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THE GENUS *BACTRIS* (ARECACEAE), TAXONOMY AND DISTRIBUTION IN THE GUIANAS

Jean-Jacques de GRANVILLE
ORSTOM, CAYENNE

TAXONOMY AND GENERAL FEATURES

The genus *Bactris* belongs to the subfamily of ARECOIDEAE, to the tribe of COCOEAE and to the subtribe of BACTRIDINAE. The BACTRIDINAE include 6 genera, 4 of which are represented in the Guianas: *Bactris*, *Acrocomia*, *Desmoncus* and *Astrocaryum*.

Bactris are small to medium-sized palms, very often growing in clumps (multi-stemmed palms). Leaves are pinnate or entire and inflorescences always bear male and female flowers. One of the most important conspicuous characteristic is the presence of spines on leaf sheath, petiole, rachis and peduncular bract. Nevertheless, a few species are almost unarmed but there is a constant feature extremely useful to identify the genus, even on seedlings and sterile material: there are always stiff and prickly bristles along the leaflets margins. So, at least in the Guianas, one can easily identify the 4 genera of BACTRIDINAE: tall palms with a stout trunk growing in savannas are *Acrocomia* if the blade is green on both sides, *Astrocaryum* are easy to recognize because the blade is white or whitish pruinose beneath and *Desmoncus* are always climbers. Consequently, all other palms without these characters and with bristles along leaflets margins are *Bactris*.

According to UHL & DRANSFIELD (1987), 239 recognized species of *Bactris* are "distributed from Mexico and the West Indies South to Paraguay, with the greatest diversity in Brazil". According to SANDERS (1991), the total number of species that were accepted by BURRET (1933-1934) or have been published subsequently reaches 257. Taking into account the fact that the important amount of synonyms should reduce this number, but also that new species will be described, a reasonable and very rough estimation of a total number of 200 species of *Bactris* can be retained.

SANDERS (1991) gave a recent cladistic analysis of *Bactris* but he recognize that it is still "premature to provide a new formal taxonomy" based on his work. Thus, the old BURRET's classification which has become the standard taxonomic reference on *Bactris*, is still used in this study. BURRET divided the genus sensu lato into 3 genera, 2 subgenera, 4 sections and 6 groups (Fig. 1): the *Guilielma* group (8 species), the *Bactris* group (128 species), the *Aiphanoides* group (1 species), the *Amylocarpus* group (53 species), the *Piranga* group (22 species) and the *Pyrenoglyphis* group (45 species).

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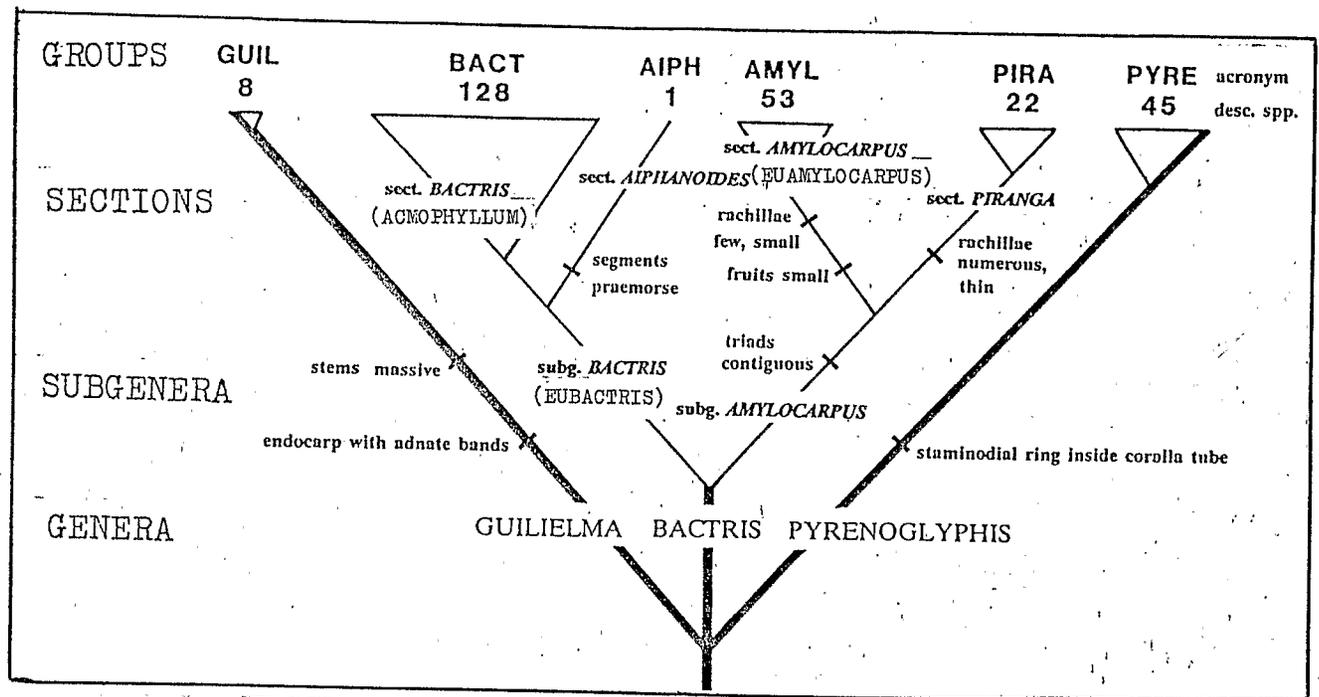


