

Clarifying the application of the long-confused name *Aloe commutata*, and the establishment of *Aloe ×commutata* Tod. (Asphodelaceae)

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Summary: The taxonomic history and application of the long-confused name *Aloe commutata* Tod. is reviewed and clarified. The name had previously been variously included in the synonymy of *Aloe macrocarpa* Tod., *A. maculata* All. and *A. grandidentata* Salm-Dyck. We agree with Reynolds (1950) that it shows characters that are intermediate between the latter two species and is likely a hybrid between them. Given the distinct horticultural value of this hybrid, the name is here resurrected as *Aloe ×commutata* Tod. We also show that Engler never published a later homonym, *Aloe commutata* Engl.; his misapplied use of the name in a specific sense [*A. commutata sensu auct.* Engler (1892)], however, became entrenched in the literature.

Zusammenfassung: Die taxonomische Geschichte und Anwendung des lange fehlinterpretierten Namens *Aloe commutata* Tod. wird analysiert und geklärt. Der Name wurde früher unteschiedlich als Synonym von *Aloe macrocarpa* Tod., *A. maculata* All. und *A. grandidentata* Salm-Dyck betrachtet. Wir stimmen mit Reynolds (1950) überein, dass das Taxon Merkmale zeigt, die zwischen den zwei letztgenannten Arten stehen, und dass es sich wahrscheinlich um die entsprechende Hybride handelt. Unter Berücksichtigung des klaren gärtnerischen Potentials dieser Hybride wird der Name hier als *Aloe ×commutata* Tod. wieder aufgenommen. Wir zeigen zudem, dass Engler nie ein späteres Homonym *Aloe commutata* Engl. publizierte, aber seine fälschliche

Anwendung des Namens [*A. commutata sensu auct.* Engler (1892)] auf Artebene hat sich tief in die Literatur eingegraben.

Introduction

Between 1876 and 1892, Agostino Todaro (1818–1892) published the *Hortus Botanicus Panormitanus* (1876–1878; 1879–1892) in which he described, among other entities, 10 species of *Aloe* L., all of which were at the time grown in the Botanical Garden of Palermo, in Italy. Of the names he established, three are currently accepted as referring to good species, one represents an interspecific hybrid, and six are either of unresolved application or are treated as synonyms of other accepted names (Table 1). Two further ‘*Aloe*’ names (*A. haynaldii* and *A. candelabrum*) are listed by IPNI as having been published by Todaro in this book; both became established in the literature and sources of confusion (see e.g. Grace *et al.*, 2011). However, these names in fact refer to *Agave haynaldii* [probably a synonym of *Agave difformis* A.Berger] and *Agave candelabrum* [probably a synonym of *Agave cantala* (Haw.) Roxb. ex Salm-Dyck] (see Gentry, 1982).

One of the names published by Todaro in 1878, *Aloe commutata* Tod., for a maculate aloe that was cultivated in the Botanical Garden of Palermo, has become a source of confusion – it had *inter alia* previously been included in the synonymy of *Aloe macrocarpa* Tod., *A. maculata* All. and *A. grandidentata* Salm-Dyck. The history and application of the name *A. commutata* is reviewed and clarified.



Figure 1. The flowers of *A. maculata* are longer than those of *A. grandidentata*, and have a prominent basal swelling. The flowers are usually uniformly coloured and in most forms the lower leaf surfaces are milky green rather than spotted. **Figure 2.** *Aloe grandidentata* in its natural habitat near Winburg in the Free State province, South Africa. The leaves of this species have maculations on both surfaces, and the tepals are white-margined. At this locality it occurs sympatrically with *A. maculata*. Photos: Gideon F. Smith.

Table 1. Species of *Aloe* described by Todaro in *Hortus Botanicus Panormitanus* and their current status.

Name	Reference (publication date*)	Origin	Status suggested in the literature
<i>A. agavefolia</i>	vol. 1, p. 85, t. 23 (1878)	Probably tropical Africa	Application unresolved
<i>A. cernua</i>	vol. 2, p. 50, t. 36 (1890)	Madagascar	= <i>A. capitata</i> Baker var. <i>capitata</i>
<i>A. commutata</i>	vol. 1, p. 75, t. 18 (1878)	Unknown, probably Cape of Good Hope	= <i>A. grandidentata</i> Salm-Dyck, = <i>A. maculata</i> All., = <i>A. macrocarpa</i> Tod.
<i>A. elegans</i>	vol. 2, p. 25 (1882), t. 29 (1886)	Ethiopia	Accepted
<i>A. fulgens</i>	vol. 2, p. 40, t. 33 (1889)	Probably southern Africa	= <i>A. arborescens</i> Mill. subsp. <i>arborescens</i>
<i>A. lanzae</i>	vol. 2, p. 54 (1890), t. 39 (1891)	Unknown, probably Cape of Good Hope	= <i>A. vera</i> (L.) Burm.f.
<i>A. macrocarpa</i>	vol. 1, p. 36, t. 9 (1876)	Ethiopia	Accepted
<i>A. percrassa</i>	vol. 1, p. 81, t. 21 (1878)	Ethiopia	Accepted
<i>A. rossii</i>	vol. 2, p. 58, t. 40 (1891)	Madagascar	= <i>A. deltoideodonta</i> Baker var. <i>deltoideodonta</i>
<i>A. schimperi</i>	vol. 1, p. 70, t. 16 (1878)	Probably Ethiopia	Accepted (as a hybrid between <i>A. maculata</i> All. and <i>A. striata</i> Haw.)

