

# Re-evaluation of the Genus *Butia* With a Description of a New Species\*

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On August 31, 1976, during a collecting trip in the state of Goias, Brazil, I was attracted by a number of medium-sized palm trees with conspicuously purplish flowers and fruits. The species was fairly common in the cerrado along both sides of the highway for a distance of about 25 km. It was especially interesting to me because of its strong resemblance to an undescribed cultivated palm (which later was considered to be an apparent hybrid) I had previously collected in the Fairchild Tropical Garden. Superficially, the palm from Goias appeared to be close to *Butia capitata*, and at first glance it was thought to be one of its varieties [var. *nehrlingiana* (L. H. Bailey) L. H. Bailey has violet-red staminate and pistillate flowers], but the petiole margins lacked teeth or spines characteristic of the genus *Butia*. Nevertheless, after searching the literature and eliminating other possibilities, I have decided to describe this palm as a new species of *Butia*.

Therefore, an amended description of the genus *Butia* is in order. The name *Butia* was originally used by Beccari (1887) as a subgenus of *Cocos*; later (1916) he elevated *Butia* to full generic status. In the latter article, he separated *Butia* from *Syagrus* by the smooth rather than sulcate spathes and spiny or toothed

petiole margins instead of fibrous or smooth petiole margins.

In 1970a, I transferred the five species of *Butia* recognized by me at the time to the genus *Syagrus* because of difficulties I sometimes encountered in distinguishing smooth or striate spathes from sulcate (deeply grooved) spathes, especially in older fruiting specimens; and in 1970b, I included *Butia* as a section of the genus *Syagrus*. After completing a systematic survey of leaf anatomy in the genus *Syagrus* (Glassman, 1972b) I began to revise my thinking about having submerged *Butia* under *Syagrus*. In this study, it was revealed that all taxa with smooth or striate spathes showed a distinct arrangement of tissues, i.e., nonvascular fibers are attached to both single medium veins and separate smaller veins from both adaxial and abaxial sides (see Figs. 1-8); whereas, in most species with sulcate spathes the nonvascular fibers are not attached to medium and smaller veins from both sides. Another important fact emerged from the survey. Taxa with fibrous or smooth petiole margins, *S. archeri* and *S. hatschbachii*, seemed to have a pattern of leaf anatomy almost identical to that of species with toothed or spiny petiole margins (*S. yatay*, *S. paraguayensis*, *S. capitata*, *S. arenicola*, and *S. eriospatha*). Traditionally, *S. archeri* and *S. hatschbachii*

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would not be included in the genus *Butia* because of the fibrous or smooth petiole margins, but at the same time they would be included because of the smooth or striate spathes. In view of the above evidence (similar leaf anatomy and smooth spathes), however, it appears that the seven taxa listed above may have had a common origin and probably are more or less closely related.

Based on the above information, I am restoring *Butia* to full generic status, but emending the description to include species with fibrous or smooth petiole margins, as well as those with toothed or spiny petiole margins.

The eight species of *Butia* are treated below with all pertinent synonymy, listing of types, descriptions, citation of specimens, vernacular names, geographic distribution and discussion. One new species is described (*B. purpurascens*), one new combination is made (*B. archeri*), and a *species incertum* is restored to a "good species" status (*B. microspadix*). A total of 32 illustrations of types, other specimens, and habit photos of various species of *Butia* was published in Glassman 1970a.

**BUTIA** (Becc.) Becc., Agric. Colon. 10: 489. 1916; L. H. Bailey, Gentes Herb. 4: 21. 1936.

*Cocos* subgen. *Butia* Becc., Malpighia 1: 352. 1887.

*Cocos* sect. *Eucocos* Drude subsect. *Butia* Barb. Rodr., Sertum Palm. Bras. 1: 80, 89. 1903.

*Syagrus* sect. *Butia* (Becc.) Glassman, Fieldiana, Bot. 32: 235. 1970 (excluding *S. vagans* and *S. schizophylla*).

Lectotype: *Butia capitata* (Mart.)

Becc. (vide Moore, Gentes Herb. 9: 251. 1963).

Trunks not or scarcely developed (usually with subterranean stem) or to 12 m tall, 20–50 cm in diam., covered with persistent petiole bases when erect, these eventually dehiscing; sheathing leaf base and petiole not always clearly separated, with combined length of 20–110 cm, margins of petiole armed with coarse spines 2–11 cm on lower part that gradually become shorter or tooth-like toward rachis, or margins merely fibrous and unarmed in some species; rachis of leaf 40–250 cm long, pinnae 20–83 on each side, mostly regularly arranged, middle ones 26–80 cm long, 0.4–2.5 cm wide, with obtuse, acute or acuminate, asymmetrical tips: expanded part of spathe 13–135 cm long, 2.5–16 cm wide, smooth or striate outside, mostly glaucous or brownish-pubescent, but densely brownish-tomentose in two species; branched part of spadix 10–100 cm long, rachillae 13–100 or more in number, each 6–60 cm long; flowers in groups of three, one pistillate with two adjacent staminate flowers, on lower part of rachilla, staminate flowers only on upper part of rachilla; pistillate flowers globose or globose-ovoid, 3–16 mm long, 3.5–10 mm in diam., sepals and petals more or less equal in length; upper staminate flowers 4–8 mm long, those in triads 6–13 mm long, sepals much smaller than petals; fruit globose or ovoid, 1.8–4.2 cm long, 1.0–2.8 cm in diam., persistent perianth 0.5–2.2 cm long, locules 1–3; embryo pores along sides near middle or sometimes toward base of endocarp; seeds conforming to shape of cavity, 0.7–3.0 cm long, 0.5–1.4 cm in diam.; endosperm homogeneous.

### Key to Species

1. Petiole margins fibrous or smooth (without teeth or spines); fruit 1–2-chambered; pinnae mostly with acuminate tips.
2. Small trees 1.2–4 m tall; middle pinnae 44–60 cm long, 1.6–1.8 cm wide, branched part of spadix 60–64 cm long; flowering and fruiting parts usually purplish ..... 1. *B. purpurascens*

