

CHECKLIST OF VENEZUELAN BROMELIACEAE WITH NOTES ON SPECIES DISTRIBUTION BY STATE AND LEVELS OF ENDEMISM

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ABSTRACT. A checklist of the 24 genera and 364 native species of Bromeliaceae known from Venezuela is presented, including their occurrence by state and indications of which are endemic to the country. A comparison of the number of genera and species known from Mesoamerica (southern Mexico to Panama), Colombia, Venezuela, the Guianas (Guyana, Suriname, French Guiana), Ecuador, and Peru is presented, as well as a summary of the number of species and endemic species in each Venezuelan state.

RESUMEN. Se presenta un listado de los 24 generos y 364 especies nativas de Bromeliaceae que se conocen de Venezuela, junto con sus distribuciones por estado y una indicación cuales son endémicas a Venezuela. Se presenta también una comparación del número de los géneros y especies de Mesoamerica (sur de Mexico a Panama), Colombia, Venezuela, las Guayanas (Guyana, Suriname, Guyana Francesa), Ecuador, y Perú, y un resumen del número de especies y número de especies endémicas de cada estado de Venezuela.

INTRODUCTION

The checklist of Venezuelan Bromeliaceae presented below (Appendix 1) adds three genera (*Brewcaria*, *Neoregelia*, and *Steyerbromelia*) and 71 species to the totals for the country since the last summary of Venezuelan bromeliads in the Flora de Venezuela series which contained 293 species (Smith 1971). The checklist, with 24 genera and 364 species, was originally prepared for use in citing species totals for Venezuela in the forthcoming Flora of the Venezuelan Guayana (Steyermark, Berry, & Holst in prep., covering the southern half of Venezuela). Checklists such as this one are also useful for comparing species totals from other countries and for assessing species diversity across geographical gradients, which help point out centers of diversity and directions of radiation.

METHODS

The checklist was prepared from both herbaria and literature sources. Herbaria surveyed were: Field Museum of Natural History (F), Missouri Botanical Garden (MO), Facultad de Agronomía-Universidad Central de Venezuela (MY), Herbario Ovalles, Universidad Central (MYF), New York Botanical Garden (NY), Herbario Universitario, Universidad de los Llanos (PORT), United States National Herbarium (US), and the Herbario Nacional de Venezuela (VEN). Principal literature references used were the Flora Neotropica Bromeliaceae treatments (Smith & Downs 1974, 1977, 1979), Flora de Venezuela

Bromeliaceae (Smith 1971), and Revision of the Guayana Highland Bromeliaceae (Smith 1986). Several additional country records were reported in works by Smith and Read (1982), Luther (1984), Morillo (1986), and Oliva-Esteva and Steyermark (1987). Author abbreviations used in the checklist follow Brummit and Powell (1992). Abbreviations of literature citations follow Stafleu and Cowan (1976-1988) for books, and Lawrence *et al.* (1968) for journals.

States in Venezuela (FIGURE 1) where the species occur are listed after each species, and the word "Endemic" is added if the species is wholly confined within Venezuela. Species that occur very near the border with Venezuela and selected excluded taxa are listed at the end of the checklist.

Subspecies, varieties, and forms are either not included in the list, or in a few instances in *Tillandsia*, are merely listed after the species where widely recognized species have been recently reduced to infraspecific levels. Some of the infraspecific taxa that have been recognized in Venezuela are likely valid biological entities, but many also appear to be artifacts of incomplete collecting or poor understanding of variation within a species. Thorough monographs involving field studies are needed before most infraspecific taxa can attain greater taxonomic or biological meaning.

While recent attempts have been made to either split up certain bromeliad genera (Smith & Kress 1989, 1990, Spencer & Smith 1993, Varadarajan & Gilmartin 1988), or combine others (Smith & Spencer 1992), a conservative approach is presented here. There will inevitably

