the states of Nuevo Leon, Coahuila, Tamaulipas, and Hidalgo; *B. decumbens* Rzedowski, in San Luis Potosi and Tamaulipas; *B. moorei* L. H. Bailey ex H. E.

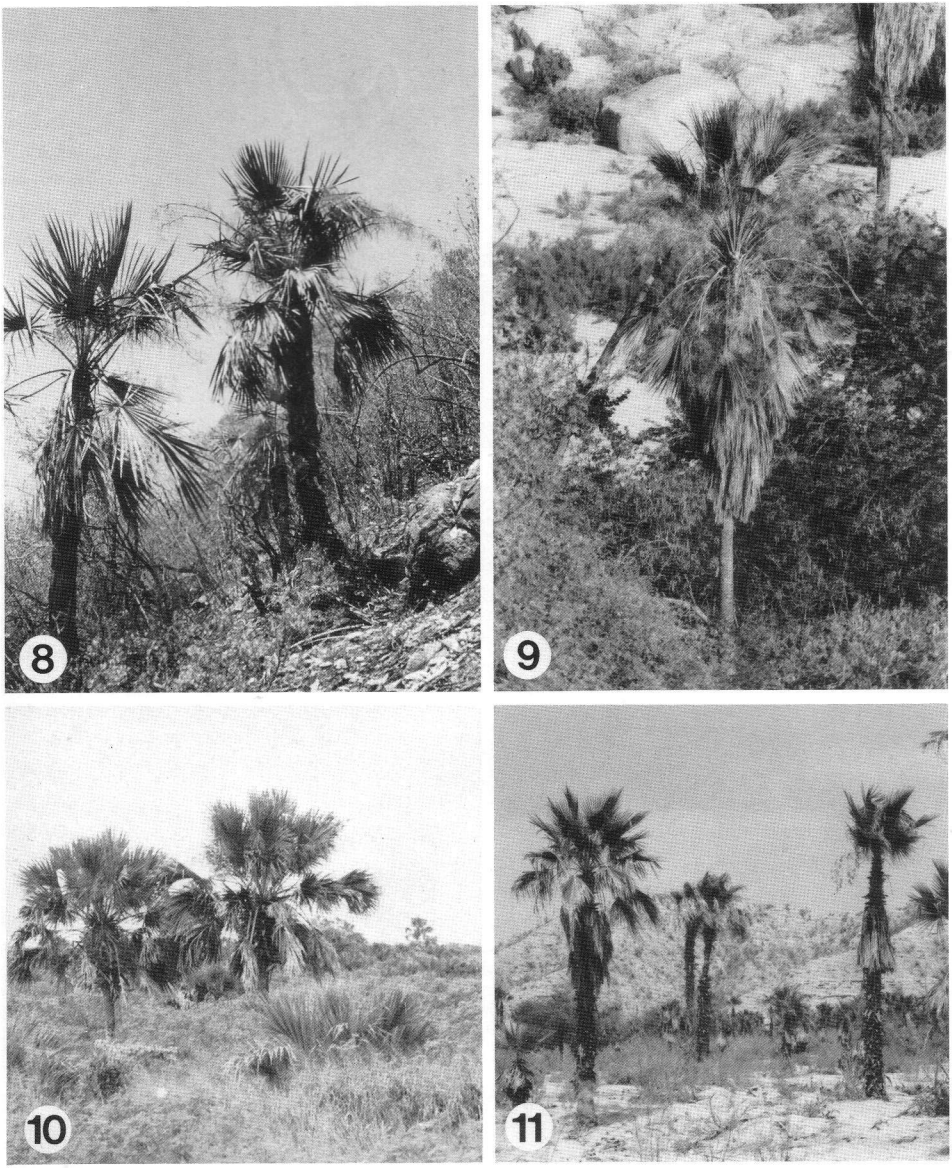


4. *Cryosophila nana* growing in an oak forest of Jalisco. 5. *Thrinax radiata* growing on sands of northern Quintana Roo. 6. Palm grove of *Coccothrinax readii* and *Thrinax radiata* on sand dunes of Yucatan. 7. *Acoelorraphe wrightii* in savannas with terrains flooded of Campeche.

