

# Palms of the Cerrado Vegetation Formation of São Paulo State, Brazil\*

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The word "cerrado" in Portuguese means "dense" or "closed." Originally it was used as an adjective in the term "campo cerrado" to distinguish a campo (field or grassland) in which trees and shrubs are present so as to form a rather open woodland, open scrub or savanna, from a "campo limpo" (clean field) which is a pure or almost pure grassland (Eiten 1972).

Palms which generally occur within the cerrado vegetation formation of the Brazilian Highlands are cited by Martius (1824, 1951), Warming (1892), Rizzini (1963) and Eiten (1972). For the cerrado within the State of São Paulo in particular, the binomials *Attalea exigua*, *A. geraensis*, *A. humilis*, *A. loefgrenii*; *Butia eriospatha*, *B. leiopatha*; *Cocos eriospatha*, *C. petrea*, *Diplothemium campestre* and *Syagrus flexuosa* are cited in various publications (see Wettstein 1904, Ferri 1944, 1955, 1969, Rachid 1947, Rawitscher 1948, Ferri and Coutinho 1958, Mattos 1966 and Angely 1970). Toledo (1952) described a new species of *Acanthococos* based on material collected in the município of Pirassununga. Glassman (1967) described two new species of *Syagrus*: *S. loefgrenii* from Rio Claro and *S. rachidii* from Pirassununga. These two species subsequently were reduced to *S. loefgrenii* by Glassman (1971).

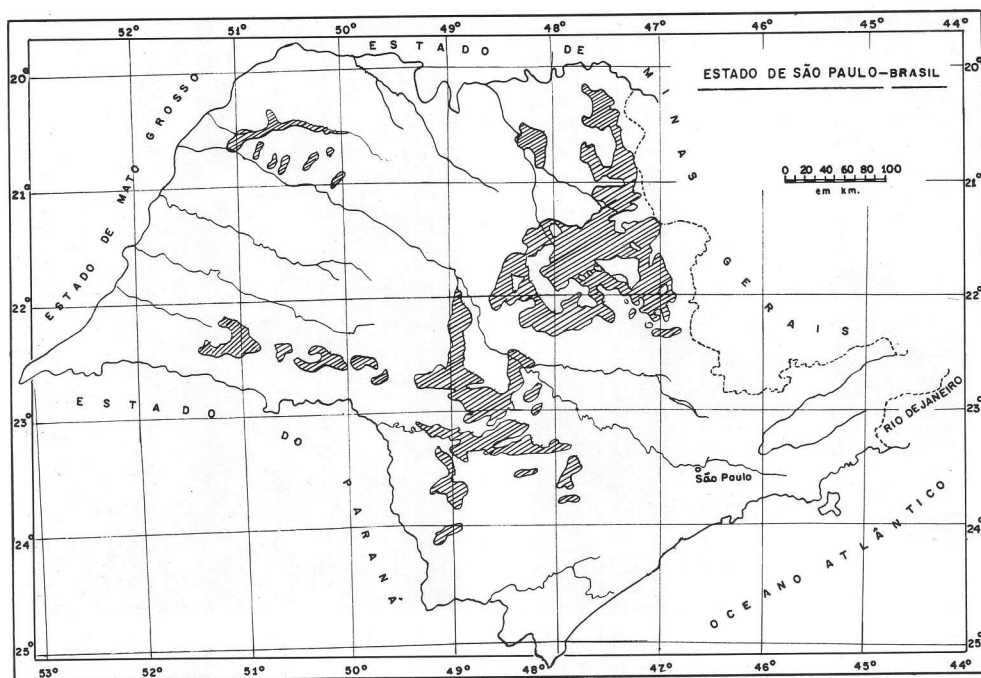
In 1972 the authors collected ample

material of palms from diverse areas of the cerrado in São Paulo State (Fig. 1). In addition, materials were examined from collections in the herbaria of the Institute of Botany of São Paulo and the Department of Botany, Institute of Biosciences, University of São Paulo. The authors studied all these materials and concluded that only six species of palms are found within the State.