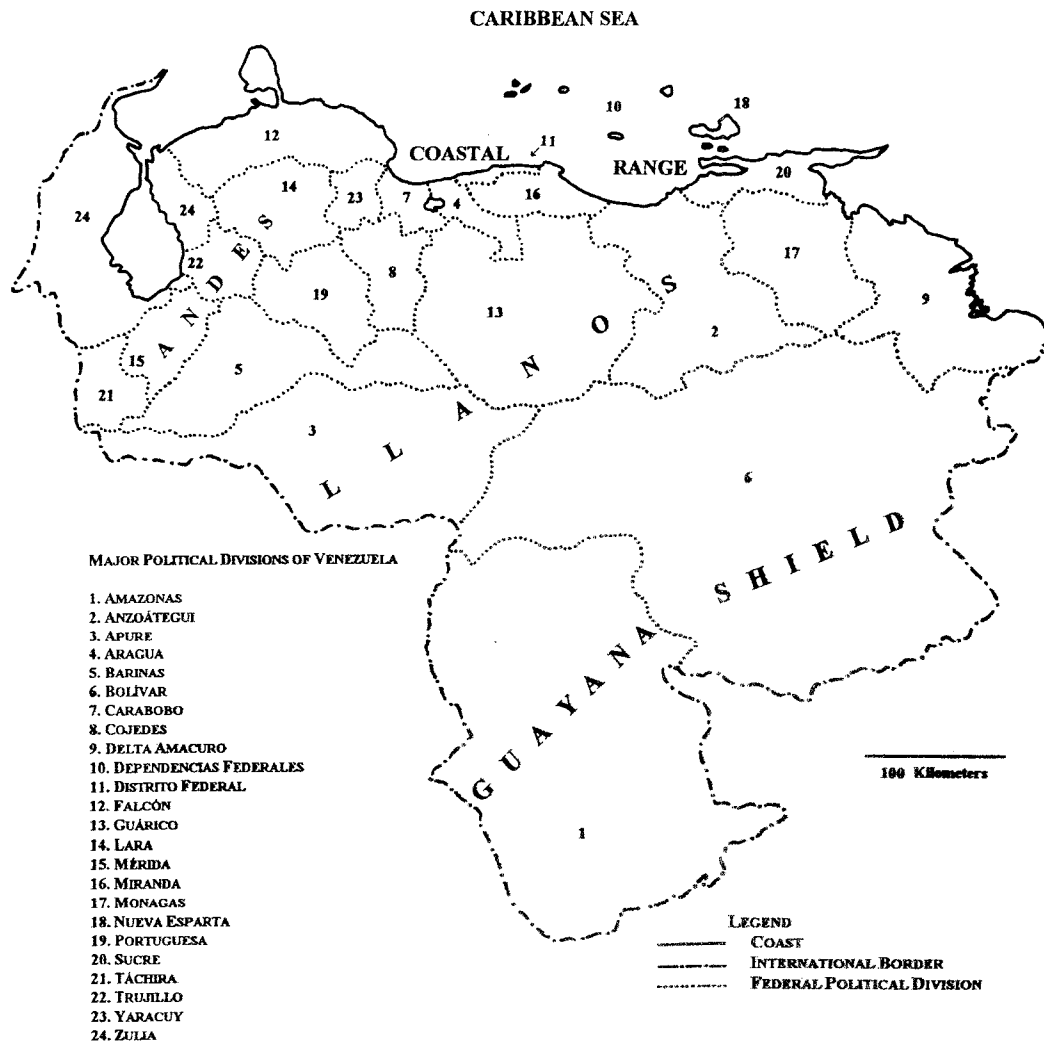


FIGURE 1. Major political divisions and physiographic regions of Venezuela.

be some, possibly major, taxonomic realignments in the family in the future, but until more detailed phylogenetic and floristic studies can be made, a traditional approach seems warranted. Synonyms have been added to the list whenever possible to reflect the alternate homotypic names that have been proposed in recent years. Heterotypic synonyms are added when they provide new information to the previous works of the Flora de Venezuela (Smith 1971) and Flora Neotropica (Smith & Downs 1974, 1977, 1979); these are largely a result of recent (Gouda 1987) or ongoing (Flora of the Venezuelan Guayana, in prep.) floristic works. Selected synonyms from the appendix are cross-referenced with accepted taxa at the end of the checklist.

RESULTS AND DISCUSSION

Venezuela ranks among the top Neotropical countries in regard to diversity and number of Bromeliaceae genera and species. Species totals from recent checklists of the Guianas (Guyana, Suriname, French Guiana; Boggan *et al.* 1992), Ecuador (Luther 1989), and Peru (Brako & Zarucchi 1993), and floras from Mesoamerica (including southern Mexico to Panama; Utley & Burt-Utley 1994) and Colombia (Smith 1977, updated through 1988, Smith pers. comm.) are compared in TABLE 1 with a list of genera and species known from Venezuela. Brazil is not included, but when a list of species from that country is assembled, it will have the highest number

TABLE 1. Species diversity of Bromeliaceae in some Neotropical countries and regions.

Subfamily/genus ²	Total species ¹	Meso- America	Colombia	Venezuela	Guianas	Ecuador	Peru
Bromelioideae							
(subtotals →)	682	45	70	56	41	56	59
<i>Aechmea</i>	200+	23	38	29	17	30	26
<i>Ananas</i>	8	1	2	4	4	4	3
<i>Androlepis</i>	1	1	—	—	—	—	—
<i>Araeococcus</i>	5	1	—	2	3	—	—
<i>Billbergia</i>	61	4	3	3	3	3	6
<i>Bromelia</i>	50	5	6	7	8	2	4
<i>Disteganthus</i>	3	—	—	—	3	—	—
<i>Greigia</i>	28	6	9	5	—	4	2
<i>Hohenbergia</i>	45	—	—	1	—	—	—
<i>Hohenbergiopsis</i>	1	1	—	—	—	—	—
<i>Neoregelia</i>	100	—	2	4	—	6	10
<i>Pseudaechmea</i>	1	1	—	—	—	—	—
<i>Ronnbergia</i>	11	2	4	—	—	2	1
<i>Streptocalyx</i>	18	—	6	1	3	5	7
Pitcairnioideae							
(subtotals →)	896	50	125	188	30	70	153
<i>Ayensua</i>	1	—	—	1	—	—	—
<i>Brewcaria</i>	2	—	—	2	—	—	—
<i>Brocchinia</i>	19	—	4	16	4	—	—
<i>Connellia</i>	5	—	—	5	2	—	—
<i>Deuterocohnia</i>	8+	—	—	—	—	—	1
<i>Fosterella</i>	15	1	—	—	—	—	5
<i>Hechtia</i>	50+	6	—	—	—	—	—
<i>Lindmania</i>	35	—	—	33	2	—	—
<i>Navia</i>	90	—	10	79	10	—	—
<i>Pitcairnia</i> ³	321	41	82	41	12	48	77
<i>Puya</i>	186	2	29	8	—	22	70
<i>Steyerbromelia</i>	3	—	—	3	—	—	—
Tillandsioideae							
(subtotals →)	994	208	196	120	49	242	199
<i>Catopsis</i>	21	17	2	4	2	3	1
<i>Glomeropitcair- nia</i>	2	—	—	1	—	—	—
<i>Guzmania</i>	160+	34	72	28	8	76	32
<i>Mezobromelia</i>	5	1	2	2	—	3	2
<i>Tillandsia</i>	515	93	92	53	22	128	140
<i>Vriesea</i>	290	63	28	32	17	32	24
Total species	2,572	303	391	364	120	368	410
Area of country or region (km²)		778,238	1,138,339	912,050	448,793	283,561	1,285,215
Number of species/ 10,000 km²		3.9	3.4	4.0	2.7	13.0	3.2
Total genera	ca. 50	19	16	24	16	15	17

¹ Total species listed for the subfamilies and genera include all species known, not just those presented in the table. Numbers listed here are mostly from Luther (1991), with some minor modifications to the genera that are largely centered in Venezuela.

² Only genera from countries and regions compared in the table are listed here.

³ Including *Pepinia*.

of genera and species of Bromeliaceae of any country. It is also much larger in area (8,506,663 km²) than any other Neotropical country and is the center of diversity of many genera, especially those of the Bromelioideae. An example of the

high bromeliad diversity in Brazil was illustrated by Fontoura *et al.* (1991) where they found 20 genera and 245 species in the southeastern state of Rio de Janeiro alone (6,321 km²).