2. Acaulescent or with very short trunk; middle pinnae 20-40 cm long, 0.3-1.0 cm wide; branched part of spadix 11-30 cm long; flowering and fruiting parts usually greenish.
3. Spathes glaucous at maturity, expanded part 30-39 cm long; branched part of spadix 20-30 cm long; middle pinnae 36-40 cm long, 0.8-1.3 cm wide ..... 2. *B. archeri*
3. Spathes densely brown-tomentose at maturity, expanded part 13-17 cm long; branched part of spadix 11-13 cm long; middle pinnae 20-26 cm long, 0.3-0.4 cm wide ..... 3. *B. microspadix*
1. Petiole margins spiny or dentate; fruit 1-3-chambered; pinnae mostly with obtuse or acute tips.
4. Pistillate flowers 10-16 mm long, 6-10 mm in diam.; mature fruit 3.0-4.2 cm long; persistent perianth 1.5-2.2 cm long.
5. Acaulescent or with trunk 1-2 m tall; leaf rachis 57-93 cm long; pinnae 40-42 on each side, middle ones 45-55 cm long, 0.8-1.5 cm wide; expanded part of spathe 40-60 cm long, 4-8 cm wide; persistent perianth of fruit 1.5-1.8 cm long ..... 4. *B. paraguayensis*
5. Trees 8-12 m tall; leaf rachis 170-200 cm long; pinnae 68-72 on each side, middle ones 75-81 cm long, 2.0-2.4 cm wide; expanded part of spathe 115-125 cm long, 10-12 cm wide; persistent perianth of fruit 1.8-2.2 cm long ..... 5. *B. yatay*
4. Pistillate flowers 3-8 mm long, 4-5 mm in diam.; mature fruit 1.5-2.6 cm long; persistent perianth 0.5-1.0 cm long.
6. Spathes densely brown-tomentose at maturity, 120-135 cm long, 14-16 cm wide at anthesis ..... 6. *B. eriospatha*
6. Spathes glaucous and glabrous or only brownish-pubescent at maturity.
7. Acaulescent, or with very short trunk; middle pinnae 35-40 cm long, 0.8-1.1 cm wide; expanded part of spathe 30-33 cm long, 2-3 cm wide; spadix with 18-22 branches; petiolar spines short and toothlike, less than 2 mm long; fruit mostly 1-chambered ..... 7. *B. arenicola*
7. Caulescent, with trunks to 5 m tall, 40-50 cm in diam.; middle pinnae 60-75 cm long, 1.5-2.5 cm wide; expanded part of spathe 80-100 cm long, 7.0-8.5 cm wide; spadix with 50-60 branches; petiolar spines coarse, the lower ones 8-11 cm long; fruit 1-3-chambered ..... 8. *B. capitata*

## Taxonomic Treatment

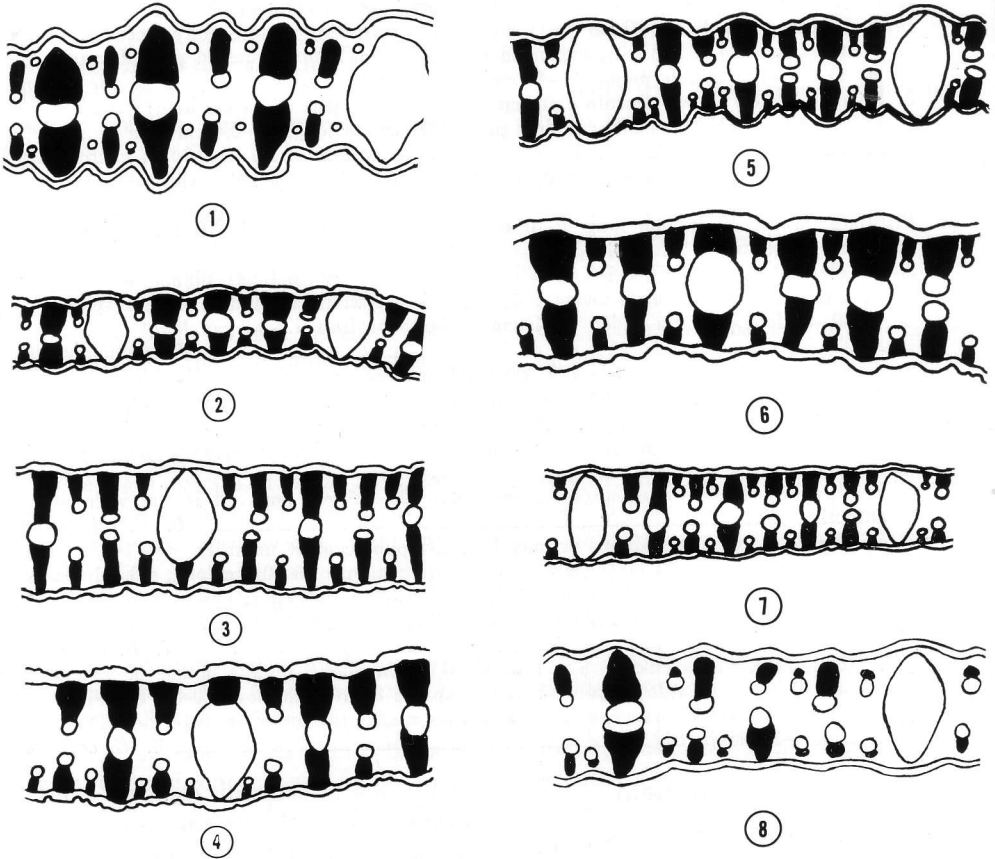
### 1. *Butia purpurascens* Glassman, sp. nov.

Palma 1.2-4 m alta. Folia aequaliter pinnatisecta petiolo non dentato rachidi 84-122 cm longa pinnis utrimque 52-58. Spatha spadix flores fructus purpurascens. Spathae pars inflata non plicata 71-80 cm longa 8-9 cm lata. Flores masculi inferiores 6-7 mm longi superiores 4-4.5 mm longi; flores feminei 5-6 mm longi 4.5-5.0 mm lati. Fructus 2.3-2.9 cm longus 1.0-1.3 cm in diam.

Holotype: Brazil, Goias, near Jatai, *Glassman 13076* (CHI).

Small trees 1.2-4 m tall, about 15 cm in diam.; sheathing leaf base and petiole not clearly separated, combined length of about 49 cm; margins of petiole densely fibrous on lower half, becoming less fibrous toward base of

rachis, not armed with teeth or spines; rachis of leaf 84-122 cm long; pinnae 52-58 on each side, more or less evenly spaced, middle ones 44-60 cm long, 1.6-1.8 cm wide, with long-acuminate, asymmetrical tips; expanded part of spathe frequently purplish, 71-80 cm long, 8-9 cm wide, smooth or striate, peduncular part 30-37 cm long; branched part of spadix frequently purplish, 60-64 cm long, peduncular part 41-48 cm long, rachillae about 50 or more, each 23-26 cm long; pistillate flowers more or less globose, frequently purplish, 5-6 mm long, 4.5-5 mm in diam., sepals and petals about equal in size; staminate flowers frequently purplish, lower ones 6-7 mm long, with prominent pseudopedicel and calyx 2-4 mm long, upper ones 4-4.5 mm long with calyx 1.5-2.5 mm long; fruit ovoid, usually purplish, 2.3-2.9 cm long, 1.0-1.3 cm in diam.,



1-8. Diagrams of cross sections of pinnae of various species of *Butia*. Double lines on upper (adaxial) and lower (abaxial) sides represent the upper and lower epidermis. Solid black areas represent clusters of nonvascular fibers, whereas the circles are diagrams of small-, medium- and large-sized veins. All other tissues have been omitted from the diagrams. Magnifications: Figs. 1, 3, 4, 5, 6, 8,  $\times 55$ ; fig. 2,  $\times 33$ ; fig. 7,  $\times 42$ . 1, *B. yatay* from Pedersen 4456 (GH); 2, *B. paraguayensis* from Pedersen 3030 (GH); 3, *B. capitata* from Glassman 8766 (CHI); 4, *B. eriospatha* from Glaziou 8059 (K); 5, *B. arenicola* from Hassler 3761 (G); 6, *B. archeri* from Glassman & Gomes 8023 (CHI); 7, *B. microspadix* from Hatschbach 11668 (F); 8, *Butia purpurascens* from Glassman 13076 (CHI).

beak 4-5 mm long, persistent perianth 7-8 mm high, locules 1-2, mature seeds not seen.

