KEY TO THE GENERA OF BROMELIACEAE at 9/2019 by Derek Butcher

This follows roughly the information given in the Monograph by Smith and Downs (Flora Neotropica no. 14, 1974 - 77) which covered 46 genera. This was expanded in Lyman Smith's paper in Beitr. Biol. Pflanzen 63 (1988) 403 - 411 to cover 51 genera where he added new genera *Steyerbromelia, Brewcaria, Pseudaechmea*, and *Lymania*. *Lindmania* was revived from synonymy of *Cottendorfia*. In the same issue but on pages 101 - 113 Elvira Gross reported findings on the germination processes of the three subfamilies and one facet is shown in the key below. The key was further updated in 1998 by L B Smith and W Till to cover 56 genera in The Families and Genera of Vascular plants, Kubitzki pages 83 - 86 (1998) where *Alcantarea, Werauhia, Ursulaea, Pepinia*, and *Racinaea* were added. *Abromeitiella* had been placed in synonymy under *Deuterocohnia* Note that *Streptocalyx* was retained purely because the genus *Aechmea* is currently in a state of flux. From a horticultural point of view the retention of this genus tends to make sense because of the similar growing conditions needed to get good specimens. However, *Chevaliera* was resurrected to genus status because of its clearly delineated boundaries and is said to be more of a natural group. Since this publication the genera have increased to 58 where Derek Butcher has now added *Canistropsis,* and *Edmundoa,* and made adjustments to *Canistrum*, *Nidularium,* and *Wittrockia* because of Elton Leme's recent work Canistrum - Bromeliads of the Atlantic Forest (1997) and Canistropsis - Bromeliads of the Atlantic Forest (1998). The merging of *Pepinia* into *Pitcairnia* at generic level in Harvard Papers in Botany Vol. 4 no.1 195 - 202 (1999) by Robinson and Taylor has reduced the genera to 57. The creation of a new genus *Viridantha* for the 'Little Green Mexican' Tillandsias by Espejo in Acta Bot Mex 60: 2002 was not accepted by botanists outside Mexico. The transfer of *Pseudananas* to a synonym of *Ananas* see Coppens d'Eeckenbrugge, G & F Leal, The Pineapple: Botany, Production and uses. CAB Int. 2: 13-32. 2003 reduces the genera to 56. The resurrection of *Andrea* Brown & Leme in Taxon 54 (1): 63-70. 2005 (now *Eduandrea* see Leme et al in J. Brom. Soc 58(2): 61-4. 2008) increases genera to 57. Givnish et al in Aliso 23: 3-26. 2007 gave major changes within Pitcairnioideae which is now Hechtioideae, Puyoideae, Pitcairnioideae, Lindmanioideae, Brocchinioideae, and Navioideae. Genus change is where *Ayensua* is now *Brocchinia* and new genus *Sequencia*. Number remains at 57. In Flora of Sao Paulo by Wanderley et al in 2007 we see some genera of plants from this state of Brazil treated differently. For example, *Canistropsis* treated as *Nidularium,* and *Edmundoa* and *Wittrockia* as *Canistrum.* These moves do not seem to have been accepted other than by botanists in Sao Paulo. No action taken. In 2010 *Lapanthus* added, number now 58.
Barfuss et al 2016 reviewed sub family Tillandsioideae and added 11 new genera, *Barfussia, Goudaea, Gregbrownia, Jagrantia, Josemania, Lemeltonia, Lutheria, Pseudalcantarea, Stigmatodon, Wallisia,* and *Zizkaea,* so the number increases to 69.
J. Aguirre-Santoro in *Ronnbergia* Alliance in Plant Syst Evol 2017 added *Wittmackia* so the number is now 70.
Leme, Barfuss & Halbritter, gen. nov. Phytotaxa 299(1):001-035. 2017 added *Waltillia.* The numberis now 71
Cryptanthoid changes in Leme et al in Phytotaxa 318(1): 001-088. 2017 add 3 new genera – *Forzzaea, Hoplocryptanthus, Rokautskyia.* We now reach 74
Karawata was created by J. Marciel et al. in Systematic Botany 44(3): 519–535. 2019 which means the number is now 75. They were treated under *Chevaliera* step 56b

The splitting of *Portea* from the rest is based on pedicellate flowers but there is an exception in the taxon which has all the attributes of a *Portea* but was described as *Aechmea rubrolilacina.* Leme has also transferred *Portea leptantha* to *Aechmea leptantha* indicating

this genus needs review.