On a per-area basis, Ecuador has the highest

bromeliad species diversity of countries compared in TABLE 1, though its small size automatically gives it a relatively high concentration of species per area. Pitcairnioideae species are especially well represented in Venezuela due mostly to the presence of three genera that have centers of diversity there (*Navia*, *Lindmania*, and *Brocchinia*), and the Andes are species-rich in Tillandsioideae. The high number of genera in Venezuela is not only due to the Guayanan pitcairnioid genera (*Ayensua*, *Brewcaria*, *Brocchinia*, *Connellia*, *Lindmania*, *Navia*, and *Steyerbromelia*), but also because parts of Venezuela belong to several other important Neotropical phytogeographical regions: Caribbean, Andean, and Amazonian.

TABLE 2 summarizes information presented in the checklist of Venezuelan Bromeliaceae (Appendix 1) with the total number of species and number of endemic species per state. In addition, the number of species per 1,000 km² is calculated for each state and overall species numbers are compared for southern and northern Venezuela.

The southern Venezuelan states of Amazonas and Bolívar are by far the richest in the country in bromeliad species, though they are also considerably larger than any other state. These states contain numerous, topographically varied (50–3,000 m elevation) habitats including mostly oligotrophic soils and large expanses of igneous and sandstone rock outcrops where many pitcairnioid species grow. The Llanos states of Anzoátegui, Apure, Barinas, Cojedes, and Guárico are relatively species-poor; they contain large expanses of mostly open-savannas with small amounts of rock outcrops, relatively few forested areas, and are only slightly varied topographically (mostly below 500 m elevation). The richest states on a per-area basis are those of the coastal range (Aragua, Carabobo, Distrito Federal, Miranda, Yaracuy, Sucre) and the Andes (Mérida, Táchira, Trujillo). These states vary greatly in elevation (sea level to 5,000 m elevation) and contain numerous forest types; epiphytic Tillandsioideae are numerous in the montane habitats that occur there. The islands that form the state of Nueva Esparta are also species-rich for their size, though nearly all of the species that occur there are relatively widespread.

Summarizing the number of endemic species in political regions can be misleading, especially in the tropics where intensive exploration frequently follows country borders. The numbers presented in TABLE 2, however, point out the two Venezuelan states where there is a high amount of local endemism: Amazonas and Bolívar. This high number of endemic species can partially be explained by the fact that some of the most speciose genera that occur there have non- or only

TABLE 2. Bromeliad species diversity and number of endemic species per state in Venezuela.

State	Number of species	Area (km ²)	Species/1,000 km ²	Number of endemics
Amazonas	173	175,750	1.0	86
Bolívar	143	238,000	0.6	48
Táchira	80	11,100	7.2	3
Aragua	67	7,014	9.6	5
Distrito Federal	65	2,050	31.7	2
Sucre	56	11,800	4.8	2
Miranda	53	7,950	6.7	1
Falcón	50	24,800	2.0	1
Yaracuy	47	7,100	6.6	—
Zulia	44	63,100	0.7	2
Mérida	40	11,300	3.5	2
Lara	39	19,800	2.0	—
Delta Amacuro	31	42,200	0.7	—
Carabobo	29	4,650	6.2	—
Anzoátegui	28	43,300	0.6	—
Portuguesa	28	15,200	1.8	—
Nueva Esparta	26	1,150	22.6	—
Monagas	25	28,900	0.9	—
Trujillo	22	7,400	3.0	1
Apure	19	76,500	0.2	—
Barinas	15	35,200	0.4	—
Cojedes	12	14,800	0.8	—
Guárico	5	64,986	0.1	—
Dependencias				
Federales	5	?, small	—	—
Southern Venezuela ¹	269	455,950	0.59	139
Northern Venezuela ²	161	458,100	0.35	38

¹ Includes Amazonas, Bolívar, and Delta Amacuro.

² Includes all other states not listed under Southern Venezuela.

scarcely appendaged seeds (*Navia*, *Lindmania*, most *Pitcairnia*), and therefore poor dispersal abilities via wind. This implies that once a population becomes established away from its parents, it is likely to remain genetically isolated. The numerous, mostly steep- or vertical-walled mountains in these states provide a further barrier to dispersal. In addition, and for reasons that are not entirely clear, habitats with oligotrophic soils, which are frequent in Amazonas and Bolívar states, tend to contain higher numbers of local endemic species. The Llanos states do not have any endemic species of Bromeliaceae. Of the 394 species of Bromeliaceae that occur in Venezuela, 176 are endemic to the country.

At the time of this writing, there are an additional 8–10 unidentified taxa known from Venezuela that are either new species for the country or new for science; however there also are some species included in the checklist presented here that are not well-defined species and may even-

tually need to be synonymized. Future collecting, though, will likely turn up even more species and new country records, and may push the total number of species for Venezuela closer to 400.

Several Guayana Shield bromeliad genera, particularly *Lindmania* and *Navia*, are in need of monographs that include extensive fieldwork. Many of the species in these genera are known only from their type collections and have proved difficult to recollect and study because of their remote localities. Recent collecting efforts in southern Venezuela, mainly by botanists from the herbarium of the University of the Llanos in Guanare (PORT) and Otto Huber, associated with the Herbario Ovalles in Caracas (MYF), have provided critical collections that will necessitate further refinements of generic limits and additions of species to the appended list of Venezuelan bromeliads. Some of these will be presented in the Flora of the Venezuelan Guayana.

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LITERATURE CITED

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APPENDIX I

Checklist of Venezuelan Bromeliaceae

Abbreviations of states are as follows: Amazonas (Am), Anzoátegui (An), Apure (Ap), Aragua (Ar), Barinas (Ba), Bolívar (Bo), Carabobo (Ca), Cojedes (Co), Delta Amacuro (DeA), Dependencias Federales (DeF), Distrito Federal (DiF), Falcón (Fa), Guárico (Gu), Lara (La), Mérida (Mé), Miranda (Mi), Monagas (Mo), Nueva Esparta (NuE), Portuguesa (Po), Sucre (Su), Táchira (Tá), Trujillo (Tr), Yaracuy (Ya), Zulia (Zu).

Endemic = endemic to Venezuela.