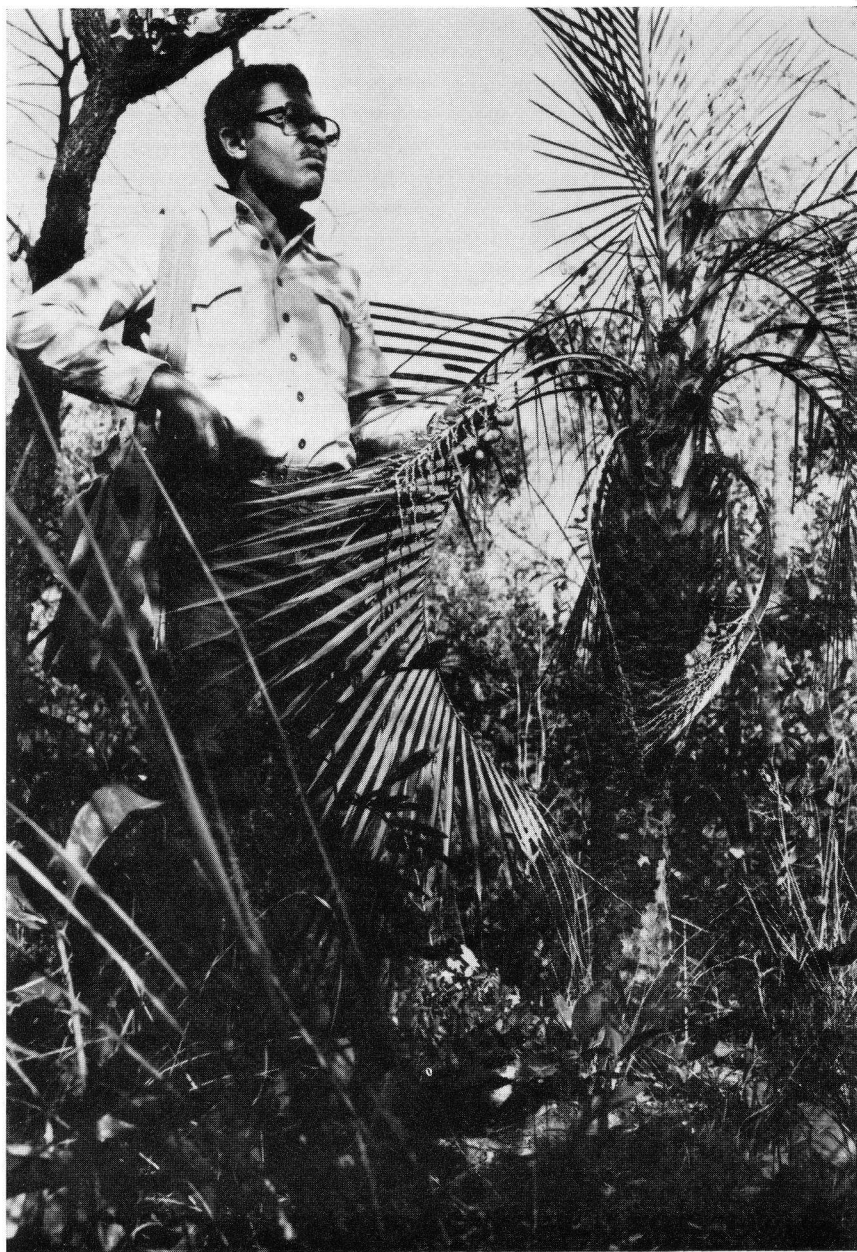
Specimens examined: BRAZIL. GOIAS: 3 km N.E. of Jatai, in pasture and cerrado, common (about 400 trees seen) for about 25 km along both sides of road, spathes, spadices, flowers, and fruits mostly purplish, Glassman 13076 (CHI, holotype); Glassman 13075, 13077, 13079, 13080, 13081, 13082

(CHI, SP); 26 km N.E. of Rio Verde, along BR 060, dense cerrado, associated with *Syagrus flexuosa*, *Attalea*, and *Alagoptera*, rachillae and flowers purple, Glassman 13071 (CHI, SP); and probably Balsamo, palma campestre, Macedo 3321 (SP, US).

Vernacular names: none recorded.

Distribution: at present, only known from cerrados in the state of Goias.

Macedo 3321 also seems to belong to



9. *Butia purpurascens* in Goiás, near type locality. Daniel Vital stands next to small but mature tree subjected to fire in the cerrado.

*B. purpurascens*. It is 2-4 m tall, has petiole margins free of spines or teeth, and has other morphological characteristics which match closely; but no

information is given on the color of the flowers. Cross sections of the pinnae, however, reveal a tissue pattern very similar to *Butia archeri*.

The new species resembles *Butia capitata* superficially, but differs from it mainly in the smooth or fibrous rather than toothed petiole margins, the long-acuminate rather than acute or obtuse tips of pinnae, and the purplish rather than greenish spathes, spadices, flowers, and fruits. It is assumed that the purplish color is due to anthocyanin pigments. When specimens were dried, some lost all of their purple color whereas others retained some or most of their color.

From a morphological standpoint, *Butia purpurascens* seems to be most closely aligned to *B. archeri* because both taxa have smooth (not toothed) petiole margins, long-acuminate tips to the pinnae, staminate and pistillate flowers similar in size, and fruits similar in size, shape and number of locules. *Butia archeri*, as described by me (1968), differs primarily in being mostly acaulescent, in the smaller dimensions of leaves, spathes, and spadices, and in the lack of the purplish color in flower and fruit parts.

As I had expected, an examination of cross sections of the pinnae of *B. purpurascens* (Glassman 13076) reveals that its anatomical pattern matches the other seven species of *Butia* very closely, thus confirming its placement within this group.

2. ***Butia archeri*** (Glassman) Glassman, **comb. nov.**

*Syagrus archeri* Glassman, Fieldiana, Bot. 31: 235, fig. 1. 1967.

Holotype: Brazil, Minas Gerais, near Lavras, *W. A. Archer* 4048 (A).

