

## Taxonomic update of *Adenocalymma* (Bignoniaceae): emendations, new synonyms, typifications, and status change

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**Abstract:** A recent taxonomic treatment of *Adenocalymma* resulted in nomenclatural changes associated with 47 names and 24 species. Seven emendations, 16 new synonyms, 29 typifications (24 of which are lectotypifications), 4 neotypifications, 1 epitypification, and 1 status change are proposed. Emendations are related primarily to the first description of the fruit of *Adenocalymma dichilum*, *A. divaricatum*, *A. fruticosum*, *A. hypostictum*, *A. macrophyllum*, *A. salmoneum*, and *A. scabriusculum*. A variety of *Adenocalymma*, *A. marginatum* var. *apterospermum*, has been raised to the rank of species (*A. apterospermum*).

**Key words:** *Adenocalymma*, Bignoniaceae, nomenclature

### 1. Introduction

*Adenocalymma* Mart. ex Meisn., *orth. cons.* (McNeill et al., 2006), is a Neotropical genus, and one of the most species-rich (47 species) genera of the tribe Bignoniaceae. It is distributed from Mexico to northern Argentina (Udulutsch et al., 2009). In Brazil, where 42 (89%) out of 47 species occur, *Adenocalymma* is widely distributed, being found in 25 out of 26 states, and is represented in all vegetational types, including rain forests, seasonal semideciduous forests, and savanna formations (Udulutsch et al., 2009).

The name “*Adenocalymma*” is of Greek origin, where “aden, adenos” (masculine noun = gland) and “kalymma” (neutral noun = cover or calyx) refer to pateliform glands present on the calyx of most species. The generic name was proposed by Martius in an annotation made on a specimen in 1839, but was validly published only 1 year later by Meisner (1840a: 300; 1840b: 208).

Although in the original publications (Meisner, 1840a, 1840b) the orthography for the genus was “*Adenocalymna*” (with **mn**), in the index of Meisner’s work (published in 1843, part 2, p. 374, Meisner, 1837–1844) and some later publications, e.g., Bentham (1876), the orthography for the genus was “*Adenocalymma*” (with **mm**). Bureau (1872) showed that the orthography used in the protologue, and then later by de Candolle (1845), was incorrect and also did not fit the origin of the term “kalymma”.

Although Bureau (1872) corrected the original orthography for “*Adenocalymma*” (with double **m**, a change officially allowed by the ICBN; see article 60, McNeill et al., 2006), many authors have used the name “*Adenocalymna*” (with **mn**), both in articles (e.g., Smith, 1893; Moore, 1895; Kränzlin, 1915; Rusby, 1920; Standley, 1929; Gentry, 1993) and on herbarium labels (e.g., Rusby, Schumann, Standley). More recently, Scudeller (2000b), based on the discussion presented by Bureau (1872) and the actual history of the use of generic names, proposed the conservation of “*Adenocalymma*” (with double **m**), which was approved by the Committee for Spermatophyta (Brummitt, 2001) and is listed in Appendix III of the ICBN (McNeill et al., 2006).

Until the previous century, the last review to include *Adenocalymma* was the treatment of Bignoniaceae in *Flora Brasiliensis* by Bureau and Schumann (1896–1897). Thereafter, species descriptions have been published in isolation (description of new species) or in local floras.

In a recent revision of *Adenocalymma*, Udulutsch (2008) found 144 names that have been proposed for the genus, of which 47 were correct and accepted, 75 were considered synonyms (29 under *Adenocalymma* species and 46 under other Bignoniaceae genera), 14 were not validly published (6 were *nomina nuda* and 8 appeared on herbarium labels only), and 8 were considered as *insertae sedis*. This study resulted in several nomenclatural

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changes, such as synonymisations, typifications, and one status change, in addition to emendations in the description of some species. All of these alterations made to the taxonomy of *Adenocalymma* are described herein, and presented following the format used by Akçiçek et al. (2012) and Hacıoğlu and Erik (2012).

## 2. Results and discussion

### 2.1. New synonyms, typifications, and emendations

Sixteen new synonyms, 29 typifications (24 lectotypifications, 4 neotypifications, and 1 epitypification), and 7 emendations of a total of 47 names associated with 24 species of *Adenocalymma* are given herein. Emendations relate to the first description of the fruit of 7 species (*Adenocalymma dichilum* A.H.Gentry, *A. divaricatum* Miers, *A. fruticosum* A.H.Gentry, *A. hypostictum* Bureau & K.Schum., *A. macrophyllum* [Cham.] DC., *A. salmonium* J.C.Gomes, and *A. scabriusculum* Mart. ex DC.), as well as the characteristics of the gynoeceum and nectariferous disc in *A. dichilum* and the habit of *A. fruticosum*. All structures described for the first time are illustrated.

1. *Adenocalymma apurense* (Kunth) Sandwith, Lilloa 3: 461 (1938).

= *Bignonia apurensis* Kunth in Humb., Bonpl. & Kunth, Nov. gen. sp. 3: 138 (1818 [1819]).

Type: Venezuela, Barinas: El Diamante, Apure river, s.a. (fl), *Humboldt* 812 (holotype: P!; isotype: B-W11432-01!).

= *Adenocalymma grenadense* Urb., Repert. Spec. Nov. Regni Veg. 14: 306 (1916).

Lectotype (designated here): Grenada, St. George: Belmont, 5 Jun 1905 (fl), *Broadway* 1798 (NY00114852!; isolectotypes: C!, L0003551!, P00608054!).

= *Adenocalymma sousae* A.H.Gentry, Flora de Veracruz 24: 22 (1982).

Type: Mexico, Veracruz: Chuniapa river, Sontecomapa, Los Tuxtlas, 26 Aug 1974 (fr), *Sousa* 4430 (holotype: MEXU; isotype: frag. MO2900637!), **syn. nov.**

**New synonym:** Gentry (1982) cites in the protologue of *Adenocalymma sousae* that this species can be distinguished from *A. apurense* exclusively by the presence of larger capsules and wingless seeds; however, *A. apurense* also has wingless seeds. This confusion began when Gentry (1973b) synonymised under *A. apurense* all the species presenting the leafy connective, namely *A. calderonii* (Standl.) Seibert, *A. grenadense*, *A. hintonii* Sandwith, and *A. inundatum* Mart. ex DC., without taking into account several morphological differences among these species (except *A. hintonii*, which should be considered a synonym of *A. calderonii*, and *A. grenadense*, considered a synonym of *A. apurense*). Since fruits were known only for *A. calderonii*, and these had winged seeds, this character was automatically conveyed to *A. apurense*. In a recent

revision of the genus (Udulutsch, 2008), these species were clearly distinguished, and one of the main features that differentiated *A. apurense* from *A. calderonii* was the presence of wingless seeds in the former and winged seeds in the latter. Thus, we consider *A. sousae*, which has the same circumscription and geographic distribution (Mexico to northern South America) as *A. apurense*, as a taxonomic synonym of this species.

**Typification:** For the name *Adenocalymma grenadense* we have found only 4 isotypes, deposited at C, L, NY, and P. As the holotype (originally deposited at B) was destroyed during World War II (Hiepko, 1987), we selected one of the isotypes as lectotype, this being the specimen deposited at NY, which is the only fertile one.

2. *Adenocalymma bracteatum* (Cham.) DC. in A.DC., Prodr. 9: 200 (1845).

= *Bignonia bracteata* Cham., Linnaea 7: 692 (1832).

Lectotype (designated here): Brazil: s.loc., s.a. (fl), *Sellow s.n.* (K000449337!; isolectotype: E00394574!).

= *Adenocalymma macrostachyum* Miers, Proc. Roy. Hort. Soc. London 3: 180 (1863).

Type: Brazil, São Paulo: 1861-1862 (fl), *Weir* 274 (holotype: K000449338!; isotype: BM000992348!), **syn. nov.**

**New synonym:** After detailed analysis of the protologue and holotype of *Adenocalymma macrostachyum*, we found that the specimen falls within the circumscription of *A. bracteatum*, a species well represented in Brazilian herbaria and with a wide distribution in the State of São Paulo (where the holotype of *A. macrostachyum* was collected), occurring predominantly in semideciduous seasonal forests. Thus, we considered *A. macrostachyum* as synonym of *A. bracteatum*.