## Key to the Palms of the Cerrado of São Paulo

- 1.\* Plants acaulescent, armed with straight black spines; 2-4 leaves emerging from the soil with long, straight pinnae to 60 cm long and 1 cm wide; from a distance easily confused with grasses of the cerrado. ... *Acanthococos emensis*
1. Plants acaulescent or caulescent, unarmed, when acaulescent never confused with grasses; leaves varying in number.
  2. Pinnae in clusters of 2-5 along the leaf rachis.
    3. Plants with long, slender, flexible stems, 1.0-2.5 m tall, up to 10 cm in diameter, occurring in clumps; inflorescences with more than 8 branches. .... *Syagrus flexuosa*
    3. Plants with subterranean stems. (In *Syagrus loefgrenii* the stems are always clumped and may emerge to 60 cm above ground).
      4. Inflorescence with 5-8 branches. .... *Syagrus loefgrenii*
      4. Inflorescence spicate. .... *Allagoptera campestris*
  2. Pinnae distributed uniformly along the leaf rachis.
    5. Rarely acaulescent; leaves gracefully recurved, pinnae glaucous, bright green below; bracts smooth; staminate and pistillate flowers on same inflorescence. .... *Butia paraguayensis*

\* Translated from the Portuguese by Dennis Johnson.



1. Map of São Paulo state showing areas of cerrado vegetation. After Borgonovi and Chiarini (1965).

5. Always acaulescent; leaves also recurved but pinnae dull, pale green below; bracts deeply grooved; staminate and pistillate flowers on different inflorescences; pistillate inflorescences with sterile staminate flowers on the upper branches. .... *Attalea geraensis*

**Acanthococos** Barbosa Rodrigues, *Palmae Hasslerianae Novae* 1. 1900.

This genus was considered by Moore (1973) as a synonym of *Acrocomia*; however, the authors were unable to find any other reference to a new combination of the species. Therefore, until new studies are carried out, the authors are maintaining *Acanthococos* as a distinct genus.

1. **Acanthococos emensis** Toledo, *Arquivos de Botânica do Estado de São Paulo (Nova Série)* 3(1): 4, t. 1-2. 1952.

Plants acaulescent with 2-4 leaves emerging from the soil; easily confused

with grasses of the cerrado vegetation. Rachis armed with straight, black spines. Inflorescence enclosed in 2 bracts, the lower membranous to leathery, smooth; the upper fusiform, acuminate, leathery to woody, covered with soft hairs associated with very stiff bristles and long spines, these last moderately to densely covering its upper part. Staminate flowers with 3 sepals slightly connate at the base, slightly imbricate; petals 3, not valvate; stamens 6, enclosed; rudiment of ovary present. Pistillate flowers with 3 sepals and 3 petals, free and imbricate; staminodes present, forming a cup-like ring with 6 teeth; ovary ovoid, velvety, with 3 stigmas exerted. Fruit more or less spherical, covered with caducous bristles. Seed 1, very rarely 2. (Fig. 2).

Specimens examined: Pirassununga, Emas, unprotected cerrado, *Medeiros-Costa and Panizza* 0149, 0150, 0151, 0152, 14/08/1972 (IPA); Same loca-



2. *Acanthococos emensis*. Photograph showing the depth of the subterranean stem of this acaulescent species. Município of Pirassununga, São Paulo.



3. Inflorescence of *Syagrus flexuosa*. Campos cerrados of Bao Vista and Pirassununga, São Paulo.

tion, *Medeiros-Costa and Panizza 0165, 0166, 30/10/1972 (IPA)*.

**Syagrus** Martius, *Palmarum Familia* 18. 1824.

1. ***Syagrus flexuosa*** (Martius) Beccari, *L'Agricoltura Coloniale* 10: 466. 1916.