Moore, in Hidalgo, San Luis Potosi and Tamaulipas; *B. nitida* Andre, in Guerrero, Oaxaca, and Chiapas; and *B. dulcis* Martius, the most abundant species with a wide distribution range, from Chiapas to Guerrero on the Pacific slope and to Puebla, Hidalgo, San Luis Potosi, Veracruz, and Tamaulipas on the Gulf of Mexico slope. All the species of this genus grow on limestone soils at elevations of 600–2,000 m.

The leaves of most species are employed for thatching simple houses and to make many kinds of handicrafts such as hats, baskets, fans, etc. The fruits of *B. dulcis* are edible.

I am considering *Brahea* as different from *Erythea* until I finish the study of both genera, including more field explo-

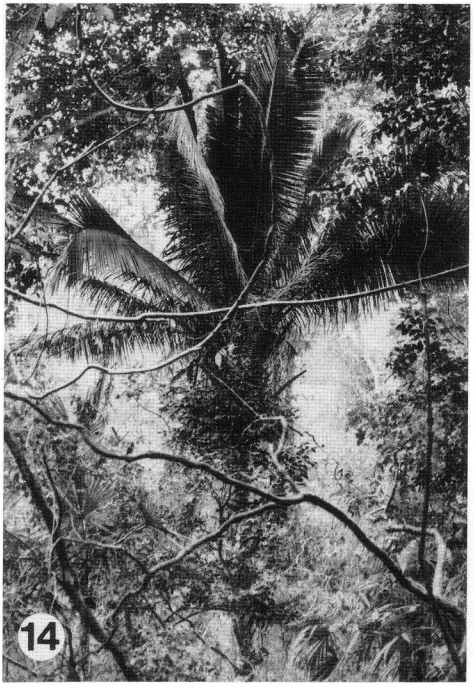


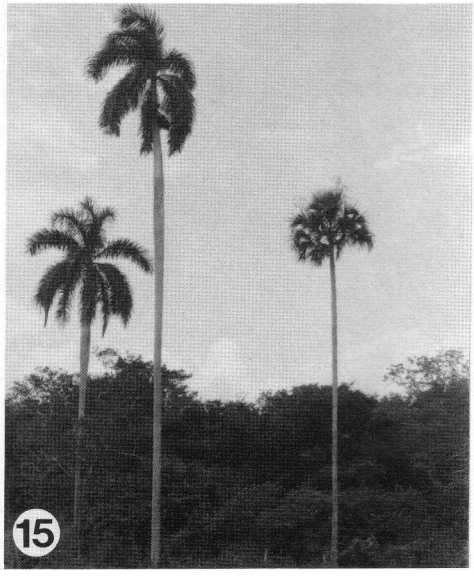
8. *Brahea berlandieri* in disturbed areas of low deciduous forest at Nuevo Leon. 9. *Erythea brandegei* growing near a river bank at Baja California Sur. 10. Secondary palm grove of *Sabal gretheriae* at northern Quintana Roo. 11. *Washingtonia robusta* growing in a dry river bed of Baja California Sur.

ration, as well as chromosome, anatomical, and pollen studies.

Erythea (Fig. 9)

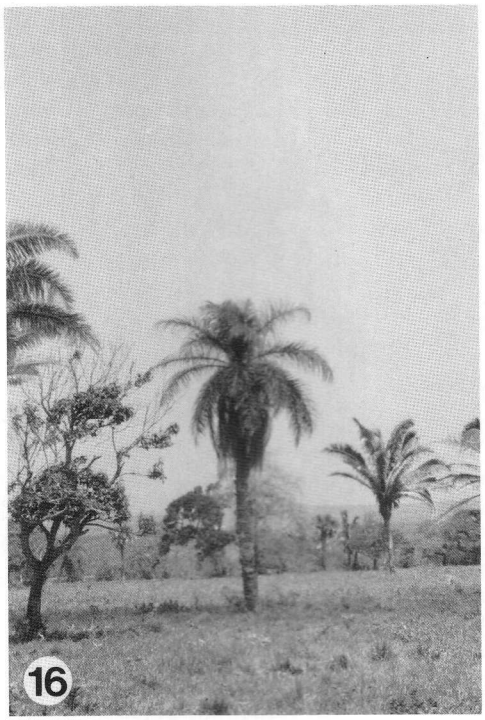
A genus with seven species, all of them occurring in Mexico, with one species extending to Guatemala, Belize, El Salvador, and Honduras. The species are: *Erythea aculeata* T. S. Brandege, in Sinaloa; *E. armata* S. Watson, in Baja California; *E. brandegei* Purpus, in Baja California Sur; *E. clara* L. H. Bailey, in





12. Primary palm grove with *Pseudophoenix sargentii* and *Coccothrinax readii* on sands at northern Yucatan. 13. *Chamaedorea pochutlensis* in a median evergreen forest in Jalisco. 14. *Orbignya guacuyule* growing in a median evergreen forest near Puerto Vallarta, Jalisco. 15. *Roystonea regia* and *Sabal yapa* at northern Yucatan.