**Typification:** For the name *Bignonia bracteata* we have found 2 isotypes deposited at E and K. As the holotype (originally deposited at B) was destroyed, one of these isotypes had to be chosen as lectotype. Since the specimen deposited at K has well-developed inflorescences and whole open flowers, it was selected as lectotype.

3. *Adenocalymma bracteolatum* DC. in A.DC., Prodr. 9: 200 (1845).

Lectotype (designated here): Bolivia, Santa Cruz: Santa Ana, Chiquitos, Aug 1842 (fl), *d'Orbigny* 758 (P00468570!; isolectotypes: BR00880300!, G00133591!, MO100030!, P00468571!, P00468572!, P00468573!).

= *Adenocalymma croceum* S.Moore, Trans. Linn. Soc. Ser. 2, 4(3): 419 (1895).

Type: Brazil, Mato Grosso do Sul: Corumbá, Jan 1892 (fl), *Moore* 950 (holotype: BM000992347!; isotype: NY00313037!).

= *Adenocalymma purpurascens* Rusby, Descr. S. Amer. pl. 121 (1920).

Type: Venezuela, Orinoco river, 1896 (fl), *Rusby & Squires s.n.* (holotype: NY00313044!), **syn. nov.**

= *Anemopaegma huachianum* Rusby, Mem. New York Bot. Gard. 7: 352 (1927).

Type: Bolivia, Huachi: head of Beni River, 2 Sep 1921 (fl), *White* 943 (holotype: NY00313066!; isotypes: MICH1115813!, MO031482!), **syn. nov.**

**New synonyms:** In 1957, Sandwith had already noticed the similarities between *Adenocalymma purpurascens* and *A. bracteolatum*, leaving the following note on the holotype of *A. purpurascens*: “Neither *A. impressum* nor *A. inundatum*, but certainly *Adenocalymma bracteolatum* DC.” Subsequently, in 1977, Gentry made another note on the same specimen, indicating that these species could be distinguished from one another by the presence of winged fruits in *A. purpurascens*. However, this is an inaccurate note, since until 1977 there were no fruit collections identified as *A. bracteolatum*, which makes the comparison invalid. Currently, collections are known with flowers and fruits, which were unidentified in herbaria, and all have yellow-rust coloured scales in the inflorescences and winged fruits and seeds, the characters used to recognise the species. Thus, after a careful analysis of the type specimens, protologue, and existing collections, we consider *A. purpurascens* as synonym of *A. bracteolatum*.

*Anemopaegma huachianum* Rusby was reduced by Gentry (1977) to the synonymy of *Adenocalymma purpurascens*. However, as both *Anemopaegma huachianum* and *Adenocalymma purpurascens* fit within the circumscription of *Adenocalymma bracteolatum*, they are being synonymised under the latter.

**Typification:** The holotype of *Adenocalymma bracteolatum* was originally deposited at P; however, as there are 4 specimens at P, a lectotypification is necessary. Among the 4 sheets, the only one with the name on the label made by de Candolle is *P00468570*, which we designated here as lectotype.

**Observation:** Moore (1895) published 2 species based on 2 different specimens (*Adenocalymma croceum* based on BM 000992347 and *Anemopaegma decorum* S.Moore based on BM 000992352, both from the same locality), but cited only one collector number (980) for both of them. However, the holotype of *Adenocalymma croceum* has the number 950 and also a later-added label with the number 980, whereas the holotype of *Anemopaegma decorum* has the number 980. Therefore, we have opted for associating the collector number 950 with the holotype of *Adenocalymma croceum* (as it is on the original label).

**4. *Adenocalymma bullatum*** Bureau ex K.Schum., Nat. Pflanzenfam. 4(3b): 214 (1894).

Lectotype (designated here): Brazil, Rio de Janeiro: Rezende, 27 Sep 1874 (fl), *Glaziou* 7771 (P00594794!; isolectotypes: C!, G00014104!, K000449339!, P00594795!, P00594796!, R!).

**Typification:** The protologue of *Adenocalymma bullatum* includes no cited specimens. However, at a later date, the author (along with Bureau, Bureau, and Schumann, 1896) cited a single known collection used to describe the species (*Glaziou* 7771), which therefore is the original material. As there are 7 specimens of *Glaziou* 7771 deposited in 5 herbaria, a lectotypification is necessary. Among the 7 materials, 2 (deposited in P) have notes made by Bureau on the label suggesting the epithet “bullatum”, but as only *P00594794* is fertile, we selected it as the lectotype.

**5. *Adenocalymma calderonii*** (Standl.) Seibert, Publ. Carnegie Inst. Wash. 522: 428 (1940).

= *Tabebuia calderonii* Standl., J. Wash. Acad. Sci. 14(11): 244 (1924).

Type: El Salvador, Acajutla: 13 Jul 1923 (fl), *Calderón* 1666 (holotype: US00125873!).

= *Adenocalymma hintonii* Sandwith, Bull. Misc. Inform. Kew 1936(1): 10 (1936).

Lectotype (designated here): Mexico, Temascaltepec: 16 Apr 1933 (fl), *Hinton* 3784 (K000449334!; isolectotypes: BM000992346!, MO031222!). Remaining syntype: *Hinton* 7259 (NY00313036!; isosyntypes: MO031219!, US00125743!).

**Typification:** Sandwith, when describing *Adenocalymma hintonii*, selected 2 specimens as type material (“typus floris” and “typus fructus”), which, according to the Code of Botanical Nomenclature (McNeill et al., 2006, art. 9.4), are considered syntypes. Of these syntypes the flowering specimen (*Hinton* 3784) was chosen as lectotype, because the fruiting material (*Hinton* 7259) has no leaves. Additionally, the diagnostic characters (e.g., leafy connective and corolla lacking nectaries) are present in the K material, reinforcing this choice of lectotype. Although the vast majority of the specimens collected by Hinton can be found in NY, number 3784 (selected here as lectotype) was found only in BM, K, and MO, without a duplicate in NY.

Although Gentry had treated *A. calderonii* as a synonym of *A. apurense* (Gentry, 1973a) and then of *A. inundatum* (Gentry, 1976; 1982), *A. calderonii* can easily be differentiated from all other species with leafy connective (*A. apurense* and *A. inundatum*) by its winged seeds and corolla lacking nectaries.

**6. *Adenocalymma comosum*** (Cham.) DC. in A.DC., Prodr. 9: 201 (1845).

= *Bignonia comosa* Cham., Linnaea 7: 693 (1832).

Lectotype (designated here): Brazil, s.loc.: s.a. (fl), *Sellow* s.n. (K000449335!; isolectotype: NY00313142!).

= *Bignonia acutissima* Cham., Linnaea 7: 691 (1832).

Neotype (designated here): Brazil, São Paulo: Santo André, Alto da Serra de Paranapiacaba Biological Reserve, 5 Jun 1990 (fl), *Chiea* 590 (SP!), **syn. nov.**

= *Adenocalymma acutissimum* (Cham.) Miers, Ann. Mag. Nat. Hist. Ser. 3, 7: 395 (1861).

= *Adenocalymma comosum* (Cham.) DC. var. *acutissimum* (Cham.) Bureau, Vidensk. Meddel. Naturhist. Foren. Kjøbenhavn 1893: 110 (1894) ['acutissima'].

= *Adenocalymma nitidum* Mart. ex DC. in A.DC., Prodr. 9: 200 (1845).

Lectotype (designated here): Brazil, Rio de Janeiro: Magé ['Sebastianópolis'], near Mandioca farm, Aug 1817 (fl), *Martius* 39 (M0086336!; isolectotype: M0086337!). Remaining syntypes: *Baclé* 303 (G00133589!); *Gaudichaud-Beaupré* s.n. (G00133605!); *Lhotsky* 22 (G00133617!).