*Cocos flexuosa* Martius, *Historia Naturalis Palmarum* 2: 120, t. 64, 86. 1826.

*Cocos flexuosa* Martius var. *cataphracta* Martius, *Historia Naturalis Palmarum* 2: 120. 1826.

*Cocos campestris* Martius, *Historia Naturalis Palmarum* 2: 121, t. 87. 1826.

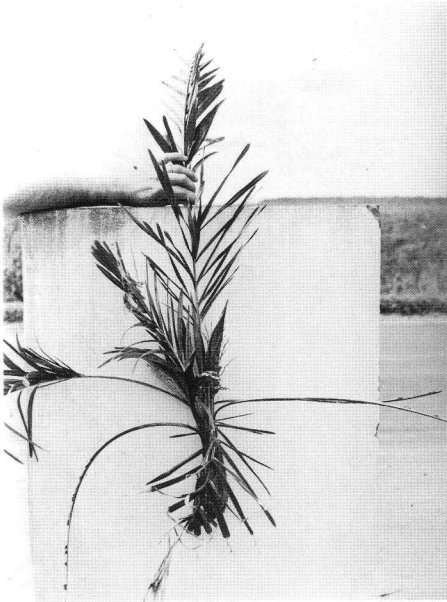
*Syagrus campestris* (Martius) Wendland, *Index Palmarum, Cyclantheum, Pandanearum, Cycadearum quae in hortis Europaeis coluntur, synonymis gravioribus interpositis* 17, 38. 1854.

*Cocos urbaniana* Dammer, *Engler Botanischer Jahrb.* 31: 22. 1902.

*Syagrus urbaniana* (Dammer) Beccari, *L'Agricoltura Coloniale*. 10: 468. 1916.

Plants always occurring in clumps, stems slender, flexible, from 1.0–2.5 m tall. Leaves with sheathing base becoming fibrous at edges; petiole smooth; pinnae distributed in clusters of 2–5 along the rachis. Staminate flowers smaller than pistillate, distributed on the same inflorescence. Fruits ellipsoidal with fibrous, mucilaginous mesocarp, edible. (Fig. 3).

Specimens examined. Pirassununga, Emas, cerrado protected from fire, *Medeiros-Costa and Panizza 0145, 07/04/1972 (IPA)*; Pacas, Rio Feio, cerrado, *Edwall 144, October 1905 (SP)*; Tietê, cerrado palm up to 2 m tall, *F. C. Hoehne and A. Gehrt s/n, 01/12/1936 (SP)*; Anhembí, Fazenda Barreiro Rico, in cerrado within the forest, *M. Kuhlmann 4541, 02/05/1959 (SP)*; Emas, cerrado, *M. Ferri s/n, 29/08, 1943 (SP)*; Mogi-Mirim, cerrado, *M. Kuhlmann and P. Gonçalves s/n, 16/10/1942 (SP)*.



4. *Syagrus loefgrenii*. Cerrado, município of Itirapina, São Paulo.

2. ***Syagrus loefgrenii*** Glassman, Fieldiana, Botany 31: 240, f. 4. 1967 (correction of "lofgrenii")

*Syagrus rachidii* Glassman, Fieldiana, Botany 31: 245. 1967.

Plants acaulescent (stem rhizomatous) or rarely with a stem 60 cm above ground, always clumped. Leaves with petioles with smooth fibrous edges, pinnae distributed in clusters of 2-4 along the rachis. Inflorescences with flowers of both sexes, staminate equal to or slightly smaller than pistillate flowers. Fruit ellipsoidal with fibrous, mucilaginous mesocarp, edible. (Fig. 4).