KEY

1. Fruits indehiscent, baccate ..... **Bromelioideae 9-56**
1a Fruits dehiscent, capsular **2**

2. Seeds plumose-appendaged ..... **Tillandsioideae ~~57-64~~ These entries deleted and new key as per Barfuss 2016 placed at end**
2a Seeds winged or naked **3**

3. Flowers dioecious, plants of Central America ... **Hechtioideae 65**
3a Flowers perfect, or rarely monoecious or polygamodioecious, or dioecious and plants of the Brazilian Shield **4**

4. Petal blades showy, tightly spiralled after anthesis, broad and distinct from claws ..... **Puyoideae 66**
4aPetal blades remaining free after anthesis, or if slightly coiled, then not clawed **5**

5. Petals large and conspicuous or, if minute, then sepals imbricate and anthers basifixed, linear ..... **Pitcairnioideae 67-69**
5a Petals minute and sepals cochlear, or petals and bracts various and sepals convolute **6**

6. Sepals convolute ..... **Lindmanioideae 70**
6a Sepals cochlear and petals minute **7**

7. Leaves entire, stellate chlorenchyma abundant **Brocchinioideae 71**
7a Leaves toothed, stellate chlorenchyma absent .... **Navioideae 72-75**

9. Sepals symmetric or nearly so **10**
9a. Sepals asymmetric **34**

10.. Filaments forming a tube to which the fleshy petals are joined along their centres but with their margins free; sepals mostly free or nearly so; leaves very laxly and coarsely spinose -serrate **11**
10a.Filaments not connate but sometimes adnate **13**

11.Sepals with soft, usually broad apices; inflorescences compound. Mexico and the West Indies to Argentina and Uruguay ***Bromelia***
11a Sepals spinose-mucronate **12**

12. Inflorescence simple, with almost no scape. Argentina ***Deinacanthon***
12a.Inflorescence branched with terminal cone-like branches, with a scape. S Mexico, Guatemala. ***Hohenbergiopsis***

13 Terminal axes of the inflorescence visible **14**
13a.Terminal axes of the inflorescence covered by leaves or bracts **20**

14. Petals naked; sepals 0.5-7 mm long **15**

14a. Petals appendaged; sepals mostly much larger **18**

15. Inflorescence compound; sepals broadly ovate or oblong, 0.5-2mm long. Costa Rica and Trinidad to Amazonian Brazil ***Araeococcus***
15a.Inflorescence simple; sepals narrowly elliptic, 7mm long; flowers subsessile or pedicellate. Mount Itatiaia area in E Brazil ***Fernseea***

16. Petals zygomorphic or tightly recoiled and flowers sessile. W Mexico and Central America to Argentina and Uruguay **17**
16a. Petals not zygomorphic **18**

17.Epigynous tube usually well developed ***Billbergia***
17a. Epigynous tube shallow. W Mexico ***Ursulaea***

18.Petals erect. E Brazil **19**
18a. Petals recoiled at the top ***Ursulaea***

19. Flowers sessile ***Quesnelia***
19a.Flowers pedicellate ***Neoglaziovia***

20. Inflorescence simple, cone-like; flowers solitary in the axil of each bract **21**
20a. Inflorescence compound **28**

21. Scape short or none; cone-like branches nidular or axillary **22**
21a. Scape well developed, obvious **26**

22. Floral bracts leaf-like, petals with reflexed lobes. NE Brazil ***Orthophytum***
See Cryptanthoid key at end
22a. Floral bracts leaf-like, petals with straight lobes. NE Brazil ***Lapanthus***
See Cryptanthoid key at end
22b. Floral bracts bract-like **23**

23. Scape distinct, its bracts shorter than the floral bracts; petals naked. Mexico and Venezuela to Chile ***Greigia***
23a. Scape none or very short **24**

24. Epigynous tube shallow, bowl-shaped*(A. pitcairnioides)* Brazil: Bahia ***Acanthostachys***
24a. Epigynous tube cylindric, deep. Chile **25**

25. Sepals obtuse, stamens included, petals blue ***Fascicularia***
25a.Sepals acute with pungent apex, stamens exserted, petals rose ***Ochagavia***

26. Scape erect, without bracts *(A.strobilacea).* S Brazil, Paraguay, Argentina***Acanthostachys***
26a.Scape covered with bracts **27**

27. Scape bracts leaf-like, scape erect. NE Brazil ***Orthophytum***
See Cryptanthoid key at end
27a Scape bracts leaf-like, no scape. NE Brazil ***Lapanthus***
See Cryptanthoid key at end
27b.Scape bracts bract-like; scape prostrate. French Guiana and adjacent Brazil ***Disteganthus***