Sonora; *E. edulis* (H. A. Wendland) S. Watson, in Isla Guadalupe, Baja California; *E. elegans* ? Franceschi, in Sonora; *E. pimo* (Beccari) H. E. Moore, in Guerrero, Michoacan and State of Mexico; and *E. salvadorensis* (Beccari) H. E. Moore, in Chiapas, Guatemala, Belize, El Salvador, and Honduras. I have found some populations of this genus for which a taxonomic position is not yet clear in Sonora,



16. *Acrocomia mexicana* and *Scheelea liebmannii* in a grassland of Tabasco. 17. *Geonoma oxycarpa* growing in a high evergreen forest of Veracruz. *Astrocaryum mexicanum* in the background.

Sinaloa, and Jalisco. The species of this genus always grow on soils derived from igneous rocks, never in limestone soils as does *Brahea*; the range of *Erythea* is mostly on the northwest Pacific slope.

The leaves of these palms are used for thatching rustic houses and to make some typical handicrafts.

Washingtonia (Fig. 11)

A genus with two species: *Washingtonia filifera* (Linden) H. Wendland and *W. robusta* H. Wendland, both occurring in Mexico; the former grows in Baja California, while the latter occurs in Baja California, Baja California Sur, and Sonora.

Washingtonia robusta is the most widely cultivated ornamental palm in Mexico. It can be found from warm areas at sea level in the Yucatan Peninsula, to high and cool places such as Mexico City.

Sabal (Figs. 10,19)

A genus with about 16 species, seven of them occurring in Mexico. They are: *Sabal mauritiiformis* (Karsten) Grisebach & H. Wendland, occurring in the states of Quintana Roo, Campeche, Tabasco, Chiapas, Oaxaca, and Veracruz; *S. pumos* (Kunth) Burret, in Michoacan; *S. rosei* (O. F. Cook) Beccari, in Guerrero, Jalisco, and Nayarit; *S. uresana* Trelease, in Sonora, and Chihuahua; *S. yapa* Wright, in the Yucatan Peninsula; *S. mexicana* Martius, which is the most widely widespread species, from Campeche to Tamaulipas in the coastal plains of the Gulf of Mexico and, from Chiapas to Guerrero along the Pacific slopes, from sea level to 2,000 m; and *S. gretheriae* Quero, a new species recently described from Quintana Roo.

Sabal dugessii S. Watson ex L. H. Bailey, was described from one cultivated

18. *Bactris balanoidea* growing in terrains flooded at Tabasco. 19. Rustic house built with trunks of *Coccothrinax readii* and thatched with leaves of *Sabal yapa* at Quintana Roo.

individual from Rincon de Bustos, a small town in the state of Guanajuato. This individual is more than 20 m tall and is still growing near a river bank. Zona (1990) considers this species and *S. pumos* as conspecific.

Sabal is one of the most economically important genera of palms in Mexico, mainly for rural people, who use it in different ways. The leaves are used for thatching. Residents of hot humid climates know by experience that roofs made with these palms are superior to those made with any other natural material. Young leaves are used to make different kinds of handicrafts; trunks are used for construction and as poles. *S. mexicana* is also used as a source of edible palm hearts ("palmito") and the fruits are used as supplementary food for pigs.

Pseudophoenix (Fig. 12)

A genus represented in Mexico by one species, *Pseudophoenix sargentii* H. Wendland ex Sargent, which as other members of the genus, is typically an Antillean insular species. Mexico is the only place where this palm grows on continental land. Its distribution is restricted to the Yucatan Peninsula. In northern Yucatan it is very abundant on sand dunes, while in Quintana Roo it occurs as an important element of some median and low forests but is not as abundant as in the dunes.

It is interesting to mention that in southern Quintana Roo, this palm was found growing 30 km inland, the farthest inland record known within its range.