Acaulescent or sometimes with a short trunk up to almost 1 m high; sheathing leaf base 13–15 cm long; petiole 8–9 cm long and 1 cm wide, margins not spiny, merely fibrous; rachis of leaf 66–72 cm long; pinnae 28–44 on each

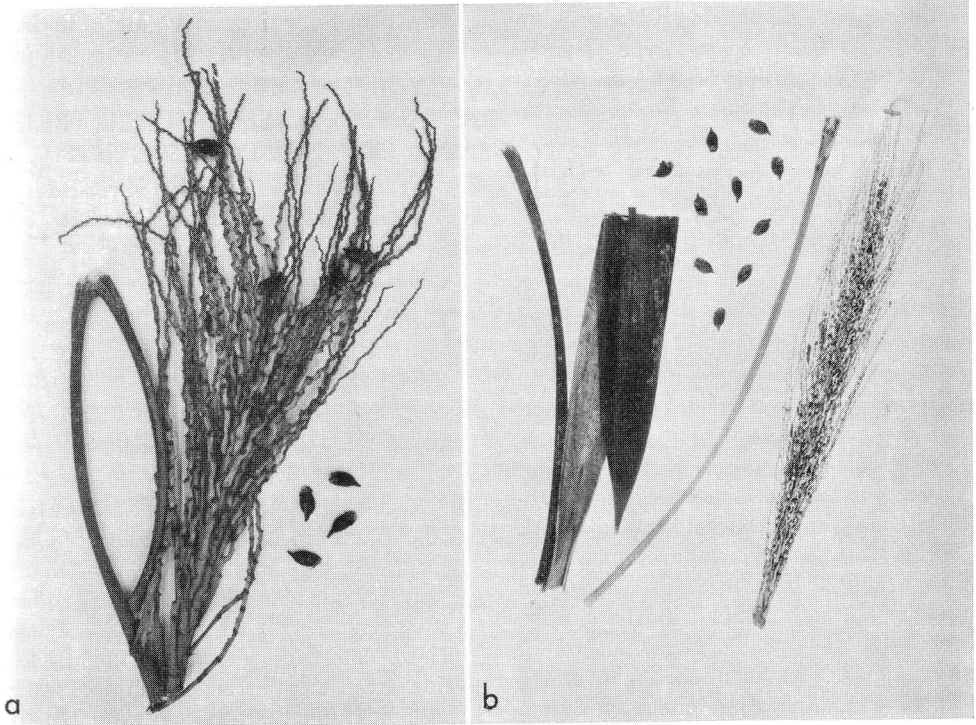
side, regularly arranged, middle ones 36–40 cm long, 0.8–1.3 cm wide, mostly with acuminate, asymmetrical tips; expanded part of spathe 30–39 cm long, 3 cm wide, smooth or striate, glaucous, peduncular part 30 cm long; branched part of spadix 20–30 cm long, rachillae 15–31, each 10–19 cm long, peduncular part of spadix 36 cm long; pistillate flowers rounded or ovoid, 4–7 mm long, 4–6 mm in diam., sepals and petals with obtuse tips; staminate flowers 5–7 mm long on lower part of rachilla, 3–5 mm long on upper part; mature fruit 1.8–2.0 cm long, 1.0–1.4 cm in diam., short-beaked, persistent perianth 8–10 mm high, endocarp woody, 1–1.5 mm thick, locules 1–2; seed (when single) irregularly globose, 7–9 mm long and 7–9 mm in diam., or when two are present flattened laterally, 10 mm long, 6 mm in diam.

Specimens examined: BRAZIL. MINAS GERAIS, near Lavras, *Archer* 4048 (A, holotype; BH, MO, NY, US, isotypes); 16 km N. of Lavras, campo natural, *Glassman & Gomes* 8018, 8019, 8020, 8021, 8022, 8023, 8024 (CHI); 10 km N. of Diamantina, associated with *Alagoptera*, in campo rupestre, common, about 50 plants seen, *Glassman* 13001 (CHI). SÃO PAULO, Casa Branca, *O. Handro* 313 (SP). GOAIS, Serro do Caiapó, 35 km S. of Caiaponia, *H. S. Irwin & T. R. Soderstrom* 7750 (BH, NY, US); 9.5 km S.E. of center of Brasilia, D. F., in tree and scrub woodland cerrado, *G. Eiten* 13062 (CHI).

Vernacular names: none recorded.

Distribution: native to Brazil in the states of Minas Gerais, São Paulo, and Goiás, in grassland pastures and cerrados.

This taxon can be easily distinguished from other acaulescent species of *Butia* (e.g., *B. arenicola* and *B. paraguayensis*) by its smooth rather than dentate petiole margins; and from *B. microspadix* by



10. *Butia purpuscens*. a, holotype, showing fruiting spadix and dark (purplish) fruits; b, part of flowering spathe of *Glassman 13081* (CHI), showing dark (purplish exterior and light brown interior), separate fruits, and flowering spadix with long stalk.

the more or less glabrous rather than densely tomentose spathes.

3. ***Butia microspadix*** Burret, Notizbl. Bot. Gart. Berlin-Dahlem 10: 1050. 1930.

Holotype: Brazil, without locality, probably state of São Paulo, *Sellow s.n.* (B, destroyed); Paratype: Brazil, campos, without locality, *J. N. Keller s.n.* (B, destroyed); Lectotype: Brazil, Rio Grande do Sul, *Luederwaldt s.n.* (SP 12267).

*Syagrus hatschbachii* Glassman, Fieldiana, Bot. 31: 240, fig. 3. 1967.

Holotype: Brazil, Paraná, Castro, Carambei, campo seco, *G. Hatschbach 11668* (F).

Acaulescent; sheathing leaf base not seen, petiole 9–10 cm long, 0.5 cm wide,

margins not spiny, merely fibrous, rachis of leaf 41–74 cm long, pinnae 19–20 on each side, regularly arranged at intervals of 1.5–3 cm, middle pinnae 20–26 cm long, 0.3–0.4 cm wide, mostly with acuminate, asymmetrical tips; expanded part of spathe 13–17 cm long, 2.5–3.5 cm wide, smooth or striate, covered with dense dark brown tomentum; branched part of spadix 11–13 cm long, rachillae 13–15, each 6–11 cm long; pistillate flowers rounded or ovoid 4–5 mm long, 3.5 mm in diam., sepals and petals with obtuse and emarginate tips; staminate flowers 4–7 mm long, sepals unequal in size, 1–4 mm long; fruit 2 cm long, 1.1 cm in diam., beak 4 mm long, locule 1, endocarp woody, about 1 mm thick, cavity smooth within, trivittate, seed not seen.

Specimens examined: BRAZIL. RIO GRANDE DO SUL (see lectotype above); PARANÁ (see holotype of *S. hatschbachii* above); Munic. Ponta Grossa, Vila Velha, *Clarissa Rolfs s.n.* (BH); *L. B. Smith & R. M. Klein 14890* (US); Parque Vila Velha, Rio Arroio Guavirova, campo limpo. *G. Hatschbach 8091* (RB, US).

Vernacular names: none recorded.

Distribution: Brazil, mostly confined to the state of Paraná where it seems to be fairly common in grasslands; also in the state of Rio Grande do Sul, and perhaps São Paulo.

After describing *S. hatschbachii* I found a specimen labelled *Butia microspadix* that had been determined by M. Burret (see lectotype above for data). Even though immature, this specimen matches *S. hatschbachii* fairly closely, as well as Burret's description of *B. microspadix*. As mentioned above, the holotype and paratype cited by Burret were apparently destroyed in the Berlin herbarium. Burret also listed another specimen "very near to this species": Brazil, São Paulo, Raiz da Serra (leg. *Luederwaldt*—com. F. C. Hoehne n. 12267). Although the institutional herbarium sheet numbers are the same (12267) in both specimens, they may not be duplicates of each other because each one bears different collecting data. At any rate, I have not been able to locate the specimen cited by Burret (from São Paulo, Raiz da Serra); hence, I have designated the specimen which I have seen (from Rio Grande do Sul) as the lectotype.

Previously, I had designated *Butia microspadix* as *species incerta* (Glassman, 1968, 1970a) because the *Luederwaldt* specimen is immature and Burret's description did not match the specimen to my satisfaction. After examination of other collections, I am now convinced that this specimen is *Butia microspadix*.