AECHMEA

- Aechmea angustifolia*** Poeppig & Endl., Nov. Gen. Sp. Pl. 2: 43. 1838.
Am, Ap, Ba, Bo, Ca, Tá.
- Aechmea aquilega*** (Salisb.) Griseb., Fl. Brit. W. I. 592. 1864.
Ar, Bo, Ca, DeA, DeF, DiF, Fa, Mi, Mo, NuE, Su, Ya.
- Aechmea aripensis*** (N.E. Br.) Pittendr., J. Wash. Acad. Sci. 48: 316. 1958.
Su.
- Aechmea bracteata*** (Sw.) Griseb., Fl. Brit. W. I. 592. 1864.
Mi, Zu.
- Aechmea brevicollis*** L.B. Sm., Contr. Gray Herb. 154: 32. 1945.—*Lamprococcus brevicollis* (L.B. Sm.) L.B. Sm. & W.J. Kress, Phytologia 66: 70. 1989.
Am.
- Aechmea bromeliifolia*** (Rudge) Baker in Benth. & J.D. Hook., Gen. Pl. 3: 664. 1883.
Am, An, Ap, Ar, Ba, Bo, Co, DeA, DiF, Fa, La, Mi, Po, Su, Tá, Zu.
- Aechmea castelnavii*** Baker, Handb. Bromel. 39. 1889.
Am, Ba, Bo, Co, La, Mé, Tá.
- Aechmea cathcartii*** C.F. Reed & Read, J. Brom. Soc. 31: 59. 1981.
Mi. *Endemic*.
- Aechmea chantinii*** (Carrière) Baker, Handb. Bromel. 49. 1889.—*Platyaechmea chantinii* (Carrière) L.B. Sm. & W.J. Kress, Phytologia 69: 272. 1990.
Am.
- Aechmea contracta*** (Mart. ex Schult.f.) Baker, J. Bot. 17: 234. 1879.—*Platyaechmea contracta* (Mart. ex Schult.f.) L.B. Sm. & W.J. Kress, Phytologia 69: 272. 1990.
Am.
- Aechmea corymbosa*** (Mart. ex Schult.f.) Mez in Mart., Fl. Bras. 3(3): 316. 1892. [A member of subgenus *Lamprococcus*, but the new combination was not made by Smith & Kress (1989) in their elevation of the subgenera of *Aechmea* to generic rank.]
Am.
- Aechmea cymoso-paniculata*** Baker, J. Bot. 17: 165. 1879.
Ar. *Endemic*.
- Aechmea dichlamydea*** Baker, J. Bot. 17: 133. 1879.
Su.
- Aechmea egleriana*** L.B. Sm., Bol. Mus. Paraense Emilio Goeldi, N.S., Bot. 1: 2. 1958.
Am.
- Aechmea fendleri*** André ex Mez in C. DC., Monogr. Phan. 9: 223. 1896.
Ar, DiF, Mi, Mo, NuE, Su, Ya.
- Aechmea filicaulis*** (Griseb.) Mez in Mart., Fl. Bras. 3(3): 425. 1894.
Ar, Ca, Ya. *Endemic*.
- Aechmea gigantea*** Baker, Handb. Bromel. 45. 1889.
Su. *Endemic*.
- Aechmea lasseri*** L.B. Sm., Bull. Bromeliad Soc. 3: 43. 1953.
Ar. *Endemic*.
- Aechmea lingulata*** (L.) Baker, J. Bot. 17: 164. 1879.
Ar, Ca, DeA, DiF, Mi, NuE, Su, Ya.
- Aechmea mertensii*** (G. Meyer) Schult.f. in Schult. & Schult.f., Syst. Veg. 7: 1272. 1830.
Am, An, Bo, DeA, Mo.
- Aechmea nudicaulis*** (L.) Griseb., Fl. Brit. W. I. 593. 1864.
Ar, Bo, Ca, DeA, DiF, Fa, Mi, Mo, NuE, Su, Ya.
- Aechmea paniculigera*** (Sw.) Griseb., Fl. Brit. W. I. 593. 1864.
DiF.
- Aechmea penduliflora*** André, Énum. Bromél. [3]. 13 Dec. 1888; Rev. Hort. 60: 563. 16 Dec. 1888.
Am, Ap, Bo, Tá, Zu.
- Aechmea politii*** L.B. Sm., Mem. New York Bot. Gard. 9: 318. 1957.
Am.
- Aechmea pubescens*** Baker, J. Bot. 17: 135. 1879.
Mé, Zu.
- Aechmea rubiginosa*** Mez in C. DC., Monogr. Phan. 9: 285. 1896.—*Chevaliera rubiginosa* (Mez) L.B. Sm. & W.J. Kress, Phytologia 66: 78. 1989.
Aechmea magdalenae auct. non (André) André ex Baker: L.B. Sm., Fl. Venez. 12(1): 304. 1971.
Am, Bo.
- Aechmea setigera*** Mart. ex Schult.f. in Schult. & Schult.f., Syst. Veg. 7: 1273. 1830.
Am, Bo.

- Aechmea spectabilis** Brongn. ex Houliet, Rev. Hort. 47: 311. 1875.
La, Tá, Tr, Zu.
- Aechmea tillandsioides** (Mart. ex Schult.f.) Baker, J. Bot. 17: 134. 1879.—*Platyaechmea tillandsioides* (Mart. ex Schult.f.) L.B. Sm. & W.J. Kress, Phytologia 69: 274. 1990.
Am, An, Ap, Bo, Ca, DeA, Su, Tá, Zu.
- Aechmea tocanina** Baker, Handb. Bromel. 39. 1889.
Am, An, Ap, Ba, Bo, Co, Tá, Ya.

ANANAS

- Ananas comosus** (L.) Merr., Interpr. Herb. Amboin. 133. 1917.
Widely cultivated.
- Ananas lucidus** Miller, Gard. Dict. ed. 8 (Ananas no. 4). 1768.
Am, Bo, Mo, Tá.
- Ananas paraguayensis** Camargo & L.B. Sm., Phytologia 16: 464. 1968. [The genus *Ananas* is much in need of a revision, and in Venezuela, especially the wild species that have been identified in herbaria as *A. paraguayensis*, *A. ananassoides* (Baker) L.B. Sm., and *A. nanus* (L.B. Sm.) L.B. Sm.]
Am, An, Ap, Bo.