Its common name is "kukA" and it is much appreciated as an ornamental in parks and gardens.

Synechanthus

A palm represented in Mexico by *Synechanthus fibrosus* (H. Wendland) H. Wendland (syn. *S. mexicanus* H. E. Moore). There are very few Mexican collections of this palm, which grows as understory element in high evergreen forest in restricted areas of the states of Oaxaca, Veracruz and Chiapas.

This palm is usually acaulescent.

Gaussia

Gaussia is represented in Mexico by *G. maya* (O. F. Cook) Quero & R. W. Read and *G. gomez-pompae* (Quero) Quero, the former occurring in southern Quintana Roo near the boundary with Belize and Guatemala, while the latter occurs in the states of Oaxaca and Tabasco. *Opsiandra* O. F. Cook has been shown to be congeneric with *Gaussia* (Quero and Read 1986).

The two species are important elements of high and median evergreen forests, where they reach more than 15 m tall, always growing on limestone-derived soils very similar to the Cuban "mogotes."

Chamaedorea (Fig. 13)

This is the genus with more species in Mexico than any other; more than 40 species have been reported. However, it is not possible to establish the exact number, because there are species only known from old descriptions and type specimens and not yet found again, and some species known from Guatemala have now been found in Mexico. Others species have been described recently, and finally the taxonomic position of some species is not clear. Thus far, I have found 35 of the following 51 species reported for Mexico: *Ch. affinis* Liebmann, *Ch. alternans* H. Wendland, *Ch. arenbergiana* H. Wendland, *Ch. atrovirens* Martius, *Ch. cataractarum* Martius, *Ch. concolor* Martius, *Ch. elatior* Martius, *Ch. elegans* Martius, *Ch. ernesti-augusti* H. Wendland, *Ch. erumpens* H. E. Moore, *Ch. ferruginea* H. E. Moore, *Ch. foveata* D. R. Hodel, *Ch. fractiflexa* D. R. Hodel & J. J. Castillo, *Ch. geonomiformis* H. Wendland, *Ch. glaucifolia* H. Wendland, *Ch. humilis* Martius, *Ch. karwinskyana* H. Wendland, *Ch. klotzschiana* H. Wendland, *Ch. lepidota* H.

Wendland, *Ch. liebmannii* Martius, *Ch. lindeniana* H. Wendland, *Ch. martiana* H. Wendland, *Ch. metallica* (O. F. Cook) H. E. Moore, *Ch. microspadix* Burret, *Ch. monostachys* Burret, *Ch. montana* Liebmann, *Ch. neurochlamys* Burret, *Ch. nubium* Standley & Steyermark, *Ch. oblongata* Martius, *Ch. oreophila* Martius, *Ch. paradoxa* H. Wendland, *Ch. parvisecta* Burret, *Ch. pochutlensis* Liebmann, *Ch. pulchra* Burret, *Ch. queroana* D. R. Hodel, *Ch. radicalis* Martius, *Ch. rhizomatosa* D. R. Hodel, *Ch. rigida* H. Wendland, *Ch. rojasiana* Standley & Steyermark, *Ch. sartorii* Liebmann, *Ch. scandens* Liebmann, *Ch. schiedeana* Martius, *Ch. schippii* Burret, *Ch. seifrizii* Burret, *Ch. simplex* Burret, *Ch. stolonifera* H. Wendland, *Ch. tenella* H. Wendland, *Ch. tepejilote* Liebmann, *Ch. tuerckheimii* (Dammer) Burret, *Ch. vistae* D. R. Hodel & N. Uhl, *Ch. whitelockiana* D. R. Hodel & N. Uhl.

Most of the species occur in shaded places, in high or median evergreen forests, or in cloud forests and oak forests. They are much appreciated as ornamentals and the leaves of some species have decorative uses.

Reinhardtia

A genus with two species in Mexico: *Reinhardtia elegans* Liebmann, occurring in small areas of Oaxaca and Chiapas and, *R. gracilis*. The latter has two varieties, *R. gracilis* (H. Wendland) Drude ex Dammer var. *gracilior* (Burret) H. E. Moore, which occurs in Veracruz, Oaxaca, Tabasco, and Chiapas and, *R. gracilis* (H. Wendland) Drude ex Dammer var. *tenuissima* H. E. Moore, that occurs in Oaxaca.