4. ***Butia paraguayensis*** (Barb. Rodr.)  
L. H. Bailey, *Gentes Herb.* 4: 47. 1936.

*Cocos paraguayensis* Barb. Rodr.,  
*Palm. Nov. Parag.* 9, t. 2. 1899.

*Syagrus paraguayensis* (Barb. Rodr.)  
Glassman, *Fieldiana, Bot.* 32: 151,  
*figs. 13–17.* 1970a.

*Butia yatay* var. *paraguayensis* (Barb. Rodr.) Becc., *Agric. Colon.* 10: 503. 1916.

Lectotype: Paraguay, in rupestribus  
Cordillera de Altos, *Hassler 896*  
(G). (Cf. Glassman 1970a, p. 151,  
*figs. 13–14.*)

Acaulescent, or with trunk 1–2 m tall, 10–20 cm in diam.; sheathing base about 20 cm long, petiole 45–48 cm long, margins mostly with short spines interspersed with fibers; rachis of leaf 57–93 cm long; pinnae 40–42 on each side, regularly arranged, middle ones 45–55 cm long, 0.8–1.5 cm wide, mostly with acute, asymmetrical tips; expanded part of spathe 40–60 cm long, 4–8 cm wide, smooth or striate, brownish-pubescent at first, becoming glabrous with age; branched part of spadix 35–38 cm long, rachillae 38–43, each 20–23 cm long; pistillate flowers ovoid, 10–16 mm long, 6–9 mm in diam.; lower staminate flowers 8–13 mm long, upper ones 4–7 mm long; mature fruit ovoid 3.0–3.7 cm long, 2.1–2.3 cm in diam., beak conspicuous, angled, persistent perianth 1.5–1.8 cm high, locules 1–3, mature seeds not seen.

Specimens examined: PARAGUAY. Cordillera de Altos, *Hassler 896* (G, lectotype; K, NY, isoelectotypes); *Fiebrig 62* (G); Centurion, dry grassy area, *Fiebrig 4097* (G, GH, K, M); without locality, in campos, *Jorgensen & Hassler 4185* (A, C, F, NY, S). ARGENTINA. CORRIENTES: Dept. Mburucuyá, Loma Alta, *T. M. Pedersen 3030* (G, GH, K, NY, S); Dept. Ituzaingo,



3 km W. of Virasoro, campestre, *Maruñak* 168 (F); Isla Apipe Grande, Puerto San Antonio, in palma yatay poñi, *Krapovickas et al.* 24195 (F); 45 km E. of Ituzaingo, campos altos, *A. Schinini et al.* 11255 (F): Dept. Capital, Arroyo Riachuelo, in lomadas arenosas, *A. Schinini et al.* 9460 (F). BRAZIL. SANTA CATARINA, 35 km N. of Itajai, orillas del mar, *Krapovickas et al.* 23078 (F); SÃO PAULO, Moji-Guaçu, Fazenda Campininha, cerrado, *Kuhlmann* 3924 (SP); 4 km S. of Emas, cerrado, *Glassman* 8746, 8747 (CHI): Pirassununga, Emas, cerrado desprotegido, *J. T. Costa* 0178 (IPA); MATO GROSSO, 28 km S. of Sidrolândia, vic. of Fazenda Santa Luzia, pasture, associated with *Syagrus graminifolia*, browsed by cattle, *Glassman* 13095, 13096 (CHI).

Vernacular names: *yatay guazu* (Paraguay), *yatay poñi* (Argentina), *coco amargoso* (São Paulo, Brazil).

Distribution: Paraguay, Argentina (province of Corrientes) and Brazil (states of Santa Catarina, São Paulo, and Mato Grosso) in campos, cerrados and pastures.

*Butia paraguayensis* is apparently closely related to *B. yatay*, and may only be a variety of this species. At present, it can be distinguished mainly by its generally smaller dimensions (except for the similarity in size of pistillate flowers).

5. ***Butia yatay*** (Mart.) Becc., Agric. Colon. 10: 498, t. 6. 1916.

*Cocos yatay* Mart., Palmet. Orbign. 93, t. 1, fig. 1, t. 30B. 1844.

*Syagrus yatay* (Mart.) Glassman, Fieldiana, Bot. 32: 157, figs. 18-24. 1970a.

Lectotype: Argentina, prov. Corrientes (Martius, 1844, t. 30B). (Cf. Glassman 1970a, p. 157, fig. 18.)

Trees (2-) 8-12 m tall, about 40 cm in diam., old petiole bases persistent on

trunk when young, eventually dehiscing completely; sheathing base 58-60 cm long, petiole 50-70 cm long, margins armed with coarse spiny teeth about 3 cm long on lower part, teeth becoming gradually smaller on upper part; rachis of leaf 170-200 cm long, pinnae 68-72 in each side, regularly arranged, middle ones 75-81 cm long, 2.0-2.4 cm wide, mostly with acute, asymmetrical tips; expanded part of spathe 115-125 cm long, 10-12 cm wide, smooth or striate, more or less glaucous outside; branched part of spadix 78-82 cm long, rachillae numerous (100 or more), each 30-32 cm long; pistillate flowers ovoid, 10-16 mm long, 6-10 mm in diam.; lower staminate flowers 8-13 mm long, those above 5-8 mm long; mature fruit ovoid 3.0-4.2 cm long, 2.5-2.8 cm in diam., with prominent, conical beak, persistent perianth 1.8-2.2 cm high, locules 1-3, seeds 2.5-3.0 cm long, 1.2-1.4 cm in diam.

Specimens examined: ARGENTINA. CORRIENTES: Goya *Curran s.n.* (US); Dept. Santo Tomé, 8 mi E. of Virasoro, *Maruñak* 173 (F); Dept. Capital, 2 km de R. 12, *Maruñak* 180 (F); Dept. Mburucuyá, Estancia Santa Teresa, forming extensive groves, *T. M. Pedersen* 4456 (GH, NY, S); ENTRE RIOS: Concordia, *Castellanos* 31-974 (K); Dept. Loreto, Rio Yabebiry, *L. Ekman s.n.* (A). URUGUAY. PAYSANDÚ, N. of Quebracho, *H. H. Bartlett* 21175 (US). CULTIVATED, *Herter* 346 (F, G, NY, S, SP).

Vernacular name: *yatay*.

Distribution: native to northeastern Argentina in the provinces of Misiones, Santa Fe, Corrientes, and Entre Rios, forming great forests in sandy areas; and to Uruguay in the departments of Paysandú and Rio Negro, in sandy soils.

*Butia yatay* is easily distinguished from other arborescent species of *Butia* by the relatively large pistillate flowers

(10–16 mm vs. 3–8 mm long). Its geographic range apparently does not overlap with that of *B. capitata*, *B. eriopatha*, or *B. purpurascens*. However, *B. yatay* is sympatric with *B. paraguayensis* in at least part of its range (in Corrientes and probably Misiones) and may be confused with the latter species during its immature, acaulescent stage of growth.