= *Adenocalymma comosum* (Cham.) DC. var. *nitidum* (Mart. ex DC.) Bureau & K.Schum., Fl. bras. 8(2): 89 (1896) ['nitida'], **syn. nov.**

= *Adenocalymma comosum* (Cham.) DC. var. *lanceolatum* Bureau & K.Schum., Fl. bras. 8(2): 90 (1896) ['lanceolata'].

Lectotype (designated here): Brazil, Rio de Janeiro: Tijuca Forest, Queimado hill, 17 Apr 1870 (fl), *Glaziou* 4126 (P00594790!; isolectotype: R!), **syn. nov.** Remaining syntypes: *Glaziou* 4736 (R!); *Glaziou* 4722 (P00594791!; isosyntype: P00594792!); *Glaziou* 14115 (P00594787!; isosyntypes: P00594788!, P00594789!); *Glaziou* 15255 (P00594793!).

**New synonyms:** This is a species with great morphological variation in its vegetative organs, not allowing separation of the varieties proposed by Bureau (1894) and Bureau and Schumann (1896). The extreme variants are detected when collections from areas occupied by restinga vegetation are compared with those from the Atlantic Forest. This variation is continuous and it is therefore not possible to suggest any diagnostic characters for these taxa. Thus, *Adenocalymma comosum* var. *acutissimum*, *A. comosum* var. *lanceolatum*, and *A. comosum* var. *nitidum* are considered synonyms of *A. comosum*.

**Typifications:** The original material of *Bignonia comosa* is composed by only 3 specimens: the holotype, originally deposited at B, and 2 isotypes, deposited at K and NY. As the holotype was destroyed during World War II (Hiepko, 1987) one of these isotypes had to be chosen as lectotype. Since the specimen deposited at K has well-developed inflorescences and whole open flowers, it was selected as lectotype. The material deposited at NY has only one broken inflorescence and a few buds.

*Bignonia acutissima* was known only from its holotype (Brazil, São Paulo, Serra de Santos, s.a. (fl), *F. Sellows* s.n.), which was originally deposited at B, and from photographs of the same specimen deposited at F and K. As the specimen was destroyed and we did not find other material or illustration associated with the protologue, a neotype was chosen. This choice took into account both the local

collection of original material as well as the diagnostic characteristics presented in the protologue. Thus, among the specimens collected in the Serra de Santos, the one that best fits the description in the protologue is *Chiea* 590, deposited at SP, which was selected as neotype. The main morphological characteristics that made this choice possible, i.e. they were present both in the protologue (and photograph of the holotype) and the neotype selected, were lanceolate to elliptical, long and acuminate, discoloured leaflets, and second-order bracteoles larger than the calyx.

In the protologue of *A. nitidum* 5 syntypes are listed: *Baclé* [303, G00133589], *Gaudichaud-Beaupré* [s.n., G00133605], *Lhotsky* [22, G00133617], and 2 collections by *Martius* (39, deposited at M and with a duplicate at the same herbarium, and s.n., not located). Of these syntypes cited by de Candolle, only one of them (*Martius* 39, M0086336) has well developed inflorescence. Moreover, this is the only one with the name on the label and notes made by Martius (including a detailed description), and its characteristics perfectly fit the description given in the protologue. Therefore, this specimen is designated here as lectotype.

For the last new synonym proposed for this species, *Adenocalymma comosum* var. *lanceolatum*, there is a list of 8 collections (syntypes) used for the description. Of these 8 syntypes, *Martius* 244, deposited at BR, E, G, K, MO, and NY, does not fit the circumscription of *A. comosum*, because, among other characteristics, it has axillary shoot prophylls and calyx lacking nectaries (in *A. comosum* the prophylls are woody and the calyx has nectaries). This collection, *Martius* 244, fits the description of *Adenocalymma ubatubense* Assis & Semir, a species recently described (Assis and Semir, 1999). Of the remaining syntypes, 2 were probably destroyed as they were at B (*Widgren* s.n., collected in Rio de Janeiro - Rio de Janeiro State, and *Wied-Neuwied* s.n., collected in Ilhéus - Bahia State), and we have found no duplicates at other herbaria. The 5 other syntypes were collected by Glaziou, and of these only 2 (*Glaziou* 4126 and 4722) have the original identification made by Bureau on the label. Of these 2 collections, only *Glaziou* 4126 is fertile and perfectly fits the description of the material presented in the protologue. Of the 2 specimens of *Glaziou* 4126, the specimen deposited at P [P00594790] was selected as lectotype because it was probably analysed by Bureau and Schumann (annotations by Bureau have been made on the label), whereas the sample deposited at R has no original annotations on the label.

7. *Adenocalymma coriaceum* A.DC., Prodr. 9: 202 (1845).

Type: Brazil, Bahia: Sep 1840 (fl), *Blanchet* 3221-A (holotype: G00133643!; isotypes: P00468574!, P00468575!, P00468576!).

= *Adenocalymma salzmannii* DC. in A.DC., Prodr. 9: 200 (1845).

Type: Brazil, Bahia: s.a. (fl), *Salzmann* 341 (holotype: G00133264!; isotypes: MPU015252!, MPU015254!, MPU015255!), **syn. nov.**

**New synonym:** *Adenocalymma salzmannii* has the same diagnostic features as *A. coriaceum* such as corolla with nectaries, included stamens, olive-brown inflorescence, glabrous leaflets and, mainly, inflorescences that develop in old stems, with a large diameter, a characteristic that does not occur in any other species of the genus. Thus, after analysis of the protologue and type material, we here propose the synonymisation of *A. salzmannii* under *A. coriaceum*.

The names *A. coriaceum* and *A. salzmannii* were published in the same paper, but as the epithet “coriaceum” is used more frequently in herbaria and publications, we chose to maintain its use. Since this was the first choice between 2 names of equal priority level (McNeill et al., 2006, art. 11.5), priority of the name *A. coriaceum* is established here.

Unlike other species of *Adenocalymma* published in *Prodromus Systematis Naturalis Regni Vegetabilis* (de Candolle, 1845), the authorship of *A. coriaceum*, according to comments at the end of the description, is A.DC. and not DC. because Alphonse de Candolle was the one who examined the material and described the species.

8. *Adenocalymma cymbalum* (Cham.) Bureau & K.Schum., Fl. Bras. 8(2): 112 (1896)

= *Bignonia cymbalum* Cham., Linnaea 7: 716 (1832).

Neotype (designated here): Brazil, Rio de Janeiro: Corcovado Mont, Feb 1818 (fl), *Pohl* 6101 (BR!).

= *Tecoma fulgens* Mart. ex DC. in A.DC., Prodr. 9: 222 (1845).

= *Memora fulgens* (Mart. ex DC.) Bureau, Vidensk. Meddel. Naturhist. Foren. Kjøbenhavn 1893: 106 (1894).

Lectotype (designated here): Brazil, Bahia: between Malhada and Caetitê, Sep s.a., *Martius* 1853 (M0088906! pro minima parte - branch on the right, with 2 leaflets and 1 flower). Epitype (designated here): Brazil, Minas Gerais: near S. Jean Baptista farm, Apr 1887 (fl), *Martius* 1057 (M [M0086338]!; isoeptype: M [M0086339]!).

**Typifications:** *Bignonia cymbalum* was described from a single collection (*F. Sellow* 1613) and most likely from a single specimen, because duplicates were not located. Since the specimen, originally deposited at B, was destroyed and there is no illustration or other material associated with the protologue, it was necessary to choose a neotype. Since there is no precise indication of the location of the holotype collection, this parameter could not be used to guide the choice. Thus, in addition to the diagnostic characteristics presented in the protologue, we chose to consider the specimens examined in taxonomic

studies that included the holotype of *B. cymbalum*, that is, specimens that were analysed and described along with the specimen collected by Sellow. The only study that used the holotype of *B. cymbalum* together with another collection on which to base a description was conducted by Bureau and Schumann (1896) for *Flora Brasiliensis*. In this work, in addition to the collection by Sellow, a specimen collected by Pohl is also cited, and it is designated here as the neotype. After analysis of the specimen collected by Pohl, deposited at BR, and comparisons with the description given in the protologue and with a photograph (at F and K) of the holotype (at B, but destroyed), it is clear that the specimen selected as neotype has the same characteristics as the original material.