28. Inflorescence obviously compound with several strobils on an elongate floral axis **29**
28a.Inflorescence pseudosimple with hands or flat fascicles in the axils of large bracts **30**

29.Floral bracts leaf-like, serrulate; cone-like branches sessile or subsessile. NE Brazil
Orthophytum **See Cryptanthoid key at end**
29a.Floral bracts bract-like, entire; cone-like branches on distinct scapes. Mexico and Venezuela to Chile ***Greigia***

30.Outer bracts of the inflorescence leaf-like; sepals high connate; petals naked. NE Brazil
Cryptanthus **See Cryptanthoid key at end**
30a. Outer bracts of the inflorescence leaf-like; sepals free or connate; petals appendaged
Lapanthus **See Cryptanthoid key at end**
30b.Outer bracts of the inflorescence bract-like, large, and covering most of the flowers. E Brazil **31**

31. Petals erect and apex distinctly obtuse cucullate, connate or agglutinated in a tube the height of the sepals ***Nidularium***
31a. Petals sub-erect to spreading at anthesis, free or nearly so **32**

32. Inflorescence wool persistent after anthesis ***Edmundoa***
32a.Inflorescence wool not persistent **33**

33. Stolons slender, flowers 20 35 mm long ***Canistropsis***
33. Stolons stout or none, flowers 45 - 80 mm long ***Wittrockia***
33.Rhizomes underground, flowers 24-27mm long, leaves entire ***Eduandrea***

34.Ovaries coalescing to form a compound fruit; inflorescence simple, strobilate ***Ananas***
34a.Ovaries always remaining distinct **35**

35. Flowers pedicellate **36**
35a.Flowers sessile or subsessile **41**

36. Inflorescence nidular, simple in most species; petals naked. Amazonia, E Brazil ***Neoregelia***
36a. Inflorescence scapose **37**

37.Sepals more or less connate, long-mucronate; petals appendaged. E Brazil ***Portea***
37a.Sepals free or unarmed **38**

38. Inflorescence simple; sepals without sharp tip **39**
38a. Inflorescence compound **40**

39. Petals naked. Colombia ***Pseudaechmea***
39a.Petals appendaged. Colombia and Guyana to NE Brazil***Aechmea*** subg. 2. ***Lamprococcus***

40. Sepals 1.5-3 mm long; inflorescence glabrous; petals naked. Colombia to Suriname and Amazonian Brazil ***Araeococcus***
40a.Sepals 3.5-22 mm long; inflorescence lepidote; petals appendaged. Mexico to Peru ***Aechmea*** subg. 1. ***Podaechmea***

41. Petals appendaged with well-developed appendages **42**
41a.Petals naked or with lateral folds or rudimentary or reduced appendages **49**

42. Epigynous tube shallow or lacking; flowers in tubular cone-like branches; inflorescence mostly pinnate and lax, rarely digitate or simple and without petal appendages *(H. littoralis).* Antilles to Venezuela and Brazil. ***Hohenbergia***

42a.Epigynous tube well developed; inflorescence various **43**

43. Sepals without a sharp tip **45**

43a. Sepals with a sharp tip. **44**

44. Inflorescence not involucrate . N and S America ***Aechmea*** subg. 3. ***Aechmea,*** . ***Aechmea*** subg. 4. ***Ortgiesia,*** ***Aechmea*** subg. 6. ***Pothuava***

44a. Inflorescence involucrate with large upper scape bracts and primary bracts. S. America ***Canistrum***

45.Floral bracts attached basally, not decurrent nor forming pouches; flowers polystichous**46**

45a.Floral bracts decurrent and forming pouches around the flowers; flowers often distichous. N and S America ***Aechmea*** subg. 5. ***Platyaechmea***

46. Inflorescence compound **47**

46a. Inflorescence simple **48**

47.Leaves distichous; blades marked with spots or bands; floral bracts minute; ovules obtuse *(Q. marmorata).* Brazil: Espirito Santo to Sao Paulo ***Quesnelia***

47a.Leaves polystichous or the blades concolorous; floral bracts large to lacking; ovules long-caudate. Colombia, Venezuela, Amazonian Brazil***Aechmea*** subg.2. ***Lamprococcus***

48. Ovules obtuse (no further distinction possible without keying by species). E Brazil ***Quesnelia***

48a.Ovules apiculate to caudate. Central America to Brazil and Argentina ***Aechmea*** subg. 7. ***Macrochordion***

49.Ovary deeply sulcate; inflorescence simple or compound. NE Brazil ***Lymania***