Crovetto and Piccinini (1951) did an ecological study of 13 different stands (palmares) of *Butia yatay* in northern Argentina (provinces of Entre Rios, Corrientes, and Santa Fe). At first, they believed that these palmares represented a stage in the psammose succession because the plants grew in sandy soil. After intensive studies, however, they concluded that the *Butia yatay* community was not involved in the formation of the regular climax of the region, but was independent of the typical succession of that area. Hence, these palmares were interpreted as being a relict climax, or an ancient vegetation type left over from a previous geological period when climate conditions were perhaps different than they are today.

6. *Butia eriopatha* (Mart. ex Drude)

Becc., Agric. Colon. 10: 496. 1916.

*Cocos eriopatha* Mart. ex Drude in Martius, Fl. Bras. 3: 424. 1881.

*Syagrus eriopatha* (Mart. ex Drude) Glassman, Fieldiana, Bot. 32: 145. 1970.

Lectotype: Brazil, Rio Grande do Sul, *Glaziou 8059* (K). (Cf. Glassman 1970a, p. 145, fig. 11.)

Trees 3–6 m tall, 45–50 cm in diam.; sheathing leaf base partially covered with a dense brownish tomentum, petiole 90–100 cm long, margins of petiole armed with short teeth or spines 1–3 cm long; rachis of leaf 2.0–2.5 m long; pinnae 50–55 on each side, regularly arranged, middle ones 70–80 cm long,

2.0–2.3 cm wide, with acute asymmetrical tips; expanded part of spathe 120–135 cm long, 14–16 cm wide, smooth or striate, covered with a dense brownish tomentum; branched part of spadix 90–100 cm long, rachillae numerous, each 35–42 cm long; pistillate flowers rounded, 3–5 mm long, 3.5–5 mm in diam.; staminate flowers 6–8 mm long below, those above 4–5 mm long; fruit mostly globose, 1.8–2.0 cm long, 1.4–2.2 cm in diam., with short beak, persistent perianth 0.2–0.4 cm high, locules 1–3, seed globose, 1.4–1.6 cm in diam. or oblong, 1.5 cm long, 1 cm in diam.

Specimens examined: BRAZIL: RIO GRANDE DO SUL: *Glaziou 8059* (K, lectotype; C); SANTA CATARINA: Ponte Alta do Sul, *Krapovickas et al. 23065* (F). CULTIVATED. BRAZIL: *Luederwaldt s.n.* (SP 6.191), *A. S. Lima 6748* (SP), *Glaziou 8050* (G). UNITED STATES: Florida, *A. Rehder s.n.* (A). TANZANIA: Research Station, Amani, *P. J. Greenway 1039* (K). CUBA: *Jack 8296* (A, NY).

Vernacular names: *butia*, *macuma*.

Distribution: Brazil, in the states of Rio Grande do Sul and Santa Catarina, in woodlands and campos.

This taxon has a more restricted geographical range than *Butia capitata*, but can be readily differentiated from it by the densely tomentose rather than the more or less glabrous spathes.

7. *Butia arenicola* (Barb. Rodr.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 10: 1051. 1930.

*Cocos arenicola* Barb. Rodr., Sertum Palm. Bras. 1: 100, t. 75B. 1903.

*Syagrus arenicola* (Barb. Rodr.) Frambach ex Dahlgr., Field Mus. Nat. Hist., Bot. Ser. 14: 264, 1936; Glassman, Fieldiana, Bot. 32: 136, fig. 1. 1970.

Holotype: Paraguay, alto planitie arenosa ad Cordillera de Altos, *Hassler 3761* (G).

Acaulescent, subterranean stem 5 cm long and 8 cm in diam.; sheathing leaf base 17 cm long, petiole 20–23 cm long, 1 cm wide at base, margins mostly with short spines interspersed with fibers; rachis of leaf 80–93 cm long; pinnae 35–37 on each side, regularly arranged, middle ones 35–40 cm long, 0.7–1.1 cm wide, mostly with acute, asymmetrical tips; expanded part of spathe 30–33 cm long, 2–3 cm wide, smooth or striate, glaucous or brownish-pubescent on outside, becoming eglaucous or glabrous with age; branched part of spadix 26–28 cm long, rachillae 18–22, each 15–18 cm long; pistillate flowers rounded or ovoid, 5–8 mm long, 4–5 mm in diam.; lower staminate flowers 8–10 mm long, those above 4–7 mm long; fruit (immature) ovoid, 2.0–2.3 cm long, 1 cm in diam., short-beaked, persistent perianth 1.0–1.5 cm high; seeds not seen.

Specimens cited: PARAGUAY. Cordillera de Altos, Hassler 3761 (G, holotype; NY, isotype); Moquinia Wald, Chodat 740 (G); Valenzuela, Balansa 4773 (G). BRAZIL. MATO GROSSO: Jaraguay, Campo Grande, Archer & Gehrt 178 (US); MINAS GERAIS: Uberova, Regnell 1288a (S); Ponto Novo, Macedo 2401 (US).

Vernacular name: *coquerinho*.

Distribution: Paraguay; and Brazil, in the states of Mato Grosso and Minas Gerais, in campos and pastures.

*Butia arenicola* is probably most closely related to *B. capitata*, and may only be an acaulescent variety of this species. At present, it can be distinguished mainly by its generally smaller dimensions.

8. *Butia capitata* (Mart.) Becc., Agric. Colon. 10: 507. 1916.

*Cocos capitata* Mart., Hist. Nat. Palm. 2: 114, t. 78–79. 1826.

*Syagrus capitata* (Mart.) Glassman,

Fieldiana, Bot. 32: 143, figs. 4–9. 1970a.

Lectotype: Brazil, Minas Gerais, campos, Martius s.n. (M). (cf. Dahlgren, 1959, pl. 83.)

*Cocos elegantissima* Chabaud, Rev. Hort. 77: 516. 1905.

*Butia capitata* var. *elegantissima* (Chabaud) Becc., Agric. Colon. 10: 517. t. 12. 1916.

Lectotype: Cult. in garden of C. Lemarchand à l'Artaude, near Toulon, France, Chabaud s.n. (FI).

*Cocos erythrospatha* Chabaud, Rev. Hort. 77: 516. 1905.

*Butia capitata* var. *erythrospatha* (Chabaud) Becc., Agric. Colon. 10: 515, t. 7A. 1916.

Lectotype: Cult. on property of C. Lemarchand à l'Artaude, common in Pradet, near Toulon, Chabaud s.n. (FI).

*Cocos lilaceiflora* Chabaud, Rev. Hort. 77: 516. 1905.

*Butia capitata* var. *lilaceiflora* (Chabaud) Becc., Agric. Colon. 10: 518. 1916.

Lectotype: Cult. in public garden, Toulon, Chabaud s.n. (FI).

*Butia nehrlingiana* L. H. Bailey, Hortus 105. 1930.

*Butia capitata* var. *nehrlingiana* (L. H. Bailey) L. H. Bailey, Gentes Herb. 4: 33, fig. 17. 1936.

Lectotype: Cult. on residence of Mr. Henry Nehrling, Gotha, Florida, Bailey 13122 (BH).

*Cocos odorata* Barb. Rodr., Pl. Nov. Cult. Jard. Bot. Rio de Jan. 1: 11, t. 4A. 1891; Sertum Palm. Bras. 1: 92, t. 68A. 1903.