ARAEOCOCCUS

- Araeococcus flagellifolius** Harms, Notizbl. Bot. Gart. Berlin-Dahlem 10: 784. 1929.
Am, Bo, Tá, Zu.
- Araeococcus micranthus** Brongn., Ann. Sci. Nat. Bot. sér 2. 15: 370. 1841.
Am, Bo, DeA.

AYENSUA

- Ayensua uaipanensis** (Maguire) L.B. Sm., Mem. New York Bot. Gard. 18(2): 29. 1969.
Bo. *Endemic*.

BILLBERGIA

- Billbergia macrolepís** L.B. Sm., Contr. Gray Herb. 114: 3. 1936.
Am, Ap, Ba, Bo, Po, Tá, Zu.
- Billbergia manaræ** Steyer., Brittonia 30: 39. 1978.
DiF. *Endemic*.
- Billbergia rosea** Hortus ex Beer, Fam. Bromel. 128. 1856 [1857].
Billbergia venezuelana Mez, Repert. Sp. Nov. Regni Veg. 17: 114. 1921.
Ar, Ca, DiF, Fa, Mi, Su.

BREWCARIA

- Brewcaria duidensis** L.B. Sm., Steyer., & H. Rob., Acta Bot. Venez. 14(3): 10. 1984.
Am. *Endemic*.
- Brewcaria marahuacæ** L.B. Sm., Steyer., & H. Rob., Ann. Missouri Bot. Gard. 73: 714. 1986.
Am. *Endemic*.

BROCCHINIA

- Brocchinia acuminata** L.B. Sm., Brittonia 3: 160. 1939.
Am, Bo.
- Brocchinia cowanii** L.B. Sm., Mem. New York Bot. Gard. 9: 293. 1957.
Am. *Endemic*.
- Brocchinia delicatula** L.B. Sm., Mem. New York Bot. Gard. 10(2): 19. 1960.
Am. *Endemic*.
- Brocchinia gilmartinii** G.S. Varad., J. Brom. Soc. 36: 251. 1986.
Bo. *Endemic*.
- Brocchinia hechtiioides** Mez, Repert. Spec. Nov. Regni Veg. 12: 414. 1913.
Brocchinia cryptantha L.B. Sm., Mem. New York Bot. Gard. 9: 293. 1957.
Am, Bo.
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Am, Bo.
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138. 1951.
Am.

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1: 28. 1797.
An, Ar, Bo, Co, Fa, Gu, La, Mé, Mi, Mo,
NuE, Po, Su, Zu.
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Am. Bo.

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Ar. *Endemic*.

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Ar, Bo, Ca, DeA, DiF, Fa, Mi, Mo, Su, Ya.

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Bo. Endemic.
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Bo. Endemic.
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Bo. Endemic.

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Am. *Endemic*.
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Navia duidae L.B. Sm., Bull. Torrey Bot. Club 58: 338. 1931.
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Am. *Endemic*.
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- Navia latifolia** L.B. Sm., Mem. New York Bot. Gard. 9: 308. 1957.
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- Navia lepidota** L.B. Sm., Phytologia 16: 459. 1968.
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- Navia liesneri** L.B. Sm., Steyer. & H. Rob., Ann. Missouri Bot. Gard. 73: 709. 1986.
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Am. *Endemic*.
- Navia linearis** L.B. Sm., Steyer. & H. Rob., Ann. Missouri Bot. Gard. 73: 709. 1986.
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Bo. *Endemic*.
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- Navia ocellata** L.B. Sm., Mem. New York Bot. Gard. 9: 310. 1957.
Am. *Endemic*.
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- Navia parvula** L.B. Sm., Mem. New York Bot. Gard. 9: 314. 1957.
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Am. *Endemic*.
- Navia pauciflora** L.B. Sm., Mem. New York Bot. Gard. 9: 306. 1957.
Am. *Endemic*.
- Navia phelpsiae** L.B. Sm., Mem. New York Bot. Gard. 9: 301. 1957.
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Am. *Endemic*.
- Navia polyglomerata** L.B. Sm., Steyer. & H. Rob., Ann. Missouri Bot. Gard. 73: 704. 1986.
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Am. *Endemic*.
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Am. *Endemic*.
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Am, Bo. *Endemic*.
- Navia reflexa** L.B. Sm., Bot. Mus. Leaf. 16: 196. 1954.
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Am.

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Am. *Endemic*.
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Bo.
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Am. *Endemic*.
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Am. *Endemic*.
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Am. *Endemic*.
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Am. *Endemic*.
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Ar, DiF. *Endemic*.
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Am, Ap, Bo. *Endemic*.
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Ba, Mé, Po, Tá, Tr.
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Bo. *Endemic*.
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Am. *Endemic*.
- Pitcairnia fendleri** Mez in C. DC., Monogr. Phan. 9: 387. 1896.
DiF. *Endemic*.
- Pitcairnia filispina** L.B. Sm., Mem. New York Bot. Gard. 9: 289. 1957.—*Pepinia filispina* (L.B. Sm.) G.S. Varad. & Gilmartin, Syst. Bot. 13: 298. 1988.
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Tá. *Endemic*.
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Am, An, Ar, Bo, Ca, DiF, Gu, La, Mé, Mi, Po, Su, Tá, Tr, Ya, Zu.
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Am. *Endemic*.
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Am. *Endemic*.
- Pitcairnia maguirei** L.B. Sm., Mem. New York Bot. Gard. 10(2): 17. 1960.—*Pepinia maguirei* (L.B. Sm.) G.S. Varad. & Gilmartin, Syst. Bot. 13: 298. 1988.
Am. *Endemic*.
- Pitcairnia maidifolia** (E. Morren) Decne. ex Planch. & Linden, Fl. Serres 9: 151. 1854.
Am, Ar, Ba, Bo, DiF, La, Mé, Po, Tá, Tr, Ya.
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Mé, Tá, Zu. *Endemic*.
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DiF, Mi, Mo, Su, Tr. *Endemic*.
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Ar, Ca, Co, DiF. *Endemic*.
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Am. *Endemic*.
- Pitcairnia nubigena** Planch. & Linden, Fl. Serres 8: 265. 1853.
Mé, Tr. *Endemic*.
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Bo, Ca, Co, DiF, Fa. *Endemic*.
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Am. *Endemic*.
- Pitcairnia pruinosa** H.B.K., Nov. Gen. Sp. 1: 295. 1816.—*Pepinia pruinosa* (H.B.K.) G.S. Varad. & Gilmartin, Syst. Bot. 13: 299. 1988.
Am, Ap, Bo.
- Pitcairnia rubiginosa** (Brongn. ex E. Morren) Baker, Handb. Bromel. 116. 1889.
Am.
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Ca, Po, Tá.
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Fa. *Endemic*.
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Mé. *Endemic*.
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Mé. *Endemic*.
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La, Po. *Endemic*.