49a.Ovary evenly rounded 1 **50**

50. Inflorescence lax; axes visible **51**

50a.Inflorescence dense **54**

51. Inflorescence simple. Costa Rica to Peru ***Ronnbergia***

51a Inflorescence simple or compound. Pacific side of South America and Caribbean Islands ***Wittmackia***

51b.Inflorescence pinnately compound **52**

52. Flowers very small; sepals not over 3mm long; ovules few; epigynous tube none. Costa Rica, Venezuela, Trinidad, Tobago, Guyana to Amazonian Brazil ***Araeococcus***

52a.Flowers small to large; sepals more than 3 mm long; epigynous tube distinct **53**

53. Branches elongate, many-flowered; flowers perfect; anthers unappendaged. E and Amazonian Brazil and adjacent areas (treated by some as *Aechmea*) ***Streptocalyx***

53a.Branches short, digitately few-flowered; flowers functionally unisexual on different plants; anthers appendaged. Central America: Guatemala to Costa Rica ***Androlepis***

54. Flowers 2 or more in the axil of each bract **55**
54a.Flower single in the axil of each bract **56**

55. Inflorescence involucrate; sepals only slightly asymmetric, not with sharp tip or mucronulate. E Brazil ***Nidularium***
55a.Inflorescence cone-like; sepals strongly asymmetric, mucronate. E and Amazonian Brazil and adjacent areas (*treated by some as Aechmea*) ***Streptocalyx***

56.Petals naked or with lateral folds; bracts papery or leathery; leaf blades often petiolate. Costa Rica to Peru. Ovaries red or pink at anthesis, turning dark purple to black in fruit; sepals becoming as fleshy as the carpels in fruit ***Ronnbergia***
56a Petals naked or with lateral folds; bracts papery or leathery; leaf blades sometimes narrowed at base, Pacific side of South America and Caribbean Islands. Ovaries green, cream, yellow, or light purple either at anthesis or in fruit sepals persistent but not as fleshy as the carpels in fruit ***Wittmackia***
56b.Petals bearing rudimentary or reduced appendages; bracts mostly thick and ligneous; leaf blades never petiolate; pollen sulcate. Mexico to Peru and Amazonian Brazil, E Brazil (See also ***Karawata***) (treated by some as *Aechmea*) ***Chevaliera***

For replacement 57-64 see Tillandsioideae at end

65.Plants dioecious with functionally unisexual flowers; petals rose or white; plants of Texas, Mexico, and northern Central America ***Hechtia***

66.Petal blades tightly spiraled after anthesis, broad, distinct from the bottom portion; leaf blades narrowly triangular, never contracted at base; ovary superior or slightly inferior; Andean plants of open slopes and summits from Costa Rica and Guayana to Chile and Argentina ***Puya***

67. Ovary wholly superior; petals regular **68**
67a.Ovary partially to wholly inferior, or, if superior then the petals zygomorphic. Petals large, naked or appendaged, sepals convolute ***Pitcairnia***

68. Petals naked **69**
68a.Petals each bearing a single basal appendage; xerophytic plants of the southern Andes from Peru to Chile, Argentina, and W. Brazil ***Deuterocohnia***

69. Seeds with a sickle-like appendage; petal blades narrow, indistinct from the base; plants of NE Brazil ***Encholirium***
69a. Seeds bicaudate-appendaged or clavate. Anthers basifixed, linear, coiled at anthesis, inner filaments adnate to the base of the petals; leaf blades thin, more or less contracted at base; mesophytic plants of Mexico to Argentina and W Brazil ***Fosterella***
69b Seeds broad alate,Bases of the filaments forming a tube and adnate to the petals; petals yellow to orange; plants of Brazil, Uruguay, Paraguay,. and Argentina ***Dyckia***

70. Flowers showy. Sepals free, convolute, apically rounded to obtuse, subcoriaceous; petals rose, red, or purple, free, unappendaged, blades broad, spreading after anthesis and not twisted together afterwards. Stamens included; anthers basifixed. Ovary wholly superior;

style elongate. Fruit a septicidal capsule. Seeds bicaudate. ***Connellia***

70a Flowers small. Sepals free, convolute, ovate to broadly ovate, rounded or broadly obtuse apically; petals free, unappendaged, exceeding the sepals, white, pink, yellow, or orange. Filaments mostly free; anthers versatile. Ovary superior, glabrous; style slender; placentae short, basal. Fruit an ovoid, septicidal capsule. Seeds slenderly fusiform, bicaudate. ***Lindmania***

71. Capsular fruits, seeds bicaudate appendaged; petals minute, regular, free; sepals cochlear, with the two adaxial overlapping the abaxial; ovary partly to wholly inferior; in florescence racemose, paniculate, or capitate; leaves entire, almost always with stellate chlorenchyma. ***Brocchinia***