*Butia capitata* var. *odorata* (Barb. Rodr.) Becc., Agric. Colon. 10: 513. 1916.

Lectotype: Brazil, in campos ad Rio

Grande do Sul, cult. in Jard. Bot. Rio de Janeiro no. 64 (Barb. Rodr. 1891, t. 4A). (Cf. Glassman 1972a, p. 92.)

*Cocos pulposa* Barb. Rodr., Pl. Nov. Cult. Jard. Bot. Rio de Jan. 1: 14, t. 4B. 1891; Contr. Jard. Bot. Rio de Jan. 2: 38, t. 3, fig. B, a-c. 1901; Sertum Palm. Bras. 1: 93, t. 68C. 1903.

*Butia capitata* var. *pulposa* (Barb. Rodr.) Becc., Agric. Colon. 10: 516. 1916.

Lectotype: Brazil, Rio Grande do Sul, in campis ab S. Sepé, Jaguarão et Caçapava and cult. in Jard. Bot. Rio de Jan. no. 454 (Barb. Rodr. 1903, t. 68C). (Cf. Glassman 1972a, p. 93.)

*Butia capitata* var. *strictior* L. H. Bailey, Gentes Herb. 4: 32, fig. 18. 1936.

Holotype: Cult. at home of Mrs. Danforth, Pasadena, Calif., *Bailey 389* (BH).

*Butia capitata* var. *subglobbosa* Becc., Agric. Colon. 10: 513, t. 10A. 1916.

Type: No locality or specimens listed. Based on a tree confused with *Cocos coronata* by Chabaud (1905, 1906).

*Butia capitata* var. *virescens* Becc., Agric. Colon. 10: 519. 1916.

Type: Cult. in School of Pomology and Horticulture, Cascine de Firenze (no specimens cited).

Trees 3–5 m tall, 40–50 cm in diam.; complete sheathing leaf base not seen, petiole 70–88 cm long; 4–7 cm wide at base, margins mostly armed with fairly short teeth on upper portion, coarsely spiny on lower part and adjacent sheathing base, spines 8–11 cm long; rachis of leaf 150–183 cm long; pinnae 63–80 on each side, regularly arranged, middle ones 60–75 cm long, 1.5–2.5 cm, with oblique, asymmetrical tips; expanded

part of spathe 80–100 cm long, 7.0–8.5 cm wide, smooth or striate, more or less glaucous, becoming eglaucous with age; branched part of spadix 85–94 cm long, rachillae 50–60, 62–69 cm long; pistillate flowers rounded or ovoid, 4–8 mm long, 4–6 mm in diam.; lower staminate flowers 7–10 mm long, those above 4–7 mm long; mature fruit orange, with soft mesocarp when ripe, ovoid, 1.8–2.6 cm long, 1.5–2.2 cm in diam., with short beak, persistent perianth 0.4–0.6 cm high, locules 1–3, seed ovoid or triangular, 1.8–2.4 cm long, 1.0–1.4 cm in diam.

Specimens examined: BRAZIL. MINAS GERAIS: campis, *Martius s.n.* (M, lectotype—two spadix parts); Minas Gerais, *Martius s.n.* (M, leaf and spathe parts); PARANÁ: Tamandaré, in campo, *G. Jons-son 985a* (F, G, K, NY, S); SANTA CATARINA: Sombrio, in campo, *P. R. Reitz 2965* (G); RIO GRANDE DO SUL: *Glaziou 8047* (C, K); *Glaziou 9334* (FI). URUGUAY. ROCHA: Castillos, *Herter 346B* (F, G, GH). CULTIVATED. ARGENTINA: Tucuman, *Venturi 5594* (US). URUGUAY: Montevideo, *Herter 346a* (F, G, GH, LE, NY, S). BRAZIL: Rio de Janeiro, *Glaziou 9334* (C, LE), *16481* (C, G, K, LE), *20535* (C, K), *Dahlgren & Millar s.n.* (F—611648). UNITED STATES: Fairchild Tropical Garden, Coral Gables, Florida, *Glassman 8766* (CHI); Gotha, Florida, Nehrling's place, *Bailey 13122* (BH, lectotype of *Butia nehrlingiana*); Pasadena, California, Mrs. Danforth's home, *Bailey 389* (BH, holotype of *Butia capitata* var. *strictior*).

Vernacular names: *cabeçudo*, *guari-roba do campo*.

Distribution: Brazil, in the states of Minas Gerais, Paraná, Santa Catarina, and Rio Grande do Sul, in woodlands and campos; and Uruguay, in the department of Rocha in woodlands.

This species is the most widely culti-

vated in *Butia* as evidenced by the large number of varieties described. Bailey (1936) constructed a key to six of the ten varieties of *Butia capitata* listed by me in synonymy. Until I can study these varieties more thoroughly in botanical gardens and other cultivated areas, I am not going to recognize them as distinct taxonomic entities.

#### DOUBTFUL OR UNCERTAIN SPECIES

***Butia amadelpha*** (Barb. Rodr.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 10: 1050. 1930.

*Cocos amadelpha* Barb. Rodr., Palm Hassler. Nov. 7. 1900; Sertum Palm. Bras. 1: 98, t. 72. 1903.

*Syagrus amadelpha* (Barb. Rodr.) Frambach ex Dahlg., Field Mus. Nat. Hist., Bot. Ser. 14: 264. 1936.

Holotype: Paraguay, Capibary, Hassler 6083 (G, destroyed?).

Unfortunately, the holotype could not be found at Geneva where the bulk of Hassler's specimens are deposited. The description (acaulescent, smooth spathes and flowers 14–15 mm) is close to that of *Butia paraguayensis*, but petioles and fruits are neither described nor illustrated. Therefore, the identity of *Butia amadelpha* is uncertain.

***Butia bonnetii*** Becc., Agric. Colon. 10: 504, t. 5, figs. 4–6. 1916.

Type: Cult. in Hyeres, France by Linden from seeds received from Mexico (no specimens cited).

Originally published under *Cocos bonnetii* Linden by Wendland (1878) as a name only. Beccari (1916) validated the specific epithet by including a description of it under *Butia*, but no specimens were cited. He compares this taxon with *Butia capitata* as having

smaller dimensions. Because of a lack of specimens and an inadequate description to distinguish it from *B. capitata*, I am considering *B. bonnetii* as an uncertain species. A number of trees cultivated under this name probably belong to *B. capitata*.

***Butia dyerana*** (Barb. Rodr.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 13: 696. 1937.

*Cocos dyerana* Barb. Rodr., Bull. Herb. Boissier, ser. 2 (3): 626. 1903.

*Syagrus dyerana* (Barb. Rodr.) Becc., Agric. Colon. 10: 416. 1916.

Holotype: Paraguay, in campis arenosis prope Concepcion, Hassler 7166 (G).

The type specimen (consisting of parts of an inflorescence and a leaf) resembles *B. paraguayensis*, but I cannot be certain of its true relationships because this taxon lacks petioles, spathes and fruits.

***Butia leiospatha*** (Barb. Rodr.) Becc., Agric. Colon. 10: 520. 1916.

*Cocos leiospatha* Barb. Dodr., Rev. Hort. 2: 23, fig. 7. 1877; Sertum Palm. Bras. 1: 81, t. 61A, 62B. 1903.