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Tá. *Endemic*.

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Ar, Ba, Bo, Ca, Co, La, Mé, Po, Tá, Tr, Ya.
- Puya grafii** Rauh, Trop. Subtrop. Pflanzenwelt 52: 5. 1985.
Am. *Endemic*.
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Zu. *Endemic*.
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Tá.
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Tr. *Endemic*.
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Am. *Endemic*.
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Am. *Endemic*.
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Ar, DiF, Fa, Tá, Zu.
- Tillandsia adpressiflora** Mez in C. DC., Monogr. Phan. 9: 661. 1896.
Am, Bo.
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La, Fa, Tr, Ya.
- Tillandsia anceps** Loddiges, *Bot. Cab.* 8: t. 771. 1823.
Am, An, Ar, Bo, DeA, DiF, Fa, Mi, Su, Tá, Ya, Zu.
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Bo.
- Tillandsia balbisiana** Schult.f. in Schult. & Schult.f., *Syst. Veg.* 7: 1212. 1830.
An, Ap, Ar, Bo, Co, DeA, DiF, Fa, La, Mé, Mi, Mo, Su, Tá, Tr, Ya, Zu.
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Ar, DiF, Mé, Su, Tá, Tr, Zu.
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Ar, Bo.
- Tillandsia bulbosa** Hook., *Exot. Fl.* 3: 173. 1825.
Am, An, Ba, Bo, Ca, DeA, DiF, Fa, Mi, Mo, NuE, Po, Su, Tá, Zu.
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Am, Tá.
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Am, Ar, Bo, DiF, Fa, La, Mé, Su, Tá.
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Am, Ar, Bo, DiF, Fa, La, Mé, Mi, Mo, Po, Tá, Tr, Ya, Zu.
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Am, Zu.
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DiF, Mé, Tá.
- Tillandsia elongata** H.B.K., *Nov. Gen. Sp.* 1: 293. 1816.
Am, Ap, Ar, Ba, Bo, Ca, DeA, DeF, DiF, Fa, Mi, NuE, Po, Su, Tá, Zu.
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Ap, Ar, Ba, Bo, Ca, DeA, DiF, Fa, La, Mé, Mi, Mo, NuE, Po, Su, Tá, Zu.
- Tillandsia fendleri** Griseb., *Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ.* 1864: 17. 1865.
Am, An, Ar, Bo, Ca, Co, DiF, Fa, La, Mé, Mi, Mo, Po, Su, Tá, Tr, Ya, Zu.
- Tillandsia flexuosa** Sw., *Prodr.* 56. 1788.
Am, An, Ap, Ar, Bo, Ca, Co, DeA, DeF, DiF, Fa, La, Mé, Mi, NuE, Po, Su, Tá, Zu.
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Tillandsia andreana auct. non E. Morren ex André: L.B. Sm., *Fl. Venez.* 12(1): 213. 1971.
Ca, Mé.
- Tillandsia gardneri** Lindl., *Bot. Reg.* 28: t. 63. 1842.
Ar, Bo, DeA, DiF, Fa, La, Mi, Mo, Su, Tá, Ya.