Fig. 1 : PHYLOGENETIC INTERPRETATION OF CLASSIFICATION OF BACTRIS PUBLISHED BY BURRET IN 1933-1934 (SANDERS, 1991)

PRELIMINARY WORK

The treatment of the genus *Bactris* for the FLORA OF THE GUIANAS required a long preliminary study of specimens in the herbaria. Vouchers have been received on loan and 21 institutions have been visited during the last 8 years. Table 1 gives the number of specimens of *Bactris* from the Guianas found in the herbaria I have visited: specimens from French Guiana are mostly localized in Cayenne (CAY) and Paris (P); specimens from Suriname are in Utrecht (U) and Paramaribo (BBS) and specimens from Guyana are distributed in Kew (K), Georgetown (BRG, FD) and some other herbaria. Moreover, many hundreds of specimens from bordering countries (Brazil and Venezuela) have been studied in order to get an estimation of intraspecific variational patterns and to delimit the areas of distribution.

TABLE 1
NUMBER OF SPECIMENS OF *BACTRIS* FROM THE GUIANAS
STUDIED IN THE HERBARIA

CAY	275		BRG	32
U	269		FD	20
P	84		BR	16
K	79		G	11
BBS	63		US	9
NY	51		BM	8
BH	44		VEN	5
M,B,MG,IAN,INPA,HAMAB,USM				<5

Another important task was to find and to see the types. Fortunately, the Revision of B.E. Dahlgren's Index of American Palms (GLASSMAN, 1972) is extremely helpful to locate the holotypes at least. Kew (K) and Munich (M) are particularly important for TRAIL's and MARTIUS' types respectively. A few other holotypes of the species occurring in the Guianas are found in Utrecht (U), Chicago (F), London (BM), Belém (MG), Paris (P), Brussels (BR). Unhappily, types of the specimens named by BURRET have been partly destroyed in Berlin (B) during the war and those of BARBOSA RODRIGUES were lost when the Botanical Museum of the Amazon (Manaus) was closed in 1890 (MORI & FERREIRA, 1987).

Lastly, other difficulties came from the fact that specimens of *Bactris* are often too fragmentary because collectors, except palm lovers, generally avoid too big and prickly plants.

COMPARATIVE LIST OF SPECIES OCCURRING IN THE GUIANAS AND DISTRIBUTION

The study of exciccata and palms in the field as well as the analysis of literature on *Bactris* led me to draw up a list of 31 species growing in the Guianas (see appendix):

The *Guilielma* group includes only one cultivated introduced species, well known for its edible fruits: *Bactris gasipaes*.

Seven species are found in the *Pyrenoglyphis* group:

Bactris pallidispina (pl. II ⁴) is common in the Guianas and in the Amazon Basin where it grows in clumps on riverbanks. Yellowish spines on sheaths and petioles are very characteristic.