Specimens examined. Itirapina, cerrado, *Medeiros-Costa and Panizza* 0153, 0154, 0155, 0156, 0157, 0161, 18/09/1972 (IPA); Pirassununga, Emas, unprotected cerrado, *Medeiros-Costa and Panizza* 0183, 0184, 0185, 0186, 0187, 0188, 0189, 01/12/1972 (IPA); Sertão de Itirapina, 12 km NW of the city. Burned over savanna, acaulescent, *Glass-*

*man and Gomes* 8012, 02/07/1965 (SP); Pirassununga, campos cerrados of Boa Vista, *Rachis* s/n, 05/09/1947 (SP—holotype of *S. rachidii*); Campo Alegre, palm of the campo and sandy cerrado, *J. F. Toledo and Gehrt* s/n, 25/09/1940 (SP—paratype of *S. rachidii*); Rio Claro, *A Loefgren* 573, 05/05/1888 (SP—holotype of *S. loefgrenii*).

**Allagoptera** C. G. Nees, Flora 4: 296. 1821.

*Diplothemium* Martius, Palmarum Familia 20, 1824.

1. ***Allagoptera campestris*** (Martius) O. Kuntze, Revisio Generum Plantarum 2: 726. 1891.

*Diplothemium campestre* Martius, Historia Naturalis Palmarum 2: 109, t. 76, figs. 1-4, t. 78. 1826.

*Diplothemium campestre* Martius var. *genuinum* Drude in Martius, Flora Brasiliensis 3(2): 432. 1881.

*Diplothemium campestre* Martius var. *glaziovii* Dammer, Engler Botanischer Jahrb. 31: 23. 1902.

Plants acaulescent. Leaves with pinnae distributed in clusters of 2-3 (4) along the rachis. Inflorescences spicate, bearing staminate and pistillate flowers in triads from the base of the rachis to a little above the middle, above that only staminate flowers.

Specimens examined. Pirassununga, Emas, campos cerrados, *N. Rachis* s/n, 21/09/1945 (SPF); Idaiatuba (cerrado ?), *H. P. Krug* s/n, 08/11/1942 (SP).

Note: The unbranched inflorescence distinguishes this species from all others found in the cerrado of São Paulo.

**Butia** (Beccari) Beccari, L'Agricoltura Coloniale 10: 489. 1916.

Two species cited in the literature are *Butia eriopatha* (Martius ex Drude) Beccari and *B. leiopatha* (Barbosa Rodrigues) Beccari (Wettstein 1904, Ferri 1944, 1955, Ferri and Coutinho 1958, Rachid 1947, Rawitscher 1948).

*Butia eriospatha* has its area of distribution in the states of Rio Grande do Sul and Santa Catarina (Glassman 1979) and *B. leiospatha* "belongs in the uncertain category because of the absence of authentic specimens, and the descriptions and illustrations are insufficient to delineate it as a clear cut species" (Glassman, 1979).

Specimen 0178 (IPA) was identified by Glassman as *Butia paraguayensis* (Barbosa Rodrigues) L. H. Bailey. All of the specimens collected by the authors were comparable to that species.

1. ***Butia paraguayensis*** (Barbosa Rodrigues) L. H. Bailey, Gentes Herbarum 4: 47. 1936.

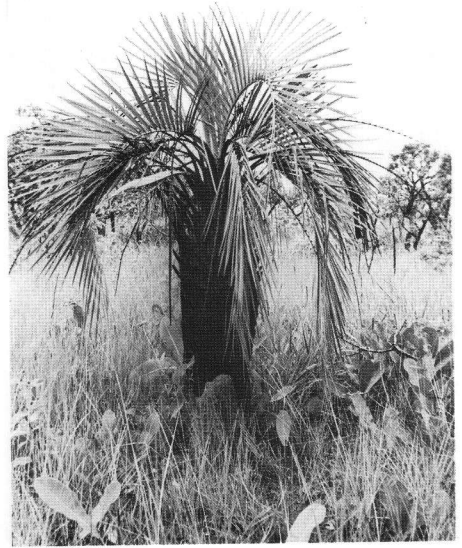
*Cocos paraguayensis* Barbosa Rodrigues, Palmae Novae Paraguayenses 9, t. 2. 1899.