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Mo.
- Tillandsia incarnata** H.B.K., Nov. Gen. Sp. 1: 291. 1816.
Mé.
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An, Bo, DiF, Mi, Su, Ya.
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An, Ap, Ar, Ba, Bo, Co, DiF, La, Fa, Mé, Mi, Mo, Po, Su, Tá, Ya, Zu.
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Bo, DiF, Fa, Mi, NuE, Su, Ya.
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An, DiF, Fa, Ya.
- Tillandsia longifolia** Baker, Handb. Bromel. 185. 1889.
Ar, DiF, Mé.
- Tillandsia monadelpha** (E. Morren) Baker, J. Bot. 25: 281. 1887.
Bo, DeA, DiF, Mi, Su, Tá, Ya, Zu.
- Tillandsia myriantha** Baker, J. Bot. 25: 242. 1887.
An, DiF, La, Mé, NuE, Su, Ya.
- Tillandsia paraensis** Mez in Mart., Fl. Bras. 3(3): 586. 1894.
Am, Bo.
- Tillandsia paucifolia** Baker, Gard. Chron. n.s. 10: 748. 1878.
Tillandsia circinnata auct. non Schlecht.: L.B. Sm., Fl. Venezuela 12(1): 207. 1971.
DiF, Fa, NuE, Su.
- Tillandsia polystachia** (L.) L., Sp. Pl. ed. 2. 410. 1762.
Bo, DeA, Mi, Mo, Su.
- Tillandsia pruinosa** Sw., Fl. Ind. Occid. 1: 594. 1797.
Am, Bo, Mé, Mi, Ya, Zu.
- Tillandsia pyramidata** André, Bromel. Andr. 86. 1889; emend. Rauh, Akad. Wiss. Abh. Math.-Naturwiss. Kl. 1973(3): 15. 1973.
Bo.
- Tillandsia recurvata** (L.) L., Sp. Pl. ed. 2. 410. 1762.
Am, An, Ap, Ar, Bo, Ca, DeF, DiF, Fa, La, Mé, Mi, Mo, NuE, Po, Su, Tá, Ya, Zu.
- Tillandsia rhomboidea** André, Enum. Bromél. 6. 13 Dec. 1888.
Fa, Tá.
- Tillandsia schiedeana** Steud., Nomencl. Bot. ed. 2. 2: 688. 1841.
Ar, Ba, Fa, Gu, Mé, Mi, Po.
- Tillandsia schultzei** Harms, Notizbl. Bot. Gart. Berlin-Dahlem 10: 216. 1928.
Mé, Tá.
- Tillandsia seemannii** (Baker) Mez in C. DC., Monogr. Phan. 9: 737. 1896.
Mé.
- Tillandsia spiculosa** Griseb., Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ. 1864: 17. 1865.—*Racinaea spiculosa* (Griseb.) M.A. Spencer & L.B. Sm., Phytologia 74: 157. 1993. [Including varieties *micrantha* (Baker) L.B. Sm. and *stenoglossa* (L.B. Sm.) Gouda.]
Am, Ar, Bo, Ca, DiF, Fa, La, Mé, Mi, NuE, Su, Tá, Tr, Ya.
- Tillandsia steyermarkii** L.B. Sm., Phytologia 28: 38. 1974.—*Racinaea steyermarkii* (L.B. Sm.) M.A. Spencer & L.B. Sm., Phytologia 74: 158. 1993.
Ar, Ya. *Endemic*.
- Tillandsia stipitata** L.B. Sm., Phytologia 5: 40. 1954.
Mé, Tá.
- Tillandsia stricta** Sol. ex Ker Gawl. in Sims, Bot. Mag. 37: t. 1529. 1813.
Bo, DeA, Fa, Su.
- Tillandsia subulifera** Mez, Repert. Spec. Nov. Regni Veg. 16: 74. 1919.
Su, Mi, Tá.
- Tillandsia suescana** L.B. Sm., Contr. U.S. Natl. Herb. 29: 441. 1951.
Tá.
- Tillandsia tenuifolia** L., Sp. Pl. 286. 1753.
An, Ar, Bo, DiF, Fa, La, Mi, Mo, NuE, Su, Ya.
- Tillandsia tenuispica** André, Enum. Bromél. 7. 13 Dec. 1888; Rev. Hort. 60: 567. 16 Dec. 1888.—*Racinaea tenuispica* (André) M.A. Spencer & L.B. Sm., Phytologia 74: 158. 1993.
Mé, Tá, Zu.
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Am, Ar, Bo, DiF, La, Mé, Mi, Po, Su, Tá, Tr, Ya.
- Tillandsia towarensis** Mez in C. DC., Monogr. Phan. 9: 769. 1896.
Ar, DiF, La, Mé, Mo, Su, Tá.
- Tillandsia turneri** Baker, J. Bot. 26: 144. 1888.
Am, Bo, Tá.
- Tillandsia usneoides** (L.) L., Sp. Pl. ed. 2. 411. 1762.
An, Ap, Ar, Bo, Ca, DeA, DeF, DiF, Fa, La, Mé, Mi, Mo, Po, Su, Ya, Tá, Zu.
- Tillandsia utriculata** L., Sp. Pl. 286. 1753.
DiF, Fa, Mi, Mo.

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Tillandsia valenzuelana A. Rich. in Sagra, *Hist. Fis. Cuba, Bot.* 11: 267. 1850.
An, DiF, Mi, Po, Tá, Zu.
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DeA, Po.
- Vriesea bi-beatricis** Morillo, *Ernstia* 39: 2. 1986.
Am. *Endemic*.
- Vriesea bituminosa** Wawra, *Oesterr. Bot. Z.* 12: 347. 1862.
Ar.
- Vriesea cowellii** (Mez & Britton) L.B. Sm., *Phytologia* 16: 80. 1968.
Ar, Fa, La.
- Vriesea didistichoides** (Mez) L.B. Sm., *Phytologia* 5: 281. 1955.
Ar, DiF, Fa, La, Mi, NuE, Tá, Ya.
- Vriesea duidae** (L.B. Sm.) Gouda, *Fl. Guianas, Ser. A(3), Fam.* 189: 72. 1987.—*Tillandsia duidae* L.B. Sm., *Bull. Torrey Bot. Club* 58: 340. 1931.
Am, Bo.
- Vriesea elata** (Baker) L.B. Sm., *Phytologia* 5: 288. 1955.
Tá, Ya.
- Vriesea fragrans** (André) L.B. Sm., *Contr. U.S. Natl. Herb.* 29: 443. 1951.
Tá.
- Vriesea fribrosa** L.B. Sm., *Mem. New York Bot. Gard.* 9: 315. 1957.
Am. *Endemic*.
- Vriesea gladioliflora** (Wendl.) Ant., *Wiener Ill. Gart.-Zeitung* 5: 98. 1880.
Tá.
- Vriesea glutinosa** Lindl., *Gard. Chron.* 388. 1856.
Bo.
- Vriesea heliconioides** (H.B.K.) Hook. ex Walpers, *Ann. Bot. Syst.* 3: 623. 1852.
Am, Ap, Ba, Ca, Fa, Mi, Po, Su, Tá, Zu.
- Vriesea heterandra** (André) L.B. Sm., *Contr. U.S. Natl. Herb.* 29: 443. 1951.
Ar, Tá.
- Vriesea hygrometrica** (André) L.B. Sm. & Pittendr., *J. Wash. Acad. Sci.* 43: 402. 1953.
Bo.
- Vriesea incurva** (Griseb.) Read, *Phytologia* 16: 458. 1968. [J.R. Grant, 1993, had suggested that this species is properly a *Tillandsia*, in which case the name and citation would be: *Tillandsia incurva* Griseb., *Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ.* 1864: 15. 1865.]
Am, Ar, Bo, DiF, Fa, La, Po, Tá, Zu.
- Vriesea johnstonii** (Mez) L.B. Sm. & Pittendr., *J. Wash. Acad. Sci.* 43: 402. 1953.
Bo, NuE, Su.
- Vriesea laxa** Mez in C. DC., *Monogr. Phan.* 9: 578. 1896; emend. L.B. Sm., *Phytologia* 7: 4. 1959.
Ar, Fa, Ya. *Endemic*.
- Vriesea maguirei** L.B. Sm., *Mem. New York Bot. Gard.* 18(2): 32. 1969.
Am.
- Vriesea melgueiroi** I. Ramírez & Carnevali, *J. Brom. Soc.* 43: 55. 1993.
Am.
- Vriesea platynema** Gaudich., *Atl. Voy. Bonite t.* 66. 1843.
Am, An, Ar, Bo, DeA, DiF, Fa, La, NuE, Su, Ya.
- Vriesea procera** (Mart. ex Schult.f.) Wittm., *Bot. Jahrb. Syst.* 13, Heft 3/4, *Beibl.* 29: 21. 1891.
DeA, Mi.
- Vriesea robusta** (Griseb.) L.B. Sm., *Phytologia* 7: 4. 1959.
Ar, DiF, Tá.
- Vriesea rubra** (Ruiz & Pavón) Beer, *Fam. Bromel.* 98. 1856 [1857]. [J.R. Grant, 1993, has suggested that this species is properly a *Tillandsia*, in which case the name and citation would be: *Tillandsia robusta* Griseb., *Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ.* 1864: 15. 1865.]
Bo, DeA, La, Tá, Zu.
- Vriesea sanguinolenta** Cogn. & March., *Pl. Ornam. pl.* 52. 1874.
Bo, Tá.
- Vriesea scalaris** E. Morren, *Belgique Hort.* 29: 301. 1879.
An.
- Vriesea simplex** (Vell.) Beer, *Fam. Bromel.* 97. 1856 [1857].
Ar, Bo, Mi, NuE, Su, Ya.
- Vriesea socialis** L.B. Sm., *Bot. Mus. Leafl.* 12: 121. 1946.
Am.
- Vriesea splendens** (Brongn.) Lem., *Fl. Serres* 6: 162. 1850.
An, Ar, Bo, Ca, Fa, Gu, Mi, Mo, NuE, Su, Ya.
- Vriesea sulcata** L.B. Sm., *Mem. New York Bot. Gard.* 9: 315. 1957.
Am. *Endemic*.
- Vriesea tequendamae** (André) L.B. Sm., *Contr. U.S. Natl. Herb.* 29: 444. 1951.
Mé, Tá.
- Vriesea viridiflora** (Regel) Wittm. ex Mez in Engl., *Pflanzenr.* IV. 32. 387. 1935.
Bo.
- Vriesea wurdackii** L.B. Sm., *Phytologia* 16: 83. 1968.
Am. *Endemic*.