The holotype of *Tecoma fulgens* has parts that belong to more than one taxon, as already discussed by Sandwith (1958) – *Tecoma* sp. (pro maxima parte) and *Memora fulgens* (pro minima parte), and most of the description conducted by Martius and presented by de Candolle (1845) refers to *Memora fulgens*. Thus, we designate it here as the lectotype, retaining the name to that part that corresponds most nearly with the original description (McNeill et al., 2006, art. 9.12).

As the type of de Candolle’s name consists of more than one species, and *Memora fulgens* is the pro minima parte, we selected an epitype (McNeill et al., 2006, art. 9.7).

9. *Adenocalymma dichilum* A.H.Gentry, Novon 3(2): 137 (1993), emend. Udulutsch (Figure 1).

Type: Brazil, Piauí: Bom Jesus - São Raimundo Nonato, caatinga, 11 May 1979 (fl), *Fernandes s.n.* (holotype: EAC 6185!; isotype: MO3204496!).

**Emendation:** Disc 1.2–2 × 3.5–3.6 mm; gynoecium glabrous, ovary 5–5.3 × 1.2–1.4 mm, subcylindrical, slightly tetragonal, surface glandulose, nectaries shiny and circular, 15 ovules per series, style 3.4–3.9 cm, stigma 2–2.2 × 1.5–2 mm, ovate. Fruit drying light brown, subcylindrical, wingless; valves 6.8 × 1.1 cm, 0.6 cm high, 1–1.5 mm thick, apical portion acute, surface rough due to prominent nectaries, midvein prominent, tomentulose, nectaries circular, sparse, evenly distributed across the valve; seeds winged, yellow to light brown, 0.7–0.9 × 0.6–1 cm (excluding wings), 1–2 mm thick, hilum white to paleaceous, 1–1.5 × 4–6 mm, wings yellow to paleaceous, 0.7–1 × 0.6–1.1 cm.

**Additional examined specimens:** Brazil, Bahia: Ibotirama, BR-242 highway, km 30, from Ibotirama to Barreiras, 7 Jul 1983 (fr), *Coradin* 6589 (CEN). Morro do Chapéu, ca. 20 km of Morro do Chapéu, going to Irecê, caatinga, 11°29'29"S, 41°19'40"W, 21 Jul 2006 (fr), *Souza* 6329 (ESA). BR-242 highway, km 519, 67.5 km of Ibotirama and 130.8 km before Seabra, right side of the highway, going to Seabra, 12°13'46.8"S, 42°46'56.7"W, 6 Feb 2007 (fl), *Udulutsch* 2807 (HRCB).



**Figure 1.** *Adenocalymma dichilum*: a-fruit, b-seed, c-disc and ovary, d-ovary, longitudinal section showing 2 series of ovules. *A. divaricatum*: e-fruit, f-seed. *A. fruticosum*: g-ovary, longitudinal section showing 2 series of ovules, h-fruit, i-flowering shoot. *A. hypostictum*: j-fruit. *A. macrophyllum*: k-seed, l-fruit. *A. salmoneum*: m-seed, n-fruit. *A. scabriusculum*: o-seed, p-fruit. (a–b) from Coradin 6589 (CEN), (c–d) from Udulutsch 2807 (HRCB), (e–f) from Udulutsch 2818 (HRCB), (g–i) from Udulutsch 2812 (HRCB), (j) from Udulutsch 2814 (HRCB), (k–l) from Vieira s.n. (VIES 4702-3), (m–n) from Pereira 2508 (VIES), (o–p), from Froés 11886 (NY). Scale bars: (d) and (g) = 1 mm, all others = 1 cm (line illustrations by R.G. Udulutsch).

10. *Adenocalymma divaricatum* Miers, Ann. Mag. Nat. Hist. Ser. 3, 7: 390 (1861), emend. Udulutsch (Figure 1).

Type: Brazil, Rio de Janeiro: Pinheiros [Painheiros], Corcovado, s.a. (fl), *Miers* 3383 (holotype: P00468577!).

= *Adenocalymma bracteatum* (Cham.) DC. var. *macradenum* Bureau, Vidensk. Meddel. Naturhist. Foren. Kjøbenhavn. 1893: 111 (1894).

Type: Brazil, Minas Gerais: 6 Aug 1885 (fl), *Glaziou* 15253 (holotype: P00594803!; isotype: K000449344!), **syn. nov.**

= *Adenocalymma magnoalatum* V.V.Scudeller, Novon 10(3): 234 (2000).

Type: Brazil, Minas Gerais: Marliéria, Rio Doce State Park, 10 Oct 1996 (fl), *Scudeller* 579 (holotype: VIC!; isotype: MO), **syn. nov.**

**Emendation:** Fruit drying olive-brown, subcylindrical, winged; valves 8–21.4 × 1.3–2.3 cm (excluding wings), 2.5–5.5 cm (including wings), 0.8–1.1 cm high, 1.3–1.5 mm thick, apical portion acute, surface smooth, slightly wavy, midvein prominent, glabrous, nectaries 0 (-6), often absent, wings 1–1.5 cm wide, membranaceous in young fruit, ca. 0.5 mm thick, and thick in mature fruit, ca. 1.5 mm thick; seeds winged, light brown, 1.3–1.5 × 1.5–1.7 cm (excluding wings), 2.8–3 mm thick, hilum paleaceous, 0.1–0.2 × 1.5–1.8 cm, wings yellow-paleaceous, 2.2–2.6 × 1.5–1.8 cm.

**Additional examined specimens:** Brazil, Bahia: Andaraí, Nova Vista, caatinga, 15 Sep 1984 (fr), *Hatschbach* 48210 (MBM). Caetité, BR-030 highway, 6.9 km of the perimeter of Caetité, going to Malhada de Pedras, left side of the highway, 14°06'09.4"S, 42°26'33.4"W, 10 Feb 2007 (fl, fr), *Udulutsch* 2818 (HRCB). Vitória da Conquista, BR-4 highway, 29 km S of Vitória da Conquista, 29 Jan 1965 (fl, fr), *Belém* 339 (NY, UB); BR-4 highway, km 1057, 16 Jan 1965 (fl, fr), *Pereira* 9494 (R). Minas Gerais: Marliéria, Rio Doce State Park, Porto Capim road, 10 Oct 1996 (fr), *Scudeller* 574 (RB, VIC). Pedra Azul, ca. 5 km NW of the perimeter of the city, going to BR-116 highway, 10 Feb 1994 (fr), *Souza* 5153 (ESA).

**New synonyms:** The small number of collections of *Adenocalymma* with fruits led to many misconceptions, including the description of new species using only the morphology of the fruit as a diagnostic characteristic. This occurred for *A. magnoalatum*, for which the presence of winged fruits and seeds was considered the main diagnostic characteristic of the species (Scudeller, 2000a). However, the circumscription of *A. magnoalatum* fits perfectly within that of *A. divaricatum*, whose fruits are being described for the first time herein (see emendation above) and, as in *A. magnoalatum*, these are winged. Additionally, although *A. divaricatum* occurs in the State of Minas Gerais (as does *A. magnoalatum*) no comparison

between these species was made in the protologue of *A. magnoalatum* (Scudeller, 2000a). Thus, we consider *A. magnoalatum* a taxonomic synonym of *A. divaricatum*.

The variety described by Bureau, *A. bracteatum* var. *macradenum*, also fits within the circumscription of *A. divaricatum*, as it has the same diagnostic characteristics of this species, such as prophylls lacking nectaries and with parallelodromous veins, second order bracteoles symmetric, corolla lacking nectaries, calyx internally papillose, and ovary glabrous. Thus, we consider *A. bracteatum* var. *macradenum* as synonym of *A. divaricatum*.

11. *Adenocalymma flavum* Mart. ex DC. in A.DC., Prodr. 9: 202 (1845).

Lectotype (designated here): Brazil, Bahia: [Ilhéus], "in via Felisberti", 1830 (fl), *Wied-Neuwied s.n.* (BR00880369!; isolectotypes: BR00880352!, BR00880385!, G00133654!).