These palms are understory elements of high and median evergreen forests.

Roystonea (Fig. 15)

In Mexico *Roystonea* is cultivated in almost all the tropical areas. In the wild, I have found two species, *Roystonea regia* (Kunth) O. F. Cook, in a small region at the north of the state of Yucatan, and *R. dunlapiana* in the southern Quintana Roo, Campeche, Tabasco, Chiapas, and Veracruz.

Both species grow on flooded soils. The common names are "palma real" and "yaqua." They are much appreciated as ornamentals.

Scheelea (Fig. 16)

Apparently three species occur in Mexico. *Scheelea liebmannii* Beccari has a broad distribution range in the Gulf of Mexico slope from Tamaulipas to Campeche and *S. preusii* Burret appears in a small area of the state of Chiapas. There are some reports of *S. lundellii* H. Bartlett, in Chiapas near the Guatemalan border, but I have not been able to find it.

The species of this genus, mainly *S. liebmannii*, form secondary rather dense palmetto groves on clay areas which are subject to periodic flooding. The fruits are used to make cookies and the leaves for thatching rustic houses. The common names are "palma real," "corozo" and "manaca."

Orbignya (Fig. 14)

This South American genus is represented in Mexico by two species, *Orbignya cohune* (Martius) Dahlgren ex Standley, in Tabasco, Chiapas, and Quintana Roo and, *O. guacuyule* (Liebmann ex Martius) Hernandez-X., on the Pacific slope from Chiapas to Nayarit. Whether *O. guacuyule* is distinct is dubious because it is very similar to *O. cohune*. There are only small differences in the flowers.

Both species occur in high or median evergreen forests, but sometimes form very dense secondary groves. The common name for both is "corozo."

Acrocomia (Fig. 16)

Acrocomia mexicana Karwinsky ex Martius, is the only species of this genus

growing in Mexico. Its populations are not very abundant, but it is widely distributed, mainly in hot-humid regions, occurring always in secondary vegetation. It benefits from human disturbance, mainly by fire. Some authors consider this species synonymous with *Acrocomia sclerocarpa* Martius.

The fruits are used to make candy and as a popular medicine. It is called "coyol" and "cocoyol."

Bactris (Fig. 18)

This South American genus with more than 230 species, is poorly represented in Mexico. Five species have been recorded, but I have found only two: *B. balanoidea* H. Wendland and *B. mexicana* Martius. Both of these grow on flooded soils, on river banks, in ravines or, in very humid soils of tropical regions from Veracruz to the Peninsula of Yucatan.

The stems of these palms are used to make baskets and rustic furniture; the fruits are edible. They are commonly known as "jahuacte."

Desmoncus

This climbing, prickly palm is represented in Mexico apparently by two species: *Desmoncus quasillarius* H. Bartlett in the Peninsula of Yucatan and Tabasco and *D. chinantlensis* Martius, in Oaxaca, Chiapas, and Veracruz. They occur typically in secondary vegetation derived from high or median evergreen forests.

The stems are used to manufacture baskets and rustic furniture. They have the common name of "bayal."

Astrocaryum (Fig. 17)

Astrocaryum mexicanum Liebmann ex Martius is the only species of the genus growing in Mexico. It is very abundant in the tropics, mainly in Chiapas, Tabasco, Oaxaca, and Veracruz, being an important element in the middle story of some high and median evergreen forest.

It is known as "chocho" and "chichon."

Geonoma (Fig. 17)

Several species of this genus have been reported from Mexico however, according to Wessels Boer (1968), only two species occur, *Geonoma oxycarpa* Martius and *G. interrupta* (Ruiz & Pavon) Martius. The former is widely distributed in the states of Veracruz, Tabasco, Oaxaca, and Chiapas, while *G. interrupta* grows only in a small area of Chiapas.

These palms grow in high and median evergreen forest.

Calyptrogyne

A genus represented in Mexico by only one species, *C. ghiesbreghtiana* (Linden & H. Wendland) H. Wendland, which grows in a restricted area of the state of Chiapas in median evergreen forest.

The Ecology of Mexican Palms

The Mexican palms occur at many different altitudes and latitudes, most at sea level or at low altitudes. However, a few species grow at higher levels, for instance *Brahea nitida*, which reaches 2,000 m in pine-oak forests, and *Sabal mexicana* which can grow near 2,000 m in oak forest. Although most palms are found in tropical regions, some species extend beyond the tropics, and reach 32 degrees North latitude on the Pacific slope, as *Washingtonia filifera* and *Erythea* spp., while on the coast of the Gulf of Mexico, *Brahea berlandieri* and *Sabal mexicana* occur up to 28 degrees.