72. Seeds bicaudate appendaged ***Sequencia***

72a Seeds not bicaudate appendaged **73**

73. Stigma lobes distorted; sepals spiral in form with the abaxial overlapping both the adaxial cells of leaf epidermis straight walled, plants of NE Brazil ***Cottendorfia***

73a Stigma lobes uniform **74**

74. Petals naked; inflorescence scapose, pinnate, and more or less open or sessile and capitate ***Navia***

74a Petals appendaged **75**

75. Seeds wedge shaped, inflorescence long-scapose, simple, densely cylindric. ***Brewcaria***

75a Seeds narrow elliptic to falcate elliptic, inflorescence compound, lax, stigmas broad, strongly contorted; ***Steyerbromelia***

Key to the genera of Tillandsioideae

Note:-For determination, flowering plants are indispensable; fruiting material is helpful in some cases. Stigma types and other floral characters are best studied in fresh material just before or at flower opening when anthers are not yet dehisced and stigmatic surfaces free from pollen; the use of a hand-lens with 10x magnification is recommended. Characters after the '_' dash are additional characters to verify the correct determination and need not necessarily appear in the corresponding couplet.

l.Ovary about l/2-1/3 inferior; stigma of the convolute-umbrella type; fruit a partly septicidal capsule; seeds with appendages of the *Glomeropitcairnia* type, long appendaged on both ends. _ Flowers spirally arranged; petals bearing basal appendages ***Glomeropitcairnia***

1a.Ovary less than 1/2 inferior or superior; stigma not of the convolute-umbrella type, if resembling a convolute type, then of the convolute-blade I type or the convolute-blade II type or of the convolute-obconic type; fruit a septicidal capsule; seeds with appendages of the *Catopsis* type or the Core Tillandsioideae type, usually long appendaged only on one end but the appendage at the apical end sometimes well developed _ Flowers spirally or distichously arranged; petals bearing or without basal appendages..... ..... **2**

2. Ovary superior to about 1/8 inferior; seeds with appendages of the *Catopsis* type, with a plumose flight apparatus formed at the apical end by multicellular hairs folded at maturity, and a multicellular, undivided plume at the basal end. _ Flowers spirally arranged; sepals strongly asymmetric; petals without basal appendages.....,. .. ***Catopsis***
2a. Ovary more than 1/8 inferior, but not more than 1/2 inferior; seeds with appendages of the Core Tillandsioideae type, with a plumose flight apparatus formed at the basal end, appendage at the apical end lacking, short and usually undivided, or rarely long and occasionally somewhat divided, not folded at maturity. _ Flowers spirally or distichously arranged; sepals usually symmetric or subsymmetric, if occasionally asymmetric, then flowers distichously arranged; petals bearing or without basal appendages **3**

3. Petals conglutinated/connate into a tube for more than 1/4 of their entire length; filaments partially agglutinated/adnate to the conglutinated/connate portion of the petals. _ Flowers usually spirally, rarely distichously arranged; petals white, yellow, or green; seeds without a distinct appendage at the apical end .... **4**.
3a. Petals free or sometimes conglutinated/connate into a tube shorter than or equalling about 1/4 of their entire length; filaments free, conglutinated/connate, or short agglutinated/adnate to the petals. _ Flowers usually distichously, rarely spirally arranged; petals violet, pink, red, orange, yellow, green, white, and rarely bicolored; seeds usually with a distinct appendage at the apical end usually up to the length of the seed proper, occasionally 1onger.....,..... **6**.
4. Petals without basal appendages. Stigma of the convolute-blade I type or the simple-erect type, occasionally of the simple-patent type or simple-pinnatisect type .... ***Guzmania***
4a. Petals bearing basal appendages. _ Stigma of the simple-erect type or the conduplicate-spiral type ,..... **5.**

5. Inflorescence compound, once or rarely twice branched, with branches composed of dense flower fascicles, petals about 1/3-1/2 of their entire length conglutinate/connate into a tube, tips slightly divergent, bearing linear and entire basal appendages, highly adnate to the conglutinated/connate portion of the petals; stamens and style included within the corolla; anthers united into a tube surrounding the stigma, not versatile; stigma of the simple-erect type..... ***Mezobromelia***
5a. Inflorescence compound, twice or rarely triple branched, a laxly flowered panicle; petals more than 1/2 of their entire length conglutinate/connate into a tube, blades spreading, bearing crenulated basal appendages adnate for less than l/3 of the conglutinated/connate portion of the petals; stamens and style exserted from the corolla; anthers not forming a tube around the stigma, versatile; stigma of the conduplicate-spiral type (weakly spiral) ..... ***Gregbrownia***