**Typification:** *Adenocalymma flavum* was described from a single collection, *Wied-Neuwied s.n.*, of which we found 4 specimens, 3 deposited at BR and a fragment at G-DC. It is indicated in the protologue that the original material used in the description is from Martius' herbarium (*h. Mart.*) and, as the 3 specimens at BR are from this herbarium (according to data on the original label and Martius' own notes on the morphological characteristics, suggesting the epithet "flavum" and an illustration of the flower), one should be selected for typification. Since only BR00880369 is fertile, we designated it as the lectotype.

12. *Adenocalymma fruticosum* A.H.Gentry, Novon 3(2): 137 (1993), emend. Udulutsch (Figure 1).

Type: Brazil, Bahia: Cascavel, Serra do Sincorá, 6 km N of Cascavel, on the road to Mucugê, 25 Mar 1980 (fl), *Harley, Bromley, Carvalho & Martinelli* 20943 (holotype: CEPEC!; isotypes: K000449345!, K000449346!, MO2918696!, SP000425!).

**Emendation:** Liana. Tendril glabrous. Ovules 3–4 per series, style 2.7–3.5 cm, stigma 2.9–3.5 × 1.2–1.5 mm, ovate. Fruit drying olive-brown, dorso-ventrally flattened, wingless; valves 15.3–18.9 × 2.2 cm, 0.3 cm high, 1 mm thick, apical portion rounded, apiculate, surface smooth, midvein slightly prominent, the same colour as the rest of the valve, glabrous, nectaries circular to elliptical, concentrated in the marginal area of the valves, winged seeds, body brown to tan, 1.9–2.6 × 1.4–1.7 cm (excluding wings), 1–1.5 mm thick, hilum greyish brown, 0.5–1 × 2.1–2.9 mm, wings yellow to paleaceous, 0.6–2.2 × 1.1–1.6 cm.

**Additional examined specimens:** Brazil, Bahia: BA-245 highway, from Mucugê to Abaíra, 8.5 km of Mucugê, right side of the highway, road to Guiné, then ca. 450 m on the road, 13°01'09.4"S, 41°26'31.3"W, 7 Feb 2007 (fl, fr), *Udulutsch* 2812 (HRCB); 13°01'10.5"S, 41°26'29.3"W, 7 Feb 2007 (fl), *Udulutsch* 2813 (HRCB).

*Adenocalymma fruticosum* was described from a single collection and was thought to be a shrub due to the absence of tendrils (hence the epithet “fruticosum”). However, this species was recollected recently in the area near the type locality and all individuals found had tendrils, characterising its habit as lianescent.

13. *Adenocalymma grandifolium* Mart. ex DC. in A.DC., Prodr. 9: 199 (1845), nom. nov.

= *Bignonia grandifolia* Vell., Fl. Flumin., 247 (1825[1829]), nom. illeg., non Jacq. 1798.

Lectotype: plate 16 in Fl. flumin. icones, vol. 6, t. 28. 1827 [1831] (Designated by Laroche in Loefgrenia 56: 6. 1973).

= *Adenocalymma prasinum* Miers, Ann. Mag. Nat. Hist. Ser. 3, 7: 395 (1861), nom. illeg., nom. sup.

= *Adenocalymma guillemirii* DC. in A.DC., Prodr. 9: 202 (1845).

= *Adenocalymma grandifolium* Mart. ex DC. var. *guillemirii* (DC.) R.C.Laroche, Loefgrenia 56: 7 (1973).

Type: Brazil, Rio de Janeiro: Serra dos Órgãos, May 1839 (fl), *Guillemir* 999 (holotype: G00133608!; isotype: P00608055!), **syn. nov.**

= *Adenocalymma grandifolium* Mart. ex DC. var. *iodocalyx* Bureau & K.Schum., Fl. bras. 8(2): 107 (1896).

Lectotype (designated here): Brazil, Rio de Janeiro: Tinguá, 24 Aug 1879 (fl), *Glaziou* 11256 (P00594797!; isolectotypes: P00594798!, P00594799!, P00594800!, R!).

= *Adenocalymma pleiadenium* Bureau & K.Schum., Fl. bras. 8(2): 107 (1896).

Lectotype (designated here): Brazil, Rio de Janeiro: Serra dos Órgãos, May 1883 (fl), *Palma* s.n., *Coleção Saldanha da Gama* 7446 (R!), **syn. nov.**

**New synonyms:** This species was first described in 1829 as *Bignonia grandifolia* by Vellozo (1825 [1829]). However, this name is a later homonym for *B. grandifolia* Jacq. (Jacquin, 1798) (= *Anemopaegma grandifolium* (Jacq.) Merr. & Sandwith), and is therefore illegitimate (McNeill et al., 2006, art. 53). Thus, de Candolle (1845) published *Adenocalymma grandifolium* as a new name for *Bignonia grandifolium* Vell., and both have the same type (McNeill et al., 2006, art. 7.3).

*Adenocalymma prasinum* was created by Miers (1861) as a declared substitute (new name) for *Bignonia grandifolia* Vell. However, de Candolle (1845) had already done this 16 years before (*A. grandifolium* Mart. ex DC.). Thus, *A. prasinum* Miers is superfluous and illegitimate, and must be rejected (McNeill et al. 2006, art. 52.1).

The variety proposed by Laroche (1973), *A. grandifolium* var. *guillemirii* (and its basionym *A. guillemirii*) is considered a synonym of *Adenocalymma grandifolium*. The diagnostic character used by Laroche (1973) cannot be used to differentiate between the proposed variety and the type-variety. The only character used as diagnostic for

recognising the different varieties was the width of the leaflets, but when comparing specimens collected along an altitudinal gradient, the differences between the leaflets were continuous. Additionally, the type of these names falls within the variation accepted for *A. grandifolium*.

A second name as a new synonym for *Adenocalymma grandifolium* is *A. pleiadenium*, whose holotype is indistinguishable from the holotype of *A. guillemirii*, which is also synonymised under *Adenocalymma grandifolium* (see above). The holotypes of *A. guillemirii* and *A. pleiadenium* come from the same location (the Serra dos Órgãos, State of Rio de Janeiro, Brazil); however, Bureau and Schumann (1896) did not have access to the holotype of *A. guillemirii*, a fact that may have contributed to the description of *A. pleiadenium* as a new species.

Contrary to what was proposed by Laroche (1973), and cited by Gentry (1975), *A. macrophyllum* is not a synonym of *Adenocalymma grandifolium*. These species can easily be distinguished by, among other characteristics, the position of the stamens (inclusive in *A. macrophyllum*, against exerted in *Adenocalymma grandifolium*) and the indumentum of the leaflets (with dendritic trichomes in *A. macrophyllum*, against glabrous in *Adenocalymma grandifolium*).

**Typifications:** The variety described by Bureau and Schumann (1896), *Adenocalymma grandifolium* var. *iodocalyx*, is associated with a single collection, however, we found 5 duplicates from this collection; 4 are deposited at P and 1 at R. Taking into account the sheets at P, 2 were annotated by Bureau, from which we selected the specimen P00594797 as lectotype, since it is fertile, has well-developed inflorescence and flowers, and is in good condition, besides being in perfect agreement with the protologue.

The holotype of *Adenocalymma pleiadenium* was probably lost, as we have not found any original material. Even the P herbarium, where most type specimens of the species described by Bureau and Schumann are deposited, has no type specimen. As the only duplicate found is at R, we designate here this sheet as the lectotype, although there is no indication that Bureau and Schumann saw it.

14. *Adenocalymma hypostictum* Bureau & K.Schum., Fl. bras. 8(2): 99 (1896), emend. Udulutsch (Figure 1).

Type: Brazil, Minas Gerais: Araçuaí, 18 Jun 1884 (fl), *Glaziou* 15257 (holotype: P00594802!; isotypes: K000449340!, R!).