Bactris concinna has a remarkable single spadix with big fleshy fruits. This Amazonian species has been reported from upper Essequibo River by SCHOMBURGK (1848) but I have never seen any specimen from the Guianas in the herbaria.

Bactris gaviona (pl. I ¹²) is known from the Amazon Basin. In the Guianas, it is restricted to Coeroeni River in Suriname (WESSELS BOER, 1965).

Bactris major (pl. I ¹⁵) is widely distributed along tropical American coast and estuaries as well as in West Indies. It is a colonial species with creeping rhizomes forming pure stands in tidal area.

Bactris cruegeriana (pl. I ⁷) lives in similar habitats. It has been found in Guyana and Suriname and it is likely to grow in French Guiana too.

Bactris gastoniana (pl. I ¹¹) is very common in Suriname and French Guiana but it has not been recorded yet in Guyana. It is a small, almost stemless palm of the understory.

Bactris oligocarpa (pl. II ²) is a Brazilian species restricted, in the Guianas, to French Guiana and South-East of Suriname. This palmet is close to *B. gastoniana* but it is smaller and leaves are simple or with 2 or 3 pairs of segments only.

The *Bactris* group is the most species diverse with 10 species in the Guianas:

Bactris maraja (pl. II ¹) is a medium-sized palm often growing in wet places, common in tropical America. It looks like *B. pallidispina* with which it has often been confused because of the yellow spines and the black fruits but leaflets are wider and sigmoid.

Bactris oligoclada (pl. II ³) is endemic to the Northern half of Guyana and to the most Eastern part of Venezuela.

Bactris penicillata (pl. II ⁶) is a small palm described from the Amazon valley by BARBOSA RODRIGUES. I have found recently this species in swamp forests of North-Eastern French Guiana (2 collections from the Kaw flood plain).

Bactris turbinocarpa (pl. II ¹¹) is also an Amazonian species only recorded in central Suriname (WESSELS BOER, 1965).

Bactris capinensis (pl. I ⁵) is a very rare species known from the Amapa (Brazil) and by 2 specimens only from Eastern French Guiana (Oyapock valley).

Bactris elegans (pl. I ⁹) is distributed in Brazil and in the 3 Guianas. It is a small caespitose palm of the understory. Leaves pinnate with numerous leaflets (even on seedlings) are very characteristic.

Bactris campestris (pl. I ⁴) grows in Venezuela, in Brazil and in the Guianas. This species is found in savannas or in savanna forest only, often on periodically flooded sandy soils.

Bactris aff. *balanophora* (pl. I ³) is probably a new species endemic to Guyana where it is found mostly in Demerara.

Bactris ptariana (pl. II ⁷) grows in montane forests of Venezuelan "tepui". It has been collected once in Ayanganna Mountains (Guyana).

The last species of this group (pl. II ¹³) is a new one, collected once in French Guiana but which may be conspecific with a similar palm growing in Peru (Loreto). This species has characteristic entire long bifid leaves.

The *Amylocarpus* group total 6 dwarf palms growing in forest understory:

Bactris simplicifrons sensu lato (pl. II ⁹) is the most widely distributed in South America. It is a tiny, generally unarmed palm. Leaves are either entire and bifid or divided into a few segments. The peduncular bract is always bare.

Bactris aubletiana (pl. I ⁴) is endemic to French Guiana and to South-East of Suriname. It differs from the latter by its prickly bract and the leaves always bifid.

Bactris pectinata (pl. II ⁵) is common in the Amazon Basin. I collected this species once only in Southern French Guiana.

Bactris complex *geonomoides* (pl. I ¹³), a prickly palmlet with bifid leaves, is also an Amazonian species. It grows in the Southern half of the 3 Guianas.

Bactris aff. *cuspidata* (pl. I ⁸) is likely to be described as a new species endemic to French Guiana where it grows mostly in submontane forest understory. Leaves are pinnate and the species is easy to recognize because it is the only one with a blade pilose on both sides.

Bactris "vesiculifera" (pl. II ¹⁵) is a nomen nudum of TRAIL. It is close but distinct from *B. geonomoides*. All the specimens I have seen are from the Potaro-Kaieteur region, in Guyana.

The last group is the *Piranga* group. It includes 7 species:

Bactris constanciae (pl. I ⁶) is distributed in the Amazon Basin and mostly in the Eastern region of the Guianas. The red fruits with smooth fleshy spines are unique in the genus.