Palms can be important elements of diverse vegetation types. They can also be found as almost pure associations known as "palmares," which in some cases can be of primary origin or may be secondarily derived due to human activities. In both cases the distribution of the "palmares" is almost always in discontinuous stands of variable extension.

An interesting example of a palm association is found in the Yucatan Peninsula, where *Coccothrinax readii* and/or *Thrinax radiata* are abundant in the mid-stratum of median semi-evergreen forests along the Caribbean coast in the state of Quintana Roo. *Cryosophila argentea* is another important element in the physiognomy of high and median evergreen forests of southern Quintana Roo and Campeche. *Gaussia* spp. are important in high evergreen forests, *G. maya* in south Quintana Roo and *G. gomez-pompae* in Oaxaca and Tabasco. *Astrocaryum mexicanum* is very abundant in the median stratum of high evergreen or semi-evergreen forests of different regions of Veracruz, Tabasco, Oaxaca, and Chiapas.

Some palms such as *Sabal* spp., *Scheelea* spp., and *Orbignya* spp., can be important elements of primary associations, mainly evergreen forests, but they can also constitute secondary associations. An interesting case is *Sabal* spp., when growing in undisturbed forests, where the individuals are generally acaulescent, with large leaves; but when the forests are destroyed, mainly by fire in order to make grasslands for cattle, the individuals can reach large sizes and constitute very dense secondary palm groves.

Other palms occur in several different kinds of primary vegetation, but are not important in the physiognomy of the association. The genera are: *Chamaedorea*, *Bactris*, *Reinhardtia*, *Geonoma*, *Calyptrogyne*, and *Synechanthus*. Some species of these palms are small individuals which occur in the lower stratum of different kinds of tropical rain forests, mainly high and evergreen forests, such as cloud and pine-oak forests.

Among the "palmares" as a primary association occurring in Mexico, we can mention those of the Peninsula of Yucatan which grow on sand dunes, where the vegetation can be dominated by one to three species of palms. On the north coast of the state of Yucatan exists a palm grove composed of *Pseudophoenix sargentii*, *Thrinax radiata*, and *Coccothrinax readii*, but in some cases the individuals of the last two genera are the main elements of the association as in the northeast Yucatan and along the coast of Quintana Roo. It is interesting to note that *Thrinax radiata* forms an almost pure stand along the eastern coast of Cozumel island.

Another primary palm community is that formed of *Acoelorraphe wrightii*, which is very abundant in savannas that are periodically flooded either by brackish or fresh water in the Yucatan Peninsula, Tabasco, Chiapas, and South Veracruz. The individuals of this species sometimes constitute dense groups resembling small islands in the savanna and they are resistant to the periodical fires of the areas.

Primary palm groves are also found in northwestern Mexico, those of *Washingtonia filifera* in Baja California and *W. robusta* in Baja California Sur, Baja California, and Sonora; *Erythea* spp., in Baja California and Sonora, and *Washingtonia robusta*, *Erythea clara*, and *Sabal uresana* in Sonora. These "palmares" constitute isolated stands growing on wet soils or in ravines.

Among "secondary palm groves," mainly due to human disturbance, those of *Brahea*, *Orbignya*, *Scheelea*, and *Sabal* are noteworthy.

Brahea dulcis is the most abundant species of the genus and is widely distributed. As all species of the genus, it is always found on limestone soils, at elevations over 800 m and forming almost pure associations in disturbed areas. Other species forming important associations are: *Brahea nitida* in Guerrero, Oaxaca, and Chiapas, which is almost always associated with disturbed pine-oak forests, and *Brahea decumbens* in San Luis Potosi, also appearing in disturbed pine-oak forests.

Orbignya also benefits from human disturbance; *Orbignya cohune* is found in almost pure stands when the natural vegetation has been felled; it grows on deep

and well drained soils in southern Quintana Roo. The same happens with *Orbignya guacuyule* on the Pacific coast from Oaxaca to Nayarit, it forms discontinuous stands and is most abundant in Colima, Jalisco, and Nayarit. Unfortunately the latter "palmares" are being replaced by coconut palms in some places.