6. Stigma of the conduplicate-patent type or conduplicate-erect type ; petals linear, forming a tubular corolla with strongly recurved and ± coiled, or spreading and ± spirally twisted blades. _ Stamens and style much exserted from the corolla; ovary 1/3-1/2 inferior..... **7**
6a. Stigma usually not of the conduplicate-patent type or the conduplicate-erect type, if rarely resembling the conduplicate-patent type, then corolla tubular; petals forming a urceolate, campanulate, salverform or tubular corolla, usually with spreading or recurved blades or tips only. _ Stamens and style included within or exserted from the corolla; ovary usually up to 1/3, very rarely up to 1/2 inferior ..... **8.**

7. Petals light green, spreading and ± spirally twisted (helicoiform); without basal appendages; ovules appendiculate, shorter than or equalling the ovule proper; seeds with an

appendage at the basal end distinctly longer than the seed proper, appendage at the apical end short, about half as long as to equalling the seed proper, undivided; stigma green
Pseudalcantarea

7a. Petals white, cream, pale to bright yellow, rarely pale wine: castaneous or dark wine, recurved or coiled, bearing well-developed basal appendages; ovules distinctly appendiculate, longer than the ovule proper; seeds with an appendage at the basal end rather short, about equalling the seed proper, appendage at the apical end distinctly larger than the seed proper, sometimes somewhat divided; stigma white ..... ***Alcantarea***

7b. differs from *Alcantarea* by petals 4 to 6 times longer than wide (vs. 10 to 15 times longer than wide), forming a narrow campanulate corolla (vs. corolla not campanulate), remaining persistent and becoming erect after anthesis (vs. ephemeral and flaccidescent after anthesis), unappendaged (vs. bearing well developed basal appendages); pollen sacs of the anthers with the line of dehiscence prevailingly frontal (vs. prevailingly lateral), leaving the connective area completely exposed and not covered by the margins of the pollen sacs at anthesis (vs. the opposed margins of the pollen sacs becoming strongly recurved and touching each other and completely covering the connective area at anthesis), pollen with sulcus margins more or less well defined but not sharply cut (vs. margins sharply cut), sulcus covered by a kind of operculum of almost smooth exine elements with some perforations (vs. sulcus without any or bearing only small and low ornamental elements), and stigma of the convolute-blade II type (vs. conduplicate-erect or conduplicate-patent types). ***Waltillia***

8. Stigma of the cupulate type ***Werauhia***
8a. Stigma not of the cupulate type, if occasionally resembling a cupulate type, then of the urceolate type or tubo-laciniate type **9**

9. Stigma of the urceolate type ***Zizkaea***
9a. Stigma not of the urceolate type **10**

10. Stigma of the tubo-laciniate type ..... ***Stigmatodon***
10a. Stigma not of the tubo-laciniate type **11**

11. Stigma of the convolute-blade II type . _ Leaves mesomorphic or rarely semi-xeromorphic, usually forming strongly to moderately impounding rosettes; petals usually bearing basal appendages .... ***Vriesea***
11a. Stigma not of the convolute-blade II type, if rarely resembling a convolute type, then of the convolute-obconic type or the convolute-blade I type, the latter with xeromorphic, densely lepidote leaves, not forming impounding rosettes, and petals without basal appendages **12**

12. Filaments conglutinate/connate at least at the base but sometimes for nearly the whole length, free from the petals; stigma of the coralliform type _ Leaves narrowly triangular; inflorescence simple, petals white or rarely yellowish with enlarged, spreading blades
Lemeltonia

12a. Filaments free from each other, but sometimes partially agglutinated/adnate to the petals; stigma usually not of the coralliform type, if rarely resembling the coralliform type, then filaments free from each other, leaves lingulate, and inflorescence usually compound **13**

13. Stigma of the conduplicate-pinnatisect type; leaves mostly conspicuously longitudinally reddish (-brown) striped near base ***Wallisia***
13a. Stigma not of the conduplieate-pinnatisect type; leaves not longitudinally reddish striped near the base..... **14.**

14. Stigma of the convolute-obconic type. _ Leaves mesomorphic, lingulate, forming an impounding rosette ***Barfussia***
14a. Stigma not of the convolute-obconic type, if rarely resembling a convolute type, then of the convolute-blade I type and leaves xeromorphic and narrowly triangular, not forming impounding rosettes **15**