Bactris acanthocarpoides (pl. I ¹) is common in Brazil, Suriname and French Guiana. It is expected in Guyana too. Leaflets are straight, narrow and in clusters. Fruits are typical of the *Piranga* group species, bright red with black setae.

Bactris sp. (pl. II ¹⁴) ranges from Eastern Suriname to Amapa with the highest density in French Guiana. It seems to be a new species very close to *B. acanthocarpoides*. However, it differs from the latter by several characters: habitat, leaflets much wider and more or less sigmoid, bigger fruits.

Bactris humilis (pl. I ¹⁴) is distributed all over the Guianas and the Amazon Basin. It is a stemless or very short single-stemmed palm with long pinnate leaves growing in the understory.

Bactris sp. (pl. II ¹²) is closely related to the latter from which it differs principally by its smaller size. So far, it has been found in French Guiana only.

Bactris trailiana (pl. II ¹⁰) is an uncommon Brazilian species collected twice in Suriname and twice in French Guiana. It differs from the other species of this group by its big entire leaves.

Lastly, *Bactris raphidacantha* (pl. II ⁸) is mostly known from French Guiana and Eastern Suriname. This species has more or less the habit of *Astrocaryum paramaca*, with which it is often mixed in the understory. Trunk is very short and the long leaves, regularly pinnate, form a funnel-shaped crown acting as a litter collector.

CONCLUSION

The distribution of *Bactris* species found in the Guianas among BURRET's groups shows that, with 31 species compared to the 257 recognized species, the Guianas hold at least 12 % of the total number of species. This proportion reaches 15.5 % when reducing the total number of species to 200 as suggested above. Some groups are much better represented than others. For example, 32 % of the *Piranga* group species occur in the Guianas while 8 % only of the *Bactris* group species are found in the same area. This suggests that the *Piranga* group has probably its center of diversity in the Guianas. On the contrary, the *Bactris* group, the relative diversity of which is low in the Guianas, may have its center of diversity in central Amazonia where the highest number of species is observed.

A comparison between the 3 Guianas in terms of endemism and species diversity suggests the following remarks:

So far, no species appears endemic to Suriname while Guyana and French Guiana hold each one 3 endemic species. Species richness seems slightly decreasing from French Guiana (22 sp.) to Suriname (19 sp.) and Guyana (17 sp.). However, I estimate this unexpected variation as not significant: as a matter of fact, Guyana, which is bigger and much more diverse in habitats and ecosystems than French Guiana, should be also more species diverse. Thus, these unexpected results mostly suggest that Guyana seems less species diverse only because floristic inventory is still insufficient. French Guiana and Suriname have been fairly well prospected, especially considering palms so that inventory of *Bactris* species can be considered as almost exhaustive in these countries. On the contrary, it is very likely to increase the number of *Bactris* species in Guyana when going on with botanical exploration.

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APPENDIX :

Checklist of the species occurring in the Guianas

- B. acanthocarpoides* Barbosa Rodrigues
B. aubletiana Trail
B. aff. balanophora Spruce

- B. campestris* Martius
- B. capinensis* Huber
- B. concinna* Martius
- B. constanciae* Barbosa Rodrigues
- B. cruegeriana* Grisebach
- B. aff. cuspidata* Martius (vel *floccosa* Spruce)
- B. elegans* Barbosa Rodrigues & Trail
- B. gasipaes* Humboldt Bonpland & Kunth (cultivated)
- B. gastoniana* Barbosa Rodrigues
- B. gaviona* (Trail) Drude
- B. geonomoides* Drude
- B. humilis* (Wallace) Burret
- B. major* N.J. Jacquin
- B. maraja* Martius
- B. oligocarpa* Barbosa Rodrigues
- B. oligoclada* Burret
- B. pallidispina* Martius
- B. pectinata* Martius
- B. penicillata* Barbosa Rodrigues
- B. ptariana* Steyermark
- B. raphidacantha* Wessels Boer
- B. simplicifrons* Martius
- B. trailiana* Barbosa Rodrigues
- B. turbinocarpa* Barbosa Rodrigues
- B. sp. nov. 1* ("*hibrido*")
- B. sp. nov. 2* ("*kahnii*")
- B. sp. nov. 3* ("*pliniana*")
- B. sp. nov. 4* ("*vesiculifera*")