Scheelea is similar to *Orbignya*; its species as those of the latter, constitute very extended palm groves mainly of *S. liebmannii*. It is very abundant along the Gulf of Mexico coast, in loamy soils, that can be flooded during part of the year. This palm grows from South Tamaulipas to southwestern Campeche. *Scheelea preussii* does not form extensive palmettos, but only grows in a reduced area of Chiapas.

Acrocomia mexicana is the typical palm of areas disturbed by man, mainly by fire, to establish grazing lands for cattle or for agriculture. It is a species with a large distribution range in several habitats; but does not form dense palmettos.

The species of *Desmoncus* are typical of disturbed areas of the rain forest, but they do not form true palmettos. They are very abundant in south and southeast Mexico.

Present Status of Mexican Palms

The natural populations of some palms have decreased; however, other populations are increasing, but the former situation is the commoner.

The disappearance or depletion of palm populations has occurred due to external rather than internal conditions, mainly because of the activities of man directly overexploiting the populations, or by the destruction or alteration of the natural habitats where the palms grow, so that some species are now vulnerable, threatened, or endangered.

Among the genera whose populations have increased, are *Brahea*, *Scheelea*, *Orbignya*, *Sabal*, and *Acrocomia* in secondary palm groves.

As an example of depleted natural palm populations caused by direct exploitation by man is *Pseudophoenix sargentii*, in the Yucatan Peninsula. This species has been used as an ornamental. Twelve years ago, it was cultivated only in parks and gardens of small towns near its natural population; but at the present time it is possible to find it cultivated in bigger towns and cities very far from its natural population, as in the states of Campeche and Tabasco. Horticulturists do not propagate this palm because of its slow growth. They usually remove adult individuals from natural populations, and as a result this species is now threatened.

Other examples of palm populations decreasing, either by direct exploitation or indirectly by destruction of natural habitats are, *Coccothrinax readii* and *Thrinax radiata*, both growing in the Peninsula of Yucatan. The trunks of the former are used to make fences and build rustic houses, as well as cottages or tourist constructions, or as ornamentals in large hotels. On the other hand, *Thrinax radiata* is used to build rustic buildings. Its trunks are used to make lobster traps and the leaves for thatching and to make brooms, so there is an overexploitation of the natural populations. Furthermore, the natural vegetation where these palms grow, has been cleared in order to open new lands for tourism development. Both species are now seriously threatened.

Something similar occurs with many species of *Chamaedorea*, mainly those appreciated as ornamentals. In some cases the whole plants are massively collected; in other cases, the seeds are overcollected for export or to be cultivated, altering the natural regeneration of new individuals. The leaves of other species have been overcollected in order to export them for ornamental use; as in the case of *Chamaedorea elegans*, *C. neurochlamys*, *C. seifrizii* and *C. oblongata*. The leaf exploitation has been so intensive that many individuals have become depauperate and do not pro-

duce enough seeds to insure the regeneration of natural populations.

The rapid forest clearing in Mexico is evident. Many natural palm populations have been lost because the palms cannot grow on cleared lands and agricultural areas, grasslands, and new urbanized centers. This is the case of *Gaussia maya* and *G. gomez-pompae*, *Cryosophila argentea*, *Chamaedorea* spp., *Calyptrogyne ghiesbreghtiana*, *Geonoma* spp., *Reinhardtia* spp., *Synechanthus fibrosus*, *Bactris mexicana*, *Roystonea regia*, *Brahea moorei*, etc.

In my travels over most of Mexico, I have noticed that, with the exception of some introduced palms like *Cocos nucifera*, *Phoenix dactylifera* and *Elaeis guineensis*, and other ornamentals, there are no plantations of palms in Mexico. Some useful palms are favored but not cultivated, such as: *Brahea* spp., *Roystonea dunlapiana*, *Sabal* spp., *Acrocomia mexicana*, *Cryosophila nana*, and *Scheelea liebmannii*.

Many universities, research centers and government institutions have realized these conservation problems and created biological reserves in different parts of the country. It is necessary to establish policies governing the commercial trade in palms and increase palm cultivation in different parts of Mexico and to avoid the destructive use of natural palm populations.

If we do not make corrective decisions, not only in Mexico but throughout all of the world, we will know many palms only through their descriptions or through herbarium specimens. Others we will never know.

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