**Emendation:** Fruit drying brown, dorso-ventrally flattened, wingless; valves 12.9–15.5 × 1.3–1.8 cm, 0.2–0.3 cm high, 0.5–0.8 mm thick, apical portion rounded, apiculate, surface smooth, midvein slightly prominent, glabrous, nectaries circular, concentrated in the basal and marginal portions of the valve; winged seeds, yellowish brown, 1–1.3 × 1.5–2.2 cm (excluding wings), 0.5–1 mm



thick, hilum light brown, 0.1–0.2 × 1.5–2.2 cm, wings yellow-paleaceous, 0.8–1.5 × 0.6–1.7 cm.

**Additional examined specimens:** Brazil, Bahia: Abaíra, 4 km of Abaíra, going to Piatã, 13°14'S, 41°41'W, 11 Mar 1992 (fl, fr), *Stannard* H51870 (CEPEC, F, HUEFS, K, NY, SPF). Ibiassucê, BA-030 highway, from Caetité to Brumado, road on left side of the highway, 29.9 km of Caetité, then 1.9 km on the road, 14°08'46.1"S, 42°16'15.2"W, 8 Feb 2007 (fl, fr), *Udulutsch* 2814 (HRCB); 14°08'46.9"S, 42°16'15.2"W, 8 Feb 2007 (fl, fr), *Udulutsch* 2816 (HRCB). Maracás, 14 km of Maracás, going to Contendas do Sincorá, 24 Jan 1965 (fl, fr), *Pereira* 9687 (R).

**15. *Adenocalymma impressum*** (Rusby) Sandwith, *Recueil Trav. Bot. Neerl.* 34: 212 (1937).

= *Bignonia impressa* Rusby, *Mem. Torrey Bot. Club* 6(1): 100 (1896).

Lectotype (designated here): Bolivia, Guanai-Tipuaní: Apr–Jun 1892 (fl), *Bang* 1321 (NY00579086!; isolectotypes: E00259231!, E00259232!, G00008979!, G00014106!, G00014107!, K000449351!, M0086329!, MO031732!, NY00579085!). Remaining syntype: *Rusby* 1129 (NY!).

= *Adenocalymma sclerophyllum* Sprague, *Verh. Bot. Vereins Prov. Brandenburg* 50: 119 (1909).

Lectotype (designated here): Brazil, Amazonas: Boca do Tejo, Juruá river, May 1901 (fl), *Ule* 5496 (MG!).

= *Adenocalymma auristellae* Kraenzl., *Notizbl. Königl. Bot. Gart. Berlin* 6(60): 371 (1915).

Lectotype (designated here): Peru, Alto Acre: Seringal Auristella, Apr 1911 (fl), *Ule* 9779 (K000449352!; isolectotype: MG!).

**Typifications:** In the protologue of *Bignonia impressa*, Rusby (1896) cited 2 syntypes, *Bang* 1321, used for most of the description, and *Rusby* 1129, used to describe fruit and seeds. *Bang* 1321 has flowers (the diagnostic characteristics of the species are floral), and several duplicates distributed at E, G, K, M, MO, and NY herbaria. Since important types of Rusby were originally deposited at NY (Stafleu and Cowan, 1981) and only NY00579086 has annotations made by Rusby himself, indicating the proposed new name, this specimen was designated as lectotype.

The original material of *Adenocalymma sclerophyllum* comprises a single collection (*Ule* 5496) and 2 specimens deposited at B and MG. As the holotype deposited at B was destroyed, we selected as lectotype the only isotype we found (deposited at MG).

In the protologue of *A. auristellae* the only collection indicated as type is *Ule* 9779. As the holotype deposited at B was destroyed, it was necessary to choose a lectotype from among the isotypes, which are deposited at MG and K. The specimen deposited at K was designated as lectotype because the dimensions of both leaves and flowers agree fully with those in the protologue. The dimensions of the specimen deposited at MG are slightly smaller.

**16. *Adenocalymma inundatum*** Mart. ex DC. in A.DC., *Prodr.* 9: 201 (1845).

Lectotype (designated here): Brazil, Pará: Marajó Island, Aug 1819 (fl), *Martius s.n.* (M0086326!; isolectotypes: M0086327!, M0086328!).

= *Adenocalymma inundatum* Mart. ex DC. var. *surinamense* Bureau & K.Schum., *Fl. bras.* 8(2): 94 (1896) ['surinamensis'].

Lectotype (designated here): Suriname, Marowijne: 1854 (fl), *Wulfschlaegel* 11 (BR00880320!), **syn. nov.**

**New synonym:** Gentry (1976), in his studies in preparation for *The Flora of Venezuela*, reinterpreted the *Adenocalymma apurense* "complex" based on the characteristics of fruits and reconsidered *A. inundatum* and its variety *A. inundatum* var. *surinamense*, both synonymised previously under *A. apurense* (Gentry, 1973b). However, confusion still abounded as he stated in this study (Gentry, 1976) that *A. inundatum* could be characterised by winged seeds, whereas *A. apurense* and *A. inundatum* var. *surinamense* had wingless seeds. We analysed collections containing flowers and fruits of *A. inundatum* (both varieties) and confirm that the seeds in this species do not have wings in any of the varieties. Thus, the synonymisation of *A. inundatum* var. *surinamense* under *A. inundatum* is proposed, since the only difference cited for distinguishing between these taxa was the presence or absence of wings in the seeds.

**Typifications:** *Adenocalymma inundatum* was described from a single collection, which consists of 3 specimens deposited at M. Since there is no indication that these specimens are parts of a single specimen, they should be considered duplicates (McNeill et al., 2006, art. 8.3). Because only M0086326 among the 3 specimens cited has well-developed inflorescence and flowers, we selected it as the lectotype.

In the protologue of *Adenocalymma inundatum* var. *surinamense* 2 syntypes were cited, *Wulfschlaegel* 11 and *Hostmann & Kappler s.n.* Since the collection *Hostmann & Kappler s.n.* has probably been lost (not found in any herbaria), we selected *Wulfschlaegel's* collection, whose specimen is deposited at BR, as the lectotype.

**17. *Adenocalymma macrophyllum*** (Cham.) DC. in A.DC., *Prodr.* 9: 199 (1845), emend. Udulutsch (Figure 1).

= *Bignonia macrophylla* Cham., *Linnaea* 7: 689 (1832).

Lectotype (designated here): Brazil, Rio de Janeiro: 1833 (fl), *Sellow s.n.* (K000449341!; isolectotypes: G00133580!, W16645!, W16646!, W16647!).

**Emendation:** Fruit drying light brown to paleaceous, cylindrical, wingless; valves 9.7–20.1 × 2.8–3.3 cm, 1.3–1.5 cm high, 1.8–2.5 mm thick, apical portion acute, surface rough due to prominent nectaries, midvein slightly sulcate to prominent, puberulent, nectaries circular distributed across the valve; seeds wingless, paleaceous to brown,

1.4–2 × 1.5–2.5 cm, 1.1–1.4 cm thick, hilum white to paleaceous, 0.6–1.1 × 1.5–2.2 cm.

**Additional examined specimens:** Brazil, Espírito Santo: Cariacica, 24 Sep 1989 (fr), *Vieira s.n.* (HRCB 33512, VIES 4702-3). Santa Teresa, road to Nova Lombardia, 9 Feb 1999 (fr), *Kollmann 1856* (HRCB, MBML); 10 Apr 1941 (fl, fr), *Mello-Filho 23* (R).

**Typification:** The holotype of *Bignonia macrophylla*, originally deposited at B, was destroyed. However, we found 5 isotypes of this collection, 1 deposited at K, 1 at G-DC, and the others at W. Since the specimen deposited at K is better preserved, with inflorescences and whole flowers, and agrees perfectly with the protologue, we designated it as the lectotype.

**18. *Adenocalymma marginatum*** (Cham.) DC. in A.DC., Prodr. 9: 200 (1845).

= *Bignonia marginata* Cham., Linnaea 7: 695 (1832).

Neotype (designated here): Brazil, Rio de Janeiro: s.a. (fl), *Gaudichaud-Beaupré 560* (G00133416!).

= *Adenocalymma marginatum* (Cham.) DC. var. *polystachyum* DC. in A.DC., Prodr. 9: 200 (1845).