*Syagrus paraguayensis* (Barbosa Rodrigues) Glassman, Fieldiana, Botany 32: 151, figs. 13-17. 1970.

*Butia yatay* (Martius) Beccari var. *paraguayensis* (Barbosa Rodrigues) Beccari, L'Agricoltura Coloniale 10: 503. 1916.

Plants rarely acaulescent or with stems to 1.5 m. Leaves gracefully recurved, pinnae equidistant, opposite or at times subopposite, glaucous, bright green below. Inflorescences enclosed in 2 bracts, the lower covered with rusty hairs, the upper smooth or lightly striate without hairs. Staminate flowers with 3 sepals, acuminate, concave, connate at the base; petals 3, oblong; ovary rudimentary, tripartite. Pistillate flowers 1-3 or rarely more on each branch; sepals 3, convolute-imbriate, petals 3, convolute; staminodes present forming a membranous, tridentate ring. Fruit oblong to ellipsoidal, generally with 2 seeds. (Fig. 5).

Specimens examined. Pirassununga, Emas, cerrado, *Medeiros-Costa and Panizza* 0167, 0168, 30/10/1972 (IPA); same location, *Medeiros-Costa and Panizza* 0178, 0179, 0180, 0181, 0182,



5. *Butia paraguayensis* in the cerrado of Emas, município of Pirassununga, São Paulo.

\* 01/12/1972 (IPA); Mogi-Guaçu, forest reserve (Fazenda Campininha), cerrado, *M. Kuhlman* 3924, 20/09/1956 (SP); Mogi-Guaçu, forest reserve (Fazenda Campininha), near Pádua Sales, cerrado *O. Handro* 451, 11/11/1955 (SP); Mogi-Guaçu, Fazenda Campininha, cerrado, *J. Mattos* 12.477, September 1965 (SP).

***Attalea*** Humboldt, Bonpland and Kunth, Nova Genera et Species Plantarum 1: 309. 1816.

Four species of *Attalea* are cited in the literature for the cerrados of São Paulo: *A. loefgrenii* (Wettstein 1904); *A. ger-aensis* (Wettstein 1904, Glassman 1977); *A. exigua* (Rawitscher and Rachid 1946, Rachid 1947, Ferri 1955, Handro and Figueiredo 1971); and *A. humilis* (Mattos 1966).

Based upon the specimens collected, observations in various field locations, and bibliographic studies, the authors concluded that only one species of this genus



6. *Attalea geraensis*. Município of Itirapina, São Paulo.

exists in the cerrado of São Paulo: *Attalea geraensis* Barbosa Rodrigues. This assertion is justified by the following three points:

1. *Attalea loefgrenii* Wettstein is not valid (Dahlgren 1936). Wettstein (1904) did not make a description in Latin of the species. The excellent photograph in Plate 54 shows, without any doubt, specimens of *Attalea geraensis*. In an attempt to resolve this question, the authors visited the areas of cerrado in the region of Sorocaba, the location cited by Wettstein for *A. loefgrenii*, and found there specimens similar to those of other areas that were identified as *A. geraensis*.

2. *Attalea exigua* Drude differs from *A. geraensis* in the structure of the pinnae, which first of all are aggregate and divergent (Drude 1881, Bondar 1964), and secondly are equidistant (Barbosa

Rodrigues 1898, 1903, Bondar 1964, Glassman 1977). In all of the areas visited by the authors, including Pirassununga and Itapetininga, where *A. exigua* was cited by Rawitscher and Rachid (1946), Rachid (1947), Ferri (1955), and Handro and Figueiredo (1971), no specimens were found with leaves having clustered and divergent pinnae. All of the specimens observed and collected there are *A. geraensis*.