*Cocos capitata* var. *leiospatha* (Barb. Rodr.) Berger, Hort. Mort. 87. 1912.

Lectotype: Brazil, Minas Gerais, Serra do Aguapé (t. 61A, 1903). (Cf. Glassman 1972a, pp. 91–92.)

No specimens were cited by Barbosa Rodrigues in either article, hence the selection of t. 61A as lectotype. Originally, he described this palm as acaulescent, but illustrated a fairly large tree (1877, fig. 7). The description is close to that of *B. capitata* or *B. arenicola*, but not clear enough for either species.

This taxon 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.

**Butia poni** (Haum.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 10: 1051. 1930.

*Cocos poni* Haum., Physis 4: 604, figs. 1, 2. 1919.

Lectotype: Argentina, Misiones, savannas and campos, San Ignacio (Hauman, figs. 1, 2, cf. Glassman 1972a, p. 93).

Besides its smaller dimensions, Hauman distinguished this palm from *Butia yatay* because it flowered and fruited before forming a trunk, whereas *B. yatay* does not flower until its trunk is about 2 m tall. Both species exist in the same campos of San Ignacio. Even though *B. poni* may be synonymous with *B. paraguayensis* ("*yatay-poñi*" is one of its vernacular names), I prefer to consider it as an uncertain species because of the absence of specimens and because of an inadequate description which essentially consists of a comparison with *B. yatay*.

**Butia pungens** Becc., Agric. Colon. 10: 523. 1916.

Holotype: Argentina, Campina de America, Feb, 1907, *Spegazzini s.n.* (FI, destroyed?).

This taxon is probably synonymous with *B. paraguayensis* since it matches its general description, but I hesitate to make this designation because of the possibility that *B. pungens* may represent an immature growth stage of *B. yatay*.

**Butia stolonifera** (Barb. Rodr.) Becc., Agric. Colon. 10: 492. 1916.

*Cocos stolonifera* Barb. Rodr., Contr. Jard. Bot. 2: 40, t. 4, fig. 4. 1901; Sertum Palm. Bras. 1: 89, t. 62A. 1903.

Type: Uruguay, Pan d'Azucar, pr. Montevideo. Cult. Jard. Bot. Rio de Janeiro no. 2259 (no specimens cited).

The description of this palm is incomplete (spadices, flowers and fruits were not seen by the author) and no specimens were cited. Therefore, *Butia stolonifera* has been designated as *species dubia*.

**Butia wildemaniana** (Barb. Rodr.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 10: 1050. 1930.

*Cocos wildemaniana* Barb. Rodr., Sertum Palm. Bras. 1: 101, t. 75A. 1903.

*Syagrus wildemaniana* (Barb. Rodr.) Frambach ex Dahlgr., Field Mus. Nat. Hist., Bot. Ser. 14: 270. 1936.

Holotype: Paraguay, Rio Apa, *Hasler 8554* (G, destroyed?).

Exact size of pistillate flowers were not given in the original description, hence this acaulescent palm could be either *B. arenicola* or *B. paraguayensis*. In view of this, plus the fact that type specimens could not be located, *B. wildemaniana* was designated as an uncertain species.

#### LITERATURE CITED

- BAILEY, L. H. 1936. The genus *Butia*. Gentes Herb. 4: 21-50, figs. 9-27.
- BECCARI, O. 1887. Le palmee incluse nel genero *Cocos* Linn. Malpighia 1: 352.
- . 1916. Il genere *Cocos* Linn. e le palme affini. Agric. Colon. 10: 489-524.
- CHABAUD, B. 1905. Le groupe de *Cocos spinosa*. Rev. Hort. 77: 515-517. 1906. *idem*. Rev. Hort. 78: 143-144.
- CROVETTO, R. M. AND B. G. PICCININI. 1951. La vegetacion de la Republica Argentina.

- I. Los palmares de *Butia yatay*. 94 pp. pl. I-IX. Buenos Aires.
- GLASSMAN, S. F. 1968. Studies in the palm genus *Syagrus* Mart. Fieldiana, Bot. 31: 363-397.
- . 1970a. A conspectus of the palm genus *Butia* Becc. Fieldiana, Bot. 32: 127-172.
- . 1970b. A synopsis of the palm genus *Syagrus* Mart. Fieldiana, Bot. 32: 215-240.
- . 1972a. A revision of B. E. Dahlgren's Index of American Palms. 294 pp. J. Cramer, Lehre, Germany.
- . 1972b. Systematic studies in the leaf anatomy of palm genus *Syagrus*. Amer. J. Bot. 59: 775-788, figs. 1-14.
- WENDLAND, H. 1878. Index général. In Kerchove de Denterghem, Les Palmiers. 348 pp. Paris.

## PALM BRIEFS

### My Palms

Teddie Buhler has asked me to write about my palms. I am happy to live with them. In 1941, when my husband and I bought the four-acre high pine land in Kendall, south of Miami, Florida for a fruit farm we started with a mango grove and about 30 varieties of tropical fruits (important, as we are vegetarians). We also planted flowering trees and palms.

We lined the entrance road with coconut palms (*Cocos nucifera*), made a rondel with 'Malayan Dwarf' and 'Makapuno' coconuts, the latter with jellylike meat. One-half acre we left natural, with pines, palmettos, and coral rock, for protection and firewood. In January-February 1977 we surely needed firewood. Two frost nights with 25 and 30 degrees F did a lot of damage to our palms. Long icicles sparkled in the morning sun where the sprinklers had been running all night.

It was a sad sight, as we walked through the garden at that time. The fishtail palm (*Caryota urens*) disappeared, though *C. mitis* had some life. All the taller palms, such as *Roystonea regia*, *Washingtonia*, *Arecastrum roman-zoffianum* (*Cocos plumosa*), *Veitchia merrillii* and *V. winin*, *Neodypsis*, *Livistona*, *Coccothrinax*, *Dictyosperma*, *Cryosophila nana*, *Hyophorbe* (*Mascarena*), *Balaka*, *Phoenix reclinata*, *P. roebelenii*,

*Chrysalidocarpus lutescens*, lost some leaves. The oil palm, *Elaeis guineensis*, is still struggling for life. All the coconuts came through except two.

I felt really sorry at losing the female *Salacca*. I had brought two seeds from Bogor, Java, collected on my world tour with The Palm Society in 1968. The male survived, but is lonesome.

When I look back on our start in 1943 I can say that we moved "to the land." High pine land is healthy to live on, but it is hard work to get something growing in white sand and limestone rock. A water system was the first thing we needed, then humus from seaweed, and organic fertilizer. That did it.

The first Christmas after we had electricity Alf, my husband, climbed a tall pine and put light bulbs among the twigs. Later we planted a cedar in the parking area and lighted it. It is now a marvelous tree as tall as our pines.

Since Alf's death in 1961 I take care of our farm and the palms with two faithful helpers. On November 18th, 1978, at The Palm Society meeting at the A. R. Jennings estate, we saw the largest private palm collection. In rich natural soil palms grow happily to the sky, while ours struggle so hard to live, even with much attention and water. They are still a wonder to me in their majesty and beauty.

ELSE MARGRAFF, age 81  
November 1978