Lectotype (designated here): Brazil, Bahia: 1834 (fl), *Blanchet s.n.* (G00133550!), **syn. nov.**

**New synonym:** The variety described by de Candolle (1845), *Adenocalymma marginatum* var. *polystachyum*, is considered a synonym of *A. marginatum*. The diagnostic characteristics used by the author (e.g., smaller petiolules and slightly larger calyx) cannot be used to differentiate between the proposed variety and the type-variety, because when comparing specimens the type of this name falls within the variation accepted for *A. marginatum*.

**Typifications:** The holotype of *Adenocalymma marginatum*, a specimen collected by Sellow that was deposited at B, was destroyed. Since it was cited as a single specimen in the protologue of this species (which did not have duplicates), it is necessary to choose a neotype as nomenclatural type. The collection *Gaudichaud-Beaupré 560* is the only one cited in the work of de Candolle (1845), which together with the specimen collected by Sellow, was used as the basis for the description of *A. marginatum*. Thus, we selected *Gaudichaud-Beaupré 560*, deposited at G-DC, as neotype. Additionally, this choice is reinforced by the fact that the description given by de Candolle (1845) fits the description in the protologue.

The variety described for this species (*A. marginatum* var. *polystachyum*) was based on 2 collections from Bahia, one collected by Blanchet and deposited at G-DC and the other collected by Martius, which has not been located. Of these syntypes, the collection deposited at GD-C is annotated by de Candolle (1845), and we therefore selected it as the lectotype.

**19. *Adenocalymma paulistarum*** Bureau ex K.Schum., Nat. Pflanzenfam. 4(3b): 214 (1894).

Lectotype (designated here): Brazil, São Paulo: Campinas, 10 Sep 1866 (fl), *Méllo 28* (K000449349!; isolectotypes: K000449348!, S!, US00125748!).

**Typification:** The species *Adenocalymma paulistarum* is found in the literature spelled 2 different ways: as *A. paulistarum* (with r, in most studies) and as *A. paulistanum* (with n, as on the labels of the collection *Méllo 28* and in his manuscript, published posthumously; Méllo, 1952).

Méllo, collector of the original material, used to send his collections of Bignoniaceae to Bureau (who by then was already an expert on this family) and in one of these consignments Méllo sent a probable new species of *Adenocalymma* (*Méllo 28*) without suggesting a name for it. In 1869, in a response to Méllo, Bureau gave the chosen name for the species (*A. paulistanum*), which was accepted by Méllo in his manuscripts (Méllo, 1952). However, some years later, when the species was effectively published (Schumann, 1894–1895), Schumann called it *A. paulistarum*, which is grammatically correct, being a plural genitive of “paulista”, and this name was used in all subsequent works.

In the original publication of *A. paulistarum* there is no indication of the type material; however, in a later study (Bureau and Schumann, 1896), the author of the species in partnership with Bureau published a more detailed description and indicated 3 collections, *Regnell III 902*, *Méllo 28*, and *Sellow s.n.*, but the third of these, originally deposited at B, was destroyed.

Considering that the specific epithet is “paulistarum” and that the only collection from the State of São Paulo is *Méllo 28* (as noted by Méllo [1952], this very collection was the original material used by Schumann), this collection was therefore used for choosing the lectotype. However, as the collection *Méllo 28* is represented by 4 specimens, 2 deposited at K, 1 at S, and 1 at US, of which only the first 2 (K) have notes made by Bureau on the label, suggesting the specific epithet, and that there was no indication that they are parts of a single specimen, these preparations are considered duplicates (McNeill et al., 2006, art. 8.3) and we chose the specimen with flowers and fruit as the lectotype (K000449349).

**20. *Adenocalymma salmoneum*** J.C.Gomes, Dusenja 2(5): 314 (1951), emend. Udulutsch (Figure 1).

Type: Brazil, Espírito Santo: north of Rio Doce, bank of São Gabriel river, Sep 1950 (fl), *Vieira 20* (holotype: RB!; isotype: K000449347!).

**Emendation:** Fruit drying olive-brown to light brown, cylindrical, wingless, valves 5.8–7.3 × 3.4–3.7 cm, 1.4–1.7 cm high, 1–2 mm thick, apical portion slightly acuminate, surface rugose due to prominent nectaries, midvein sulcate, puberulent, glabrescent, nectaries circular distributed across the valve; seeds wingless, yellowish-brown, 1.2–1.6 × 1.7–2.1 cm, 0.9–1.2 cm thick, hilum yellow to paleaceous, 0.9–1.1 × 1.3–2.1 cm.

**Additional examined specimens:** Brazil, Espírito Santo: Aracruz, Comboios, 7 Jan 1992 (fr), *Pereira* 2508 (VIES).

21. *Adenocalymma scabriusculum* Mart. ex DC. in A.DC., Prodr. 9: 201 (1845), emend. Udulutsch (Figure 1).

Lectotype (designated here): Brazil, Piauí: Oeiras, Olho d' água, sandy soil, May 1817 (fl), *Martius* 2500 (M0086322!; isolectotype: M0086323!).

**Emendation:** Fruit drying brown, cylindrical, wingless, valves 5.3–8.5 × 1.9–3.25 cm, 0.6–0.9 cm high, 0.9–1 mm thick, apical portion acute, surface slightly rugose due to protruding nectaries, median nerve prominent, puberulent, glabrescent, nectaries circular, sparse, wingless seeds, yellowish-brown, 1.5 × 1.6 cm, 0.6 cm thick, hilum paleaceous, 0.4 × 1.5 cm.

**Additional examined specimens:** Brazil, Maranhão: São Luís, Barreto road, 1940 (fr), *Froés* 11886 (NY).

**Typification:** *Adenocalymma scabriusculum* was described from a single *Martius* collection (Brazil, Piauí, flowering in May, deposited at M, [2500]); however, there are 2 specimens deposited at M. As the specimen M0086322 has the original notes written by Martius, including a description, and the label has complete data on the collection location (the same as in the protologue), we selected this specimen as the lectotype.

22. *Adenocalymma tephriocalyx* Bureau ex K.Schum., Nat. Pflanzenfam. 4(3b): 214 (1894).

Lectotype (designated here): Brazil, Rio de Janeiro: Tijuca Forest, 27 Aug 1878, *Glaziou* 8815 (P00594807!; isolectotypes: P00594805–P00594806! *pro maxima parte*, R 11394!).

= *Adenocalymma subsessilifolium* DC. var. *tephriocalyx* (Bureau ex K.Schum.) R.C.Laroche, Loefgrenia 56: 8 (1973), **syn. nov.**

**New synonym:** The shrubby habit of *Adenocalymma tephriocalyx* is shared by only a few species of the genus; however, the sessile leaves and funnel-shaped corolla distinguish this species from all others except *A. subsessilifolium*. The absence of nectaries on the corolla and the greyish indumentum on the inflorescence of *A. tephriocalyx* easily differentiate this species from *A. subsessilifolium* (nectaries present on the corolla and the ferruginous indumentum on the inflorescence).

Based on the morphological characteristics mentioned above, the treatment by Laroche (1973), who considered this species a variety of *A. subsessilifolium*, is inappropriate.

**Typification:** In the protologue of this species the material used for its description was not mentioned; however, later the same author, in partnership with Bureau (Bureau and Schumann, 1896), cited 2 collections (*Glaziou* 8815 and 9527), the only ones known for this species to date.

At P there are 2 specimens of *Glaziou* 8815, and one of them is mounted on a sheet together with a portion (single inflorescence) from *Glaziou* 9527, a separate collection of the same species. This sheet bears 2 separate barcodes, each corresponding to the parts of these different collections: *Glaziou* 9527 [P00594805] and *Glaziou* 8815 [P00594806].

Thus, the only complete collection (including vegetative and reproductive parts) of the species is *Glaziou* 8815, used for lectotypification. We found 3 specimens of this collection, 2 of which are deposited at P and the other at R; those at P were used for the original description of the species because there are notes made by Bureau on the labels suggesting the name “tephriocalyx”. Of these 2 specimens, we selected P00594807 as the lectotype because it contains only *Glaziou* 8815 in the preparation, avoiding any further confusion.