3. *Attalea humilis* Martius ex Sprengel, in addition to the larger size of its parts, is also distinguished from *A. geraensis* by the presence of dark scales on the dorsal side of the central nerve of the pinnae (Bondar 1964). Scales were not found on the specimens collected at Fazenda Campininha, where Mattos (1966) referred to the occurrence of *A. humilis*. Care was also taken to look

closely for the presence of scales on the specimens collected in other areas, also with negative results.

1. **Attalea geraensis** Barbosa Rodrigues, *Plantas Novas Cultivadas no Jardim Botânico do Rio de Janeiro* 6: 22, t. 7. 1898.

Plants acaulescent with 3-6 leaves emerging from the soil, rachis recurved, pinnae opposite, at times subopposite, not in clusters. Staminate and pistillate inflorescences on the same plant, enclosed in 2 woody bracts. Staminate flowers with 3-4 petals, lanceolate, acuminate; stamens 6-9, erect, enclosed. Pistillate flowers much larger than staminate; staminodal ring present, covering  $\frac{1}{3}$  of ovary; stigmas exerted. Fruits ovoid with 1-4 seeds. (Fig. 6).

Specimens examined. Itapetininga, Fazenda Sta. Luiza do Campo Largo, SSE of Itapetininga, *S. M. Campos* 186, 15/03/1960 (SP); Sertão de Itirapina, 12 km NW of the city, burned over savanna, acaulescent, *S. F. Glassman and J. C. Gomes Jr.* 8014, 02/07/1965 (SP); Mogi-Mirim, *A Gehrt* 31859, 06/06/1932 (SP); Pirassununga, Emas, unprotected cerrado, *Medeiros-Costa and Panizza* 0146, 0147, 0148, 07/04/1972 (IPA); Itirapina, cerrado, *Medeiros-Costa and Panizza* 0160, 18/09/1972 (IPA).

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## NEWS OF THE SOCIETY

### Special Press Release

Inquiries have been received from four different locations regarding the organization of new chapters of the Palm Society, Inc. We are pleased and will do all we can to encourage these objectives. It will be interesting to watch their development. The "new chapters" and their coordinators are:

Arizona, USA: John Casey, 2505 Foote Drive, Phoenix, AZ 85008, USA. 20 current Palm Society Members.

Gulf Coast, USA: Dr. Tom Mignerey, 3947 Hwy 297 A, Cantonment, FL 32533, USA. 9 current Palm Society members and growing!

New Zealand: Arno King, 143 Kowhai Road, Mairangi Bay, Auckland 10, New Zealand. 12 members, a Newsletter, and enthusiastic.

North Queensland, Australia: J. Kelly, PO Box 1268, Townsville 4810, North Queensland, Australia. 8 current members in Townsville with many more in the surrounding area. A tropical climate and a proposed botanic garden especially dedicated to palms makes this a very exciting endeavor.

It is hoped that the foregoing will be a challenge for other Palm Society members to form chapters. Some possibilities are: United Kingdom with 25 current members; Continental Europe with 40 mem-

bers; the Philippines with 10 members; South Africa with 23 members; Brownsville, Texas area with 18 members; Louisiana with 10 members; Maryland/Virginia/Washington DC with 20 members; New York and New Jersey with 32 members; North and South Carolina, Georgia and Tennessee with 36 members; and Ohio, Pennsylvania and Illinois with 30 members.

The formation of a chapter, the sharing of information made possible through meetings and quarterly newsletters and meeting fellow members who share your common interest creates some special magic! Please contact Lynn McKamey or Jim Mintken (Promotional Committee) if you desire guidelines or assistance in forming a chapter in your area.

### News from Central Florida

The 1983 winter meeting of the Central Florida Palm Society, held on February 12 at the Imperial House restaurant in Winter Park, was a huge success, thanks to the combined efforts of Dave and Marion Besst and Ed and Nancy Hall.

Before the luncheon everyone had a tour of the lovely landscaping at the Besst and Hall homes. Refreshments and the video tape of Dave's television program on Palms for Central Florida were enjoyed along with the tour of the Besst's beautiful

(Continued p. 130)