SELECTED SYNONYMS USED
IN THE CHECKLIST

- Aechmea magdalenae* auct. = *Aechmea rubiginosa*
Billbergia venezuelana = *Billbergia rosea*
Brocchinia bernardii = *Brocchinia melanacra*
Brocchinia cryptantha = *Brocchinia hechtoides*
Brocchinia oliva-estevae = *Brocchinia tatei*
Brocchinia secunda = *Brocchinia tatei*
Chevaliera = *Aechmea*
Cottendorfia—all Venezuelan species are now placed in *Lindmania*
Guzmania geniculata = *Guzmania sphaeroidea*
Guzmania pleiosticha = *Mezobromelia pleiosticha*
Guzmania pleiosticha auct. = *Guzmania altsonii*
Guzmania plumieri auct. = *Guzmania steyermarkii*
Guzmania venamensis = *Guzmania sphaeroidea*
Lamprococcus = *Aechmea*
Lindmania terramarae = *Lindmania marahuacae*
Navia gracilis = *Navia reflexa*
Navia grafii = *Navia phelpsiae*
Navia igneosicola = *Navia arida*
Navia iosothrix = *Navia nubicola*
Navia pedemontana = *Navia nubicola*
Navia platyphylla = *Navia ramosa*
Navia plowmanii = *Navia diffusa*
Pepinia = *Pitcairnia*
Pitcairnia breweri = *Pitcairnia armata*
Pitcairnia wurdackii = *Pitcairnia bulbosa*
Platyaechmea = *Aechmea*
Puya phelpsiae = *Pitcairnia phelpsiae*
Racinaea = *Tillandsia*
Tillandsia abysmophila = *Tillandsia confinis*
Tillandsia andreana auct. = *Tillandsia funkiana*
Tillandsia caribea = *Tillandsia tetrantha* var. *caribea*
Tillandsia circinnata auct. = *Tillandsia paucifolia*
Tillandsia duidae = *Vriesea duidae*
Tillandsia stenoglossa = *Tillandsia spiculosa* var. *stenoglossa*
Tillandsia valenzuelana = *Tillandsia variabilis*

Vriesea capituligera = *Mezobromelia capituligera*

Vriesea splitgerberi = *Mezobromelia pleiosticha*

SPECIES OCCURRING NEAR THE
BORDER WITH VENEZUELA

- Lindmania dendritica* (L.B. Sm.) L.B. Sm., Ann. Missouri Bot. Gard. 73: 695. 1986.—*Cottendorfia dendritica* L.B. Sm., Mem. New York Bot. Gard. 18(2): 31. 1969.
 Brazil, Amazonas: Serra da Neblina.
Lindmania maguirei (L.B. Sm.) L.B. Sm., Ann. Missouri Bot. Gard. 73: 695. 1986.—*Cottendorfia maguirei* L.B. Sm., Mem. New York Bot. Gard. 18(2): 31. 1969.
 Brazil, Amazonas: Serra da Neblina.
Navia barbellata L.B. Sm., Mem. New York Bot. Gard. 10(5): 38. 1964.
 Guyana: Karowtipu.
Pitcairnia sprucei Baker, J. Bot. 19: 303. 1881.
 Colombia, Guainía: Río Guainía.
Vriesea mitoura L.B. Sm., Mem. New York Bot. Gard. 18(2): 32. 1969.
 Brazil, Amazonas: Serra Pirapucú.

EXCLUDED SPECIES

- Navia lopezii* L.B. Sm., Bot. Mus. Leaf. 15: 40. 1951. = *Aratitiopea lopezii* (L.B. Sm.) Steyer. & P.E. Berry, Ann. Missouri Bot. Gard. 71: 297. 1984, a member of the Xyridaceae.
Tillandsia cuatrecasasii L.B. Sm., Phytologia 5: 36. 1954. This species, whose type is from Valle state in Colombia, has been reported from Venezuela on the basis of a single collection from the Chimantá massif in Bolívar state (*Steyermark & Wurdack 927*, NY), but a preliminary study of the specimen suggests that it might be better placed in *Tillandsia confinis* or *T. compacta*.
Vriesea macrostachya (Bello) Mez in C. DC., Monogr. Phan. 9: 601. 1896. This species was reported from Venezuela by Mez on the basis of a collection by Fendler (2450), but since has not been verified.