15. Sepals usually distinctly asymmetric, free, and stigma of the simple-erect type or of the conduplicate-spiral type (weakly spiral); rarely sepals subsymmetric and stigma resembling the coralliform type ..... ***Racinaea***
15a. Sepals usually symmetric or subsymmetic, the adaxial ones often connate (and therefore appearing asymmetric); stigma not of the coralliform type, usually of the simple-erect type or conduplicate-spiral type, rarely of the simple-truncate type, the simple-patent type, the conduplicate-patent type or the convolute-blade I type .... **16.**

16. Floral bracts deciduous along a basal transversal line after anthesis when dry, 3 times the length of the sepals, laterally strongly compressed and sharply carinate ***Jagrantia***
16a. Floral bracts persistent when dry, maximally 2 times the length of the sepals, ± rounded in transversal section even if carinate **17**

17. Petals without basal appendages. _ stigma usually of the simple-erect type or the conduplicate-spiral type, rarely of the simple-truncate type, simple-patent type or convolute-blade I type..... ..... **18**.
17a. Petals bearing basal appendages. _ stigma of the simple-erect type , the simple-patent type or the conduplicate –spiral type **19**

18. Petals short connate at the base forming a common tube with the short adnate filament bases; leaf sheaths very dark, usually becoming silver-grey when dry. _ Petals yellow or rarely white; stamens and style included within the corolla; ovules obtuse, stigma of the simple-erect type ***Josemania***
18a. Petals free and filament bases not adnate to the petals; leaf sheaths usually not very dark and not becoming silver-grey when dry. _ Petals violet, pink, red, orange, yellow, green, white, and rarely bicolored; stamens and style included within or exserted from the corolla; ovules usually appendiculate. rarely obtuse or subobtuse; stigma usually of the conduplicate-spiral type or the simple-erect type, occasionally of the simple-patent type or simple-truncate type, rarely of the conduplicate-patent type or the convolute-blade I type.. ***Tillandsia*** p.p.

19. Leaves xeromorphic to occasionally semi-xeromorphic, usually densely lepidote; leaf blades narrowly triangular. _ Petals usually violet, rarely green or yellowish, often bicolored with contrasting margins, sometimes with crenulated margins; ovules appendiculate, shorter than or equalling the ovule proper..... ***Tillandsia*** p.p. (T subg. ***Pseudovriesea*** p.p.)
19a. Leaves mesomorphic, not densely lepidote; leaf blades lingulate. _ Petals white, greenish-white, oryellow, rarely red or deep pink, margins always entire; ovules obtuse or rarely appendiculate **20**

20. Corolla unilaterally bent. slightly zygomorphic; petals free; stamens and style exserted from the corolla, stigma of the conduplicate-spiral type or simple-patent type **21**
20a. Corolla actinomorphic; petals short connate at the base for <1/4 of their entire length or about 1/4 of their entire length conglutinated/connate into a tube; stamens and style included within the corolla; stigma of the simple-erect type **22**

21. Stigma of the conduplicate-spiral type; petals red, deep pink, or yellow, tips straight or slightly divergent ***Lutheria***
21a. Stigma of the simple-patent type; petals white or greenish-white, the adaxial one ± straight, the two abaxial ones recurved ***Tillandsia*** p.p. ('***Vriesea***' sect. ***Cylindrostachys***)

22. Petals short connate at the base for < 1/4 of their entire length, tips cucullate, forming a hardly opened corolla, petal appendages spathulate; anthers free; floral bracts ecarinate. ***Goudaea***
22a. Petals about l/4 of their entire length conglutinated/connate into a tube, tips straight or recurved, petal appendages linear; anthers united into a tube surrounding the stigma, not versatile; floral bracts carinate ***Cipuropsis*** and mesomorphic northern Andean 'Vriesea'

Key to Cryptanthoid genera and subgenera

1 Plants andromonoecious with perfect flowers in the basal fascicles and the staminate ones concentrated in the central/apical portion of the inflorescence; pollen sulcus completely covered by a net of exine elements; stigma conduplicate-patent, without papillae or inconspicuously and sparsely papillate; fruits 12-20 mm long, with the distal portion of the persistent sepals soon decaying and their proximal remnants 2-4 times shorter than the fruit; seeds 3.5-5 mm long . ***Cryptanthus***
1 * Plants homogamous; pollen sulcus only covered by small and sparse exine elements never forming a net; stigma other than conduplicate-patent or if conduplicate-patent then densely papillate; fruits 4-10 mm long, with persistent sepals, these slightly shorter to 3.5 times longer than the fruit; seeds 1.2-3 mm long
2