Plate I : DISTRIBUTION OF BACTRIS IN THE GUIANAS

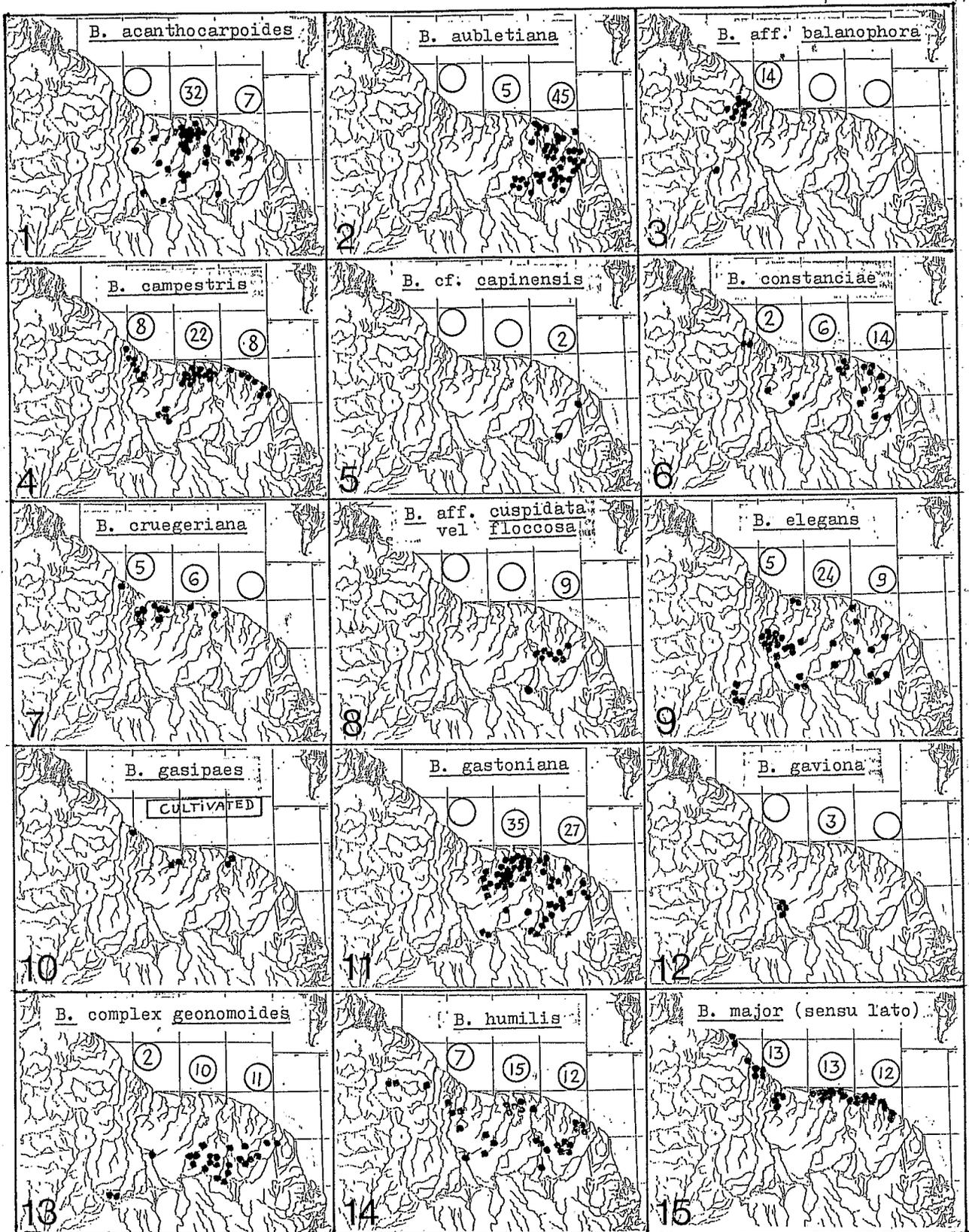


Plate II : DISTRIBUTION OF BACTRIS IN THE GUIANAS