23. *Adenocalymma trifoliatum* (Vell.) R.C.Laroche, Loefgrenia 56: 5 (1973).

= *Bignonia trifoliata* Vell., Fl. Flumin. 245 (1825 [1829]).

Lectotype: plate 16 in Fl. flumin. icones, vol. 6, t. 16. 1827 [1831] (Designated by Laroche in Loefgrenia 56: 5. 1973).

= *Adenocalymma longiracemosum* Mart. ex DC. in A.DC., Prodr. 9: 201 (1845) [‘longiracemosum’], nom. illeg., nom. sup.

= *Adenocalymma longiracemosum* Mart. ex DC. var. *trichocladum* DC. in A.DC., Prodr. 9: 201 (1845) [‘longiracemosum’].

Neotype (designated here): Brazil, Rio de Janeiro: Grumari, 8 Jan 1986 (fl), *Araujo* 7133 (GUA!), **syn. nov.**

= *Adenocalymma trifoliatum* (Vell.) R.C.Laroche var. *trichocladum* (DC.) R.C.Laroche, Loefgrenia 56: 6 (1973), **syn. nov.**

**New synonyms:** This is one of the few species of *Adenocalymma* described in the work of Vellozo (1825 [1829]), which has been accepted, although the original description is extremely brief. The citation of the corolla nectaries as a diagnostic characteristic of the species and its occurrence recorded for Rio de Janeiro are important for sufficient identification of the species.

After examination of the protologue of *A. longiracemosum* var. *trichocladum*, it was clear that this taxon falls within the circumscription of *A. trifoliatum*, featuring, among other characteristics, nectaries on the corolla and the same geographical distribution. Thus, the variety *A. longiracemosum* var. *trichocladum* is now considered a synonym of this species, including the combination made by Laroche (*A. trifoliatum* var. *trichocladum*), since the diagnostic character used by the author (quantity of indumentum on the leaves - abaxial surface of leaflets, petiole, and petiolule tomentose) cannot be used to differentiate between the proposed variety and

the type-variety, because when comparing specimens the quantity of indumentum is very variable (we found specimens from hirsute to glabrous). Additionally, the type of this name falls within the variation accepted for *A. trifoliatum*.

**Typifications:** The variety *Adenocalymma longiracemosum* var. *trichocladum* was described from a single collection, *Martius 1080*, which is currently known only from 2 photographs, deposited at K and F. Since no other material associated with the original protologue exists, neotypification is necessary.

The varieties proposed by de Candolle (1845) can be differentiated, according to the author himself, only by the large amount of hirsute indumentum on the stems and leaves of *A. longiracemosum* var. *trichocladum*. After examination of various collections, a continuous variation of this characteristic was observed, i.e. from glabrous to hirsute plants, not allowing the recognition of varieties, which led to synonymisations (see New Synonyms item above). Thus, the choice of a neotype for *A. longiracemosum* var. *trichoclada* was based on the amount of trichomes of the specimens and, consequently, in their agreement with the protologue. Thus, we selected the specimen *Araujo 7133*, deposited at GUA, as neotype because it is one of the specimens that best represents this extreme variation (large amount of hirsute indumentum on the stems and leaves).

**24. *Adenocalymma uleanum*** Kraenzl., Notizbl. Königl. Bot. Gart. Berlin 6(60): 372 (1915).

Lectotype (designated here): Peru, Loreto: Yurimaguas, Aug 1902 (fl), *Ule 6280* (MG!).

= *Adenocalymma latifolium* Rusby, Descr. S. Amer. pl. 121 (1920) ['latifolia'].

Lectotype (designated here): Bolivia, s.loc.: s.a. (fl), *Bang 2535* (NY00313041!; isolectotypes: K000449353!, NY00313040!).

**Typifications:** In the protologue of *Adenocalymma uleanum*, Kränzlin (1915) cited only 2 collections, *Ule 6280* and *Ule 9784*, which were deposited at MG and B, respectively. As there was no indication of the holotype in the protologue, it is necessary to choose a lectotype from among these syntypes. Since the collection deposited at B was destroyed (only 2 photographs are currently known and deposited at F and K), we selected the specimen *Ule 6280*, deposited at MG, as the lectotype.

*Adenocalymma latifolium* was described from a single collection, *Bang 2535*, which has 3 specimens, 2 deposited at NY and another at K. As the specimens at NY are probably original, since Rusby worked at NY (Stafleu and Cowan, 1981) and there are notes made by Rusby on the labels of these specimens, we selected the preparation NY00313041, which has well-developed inflorescences and flowers and a young fruit, as the lectotype.

### Status change

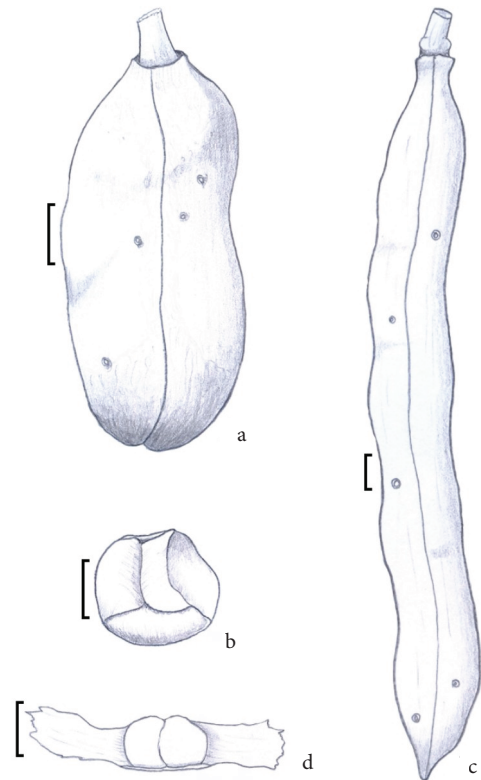
**1. *Adenocalymma apterospermum*** (Sandwith) Udulutsch & Assis, **comb. nov.**

= *Adenocalymma marginatum* (Cham.) DC. var. *apterospermum* Sandwith, Kew Bull. 1954: 610 (1955).

Type: Brazil, Santa Catarina: Florianópolis, Tavares river, 11 Mar 1953 (fl, fr), *Reitz & Klein 300* (holotype: K000449343!).

*Adenocalymma apterospermum* was described as a variety of *A. marginatum* and, according to the author (Sandwith, 1955), it is different from the type variety because it has less compressed valves, wingless seeds, and leaves with an apiculate or emarginate apex.

However, the presence of leaflets with a retuse and mucronulate, rarely obtuse apex in *A. marginatum* var. *apterospermum* (against acuminate apex in *A. marginatum* var. *marginatum*), cylindrical fruits with a length to width ratio of 2.7–4.6 and a thickness of 3 cm (against subcylindrical fruit, with a ratio of 8.1–10.5 and up to 1.5 cm thick in *A. marginatum* var. *marginatum*, Figure 2), wingless seeds (against winged seeds in *A. marginatum* var. *marginatum*, Figure 2) and flowers with puberulent filaments and style (against glabrous filaments and style



**Figure 2.** *Adenocalymma apterospermum*: a-fruit, b-seed. *A. marginatum*: c-fruit, d-seed. (a–b) from *Smith 12317* (R); (c–d) from *Araujo 8946* (GUA). Scale bar: 1 cm (line illustrations by R.G. Udulutsch).

in *A. marginatum* var. *marginatum*) make these “varieties” very distinct. Additionally, there are significant differences in the geographical and ecological distributions of these “varieties”. While *A. marginatum* var. *apterospermum* occurs only in the coastal states of Santa Catarina and Rio Grande do Sul, in areas occupied by restingas and dunes, *A. marginatum* var. *marginatum* is widely distributed, occurring in the north, northeast, west-central, south-east, and south of Brazil and in Argentina and Paraguay, in cerrado areas and predominantly in deciduous and semideciduous seasonal forests. Considering the morphological features mentioned above and the differences in geographical and ecological distributions, we propose a status change, elevating *A. marginatum* var. *apterospermum* to the species level.

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