2 Petals without appendages, but at most with well developed longitudinal callosities.. **3**
2* Petals with well developed appendages **7**

3 Petals connate at the base, usually white; or rarely free but then the petals greenish-yellow in their visible parts **4**
3* Petals free,white or lilac-rose **6**

4 Basal flower fascicles with (5-) 6-15 flowers; pollen 50-55 µm; stigma simple-imbricate; plants from the Atlantic Forest of Espirito Santo ***Rokautskyia***
4* Basal flower fascicles with 2-5 (-6) flowers or the inflorescence simple; pollen 40-50 µm; stigma not simple-imbricate; plants from Campos Rupestres of Minas Gerais **5**

5 Leaves coriaceous, not succulent; petals connate at the base to 1/3 of that length, or rarely free but then the petals greenish-yellow in the visible parts; anthers always straight at anthesis; pollen ca. 50 µm; stigma cylindric-distent; persistent sepals slightly shorter to equaling the fruit length or rarely 1.4 times as long; seeds 35-75 per fruit . ***Hoplocryptanthus***
5* Leaves thick-coriaceous, succulent; petals connate at the base to l/7 of their length; anthers usually strongly recurved to spirally coiled at anthesis; pollen ca 40 µm; stigma simple-erect or simple-patent with tendency to simple-dilated; persistent sepals up to 1.5 times as long as the fruit; seeds 2-8 per fruit.. ***Forrzaea***

6 Plants stemless; leaves thick-coriaceous, succulent; inflorescence with inconspicuous, to 6-flowered fascicles; stamens subequal in length; anthers usually strongly recurved to spirally coiled at anthesis; pollen ca. 40 µm ***Forrzaea***

6* Plants distinctly caulescen; leaves coriaceous, not succulent; inflorecence with conspicuous, up to 9-flowered fascicles, stamens distinctly unequal with the antepetalous ones much shorter than the antesepalous ones; anthers straight; pollen 40-45 µm ***Orthophytum*** subg. ***Orthocryptanthus***

7 Petals with laminiform appendages; stigma conduplicate-patent ***Lapanthus***

7* Petals with appendages other than laminiform; stigma simple-dilated or with tendency to simple-patent or conduplicate-spiral **8**

8 Inflorescence sessile and petals neither obtuse-cucullate nor forming a clavate or subclavate corolla **11**

8* Inflorescence on a short to elongate peduncle, if sessile then the plants long caulescent, and with the basal portion of the central leaves and the primary bracts turning reddish or bright red, forming a colorful ring around the inflorescence, petals obtuse-cuculate and forming a subclavate corolla **9**

9 Plants long caulescent and the basal portion of the central leaves and primary bracts turning reddish or bright red forming a colorful ring around the inflorescence, if short caulescent or stemless then the petal appendages of the cupuliform or sacciform type; pollen 35-40 µm in diameter ***Orthophytum*** subg. ***Capixabanthus***

9* Plants stemless or nearly so, sometimes pseudocaulescent but then without a distinct leaf rosette; appendages of the echinatiform or scutelliform type, rarely with tendency to cupuliform or sacciform; pollen 40-60 µm in diameter **10**

10 Flower fascicles subflabellate-pulvinate; petals obtuse-cucullate, erect and forming a clavate corolla not exposing the stamens; petal appendages scutelliform or rarely sacciform; plants from the cenral-northern Espinhaco Range in Minas Gerais state ***Orthophytum*** subg. ***Clavanthus***

10* Flower fascicles usually strobilate; petals acuminatc, acute or rounded, ercct except for the suberect to recurved distal portion, exposing the stamens; petal appendages echinatiform; plants with much broader geographical range, bur mostly not encompassing the Espinhaco Range in Minas Gerais state. ***Orthophytum*** subg. ***Orthophytum***

11 Plants long caulescent; primary bracts green, not contrasting in color with the leaves; sepals 2.5-3.5 times the fruit length; petals broadly spathulate from a very narrow base, blades suborbicular, rose-lilac to lilac-purple, spreading at anthesis and flaccidescent afterwards; stamens deeply included and not visible; stigma conduplicate-spiral. ***Orthophytum*** subg. ***Krenakanthus***

11* Plants stemless; primary bracts and the basal portion of the inner leaves turning white, yellow or red, forming a colourful ring around the inflorescence in contrast with the color of the distal portion of leaves; sepals about equaling the fruit length; petals narrowly spathulate, blades ovate to obovate, white, erect to recurved at anthesis, not flaccidescent and remaining erect or nearly so afterward; stamens visible at least in part; stigma simple-erect with tendency to simple-patent. ***Sincoraea***