*as given in TL-2 (<http://tl2.idcpublishers.info/>)

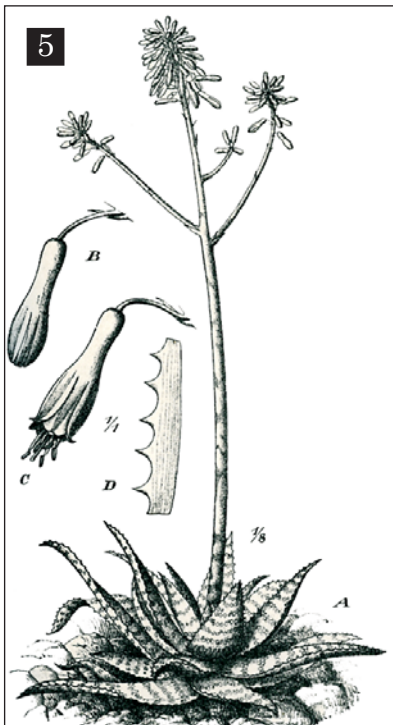
We agree with Reynolds (1950) that the entity to which the name was applied shows characters that are intermediate between *A. maculata* (Figure 1) and *A. grandidentata* (Figure 2) and is likely a hybrid between them. Given the distinct horticultural value of this hybrid, the name is here resurrected as *Aloe* ×*commutata* Tod. We were able to verify that Engler did not publish a later homonym, *Aloe commutata* Engl.; his misapplied use of the name *A. commutata* Tod. in a specific sense, however, became entrenched in the literature.

***Aloe commutata* Tod. and *A. commutata sensu auct.* Engler (1892)**

Aloe commutata was one of the new species described by Todaro (1876–1878). He noted that the plant to which he applied this name had previously been referred to *A. grandidentata* Salm-Dyck, but he considered it to be distinct as it did not have elongate-lanceolate leaves that are reflexed from the base, while the flowers were more widely spaced in the sparse inflorescences. However, he acknowledged that the perianth was clavate and the stamens exerted, which are characters associated with *A. grandidentata*. Todaro's plants were of uncertain origin, but he suggested that it might be the Cape of Good Hope, a locality name often used in older literature for (somewhere

in) South Africa. In fact, the original geographical distribution ranges of the plants described by Todaro are often uncertain (see Table 1) which seemingly indicates that no accurate records were kept on their acquisition and origin

In 1897, five years after Todaro passed away, the well-known cactus and succulent specialist Alwin Berger (1871–1931) started a 17-year residency as curator of La Mortola, also known as the Hanbury Gardens, in Italy (Gastaldo & Profumo, 1999; Greggio, 2001, 2002; Mazzino, 1997; Moore, 2004; Russo, 2001). While based there he established remarkable taxonomic insights into the classification of the genus, and the infrageneric groups he recognized were eventually adopted in an amended format by Reynolds (1950). Berger clearly had access to Todaro's material as he treated *A. commutata* in his major works on aloes (Berger, 1905, 1908). Berger (1905, 1908) accepted the name *A. commutata* as circumscribed by Todaro as a good species. He noted that in leaf shape and maculation the species was similar to, and could be confused with, *A. saponaria* (Ait.) Haw. (a name at present treated as a synonym of *A. maculata* All., cf. Guglielmone *et al.*, 2009), but the shape of the perianth and the elongated racemes easily separated it from that species (Berger, 1908). Other authors did not agree with Berger's acceptance of *A. commutata* Tod. (Table 2.)



Berger (1908) also referred to an *A. commutata* Engl., which he considered distinct from Todaro's species and synonymized with *A. macrocarpa* Tod. This appeared to indicate that Engler had himself described a species with the same epithet, which caused some confusion among later authors. In fact, the entity is *A. commutata sensu auct.* Engler (1892), a misapplied name. In that 1892 publication, Engler did not describe an entity as *A. commutata* under his name, but listed the species *A. commutata* Tod. and cited the collection *Schimper 798* from Ethiopia. The same collection had already been cited by Baker (1881) under *A. commutata* Tod., which he listed as occurring in Ethiopia and noted that it was introduced into cultivation in Europe in 1878, and was again cited by Baker in 1898 under *A. commutata* Tod. Later Berger considered this collection to be wrongly identified as *A. commutata*, and determined it to be *A. macrocarpa* (Berger, 1908). He noted that it differed from *A. commutata* in the globose perianth base and described it as *A. macrocarpa* var. *major* A. Berger, of which it became the type.

Figure 3. *Aloe* ×*commutata* in cultivation in the Desert Garden of the Huntington Botanical Gardens near Pasadena in California, USA. This hybrid has definite horticultural value. Photo: Gideon F. Smith. **Figure 4.** Close-up of an inflorescence of *A. ×commutata*, showing the club-shaped flowers. Photo: Gideon F. Smith. **Figure 5.** Black and white drawing of *A. commutata* (Berger, 1908: Fig. 77 A–D). This image closely coincides with the colour plate of the species included in Todaro (see Figure 6).

Table 2. Interpretation of the name *Aloe commutata* Tod.

Author (date: page number)	Suggested taxonomy
Baker (1881: 165)	Accepted, including the plant cultivated in Palermo in 1878 and the Ethiopian collection <i>Schimper 798</i> (BM)
Engler (1892: 164)	Accepted as an Ethiopian species, based on <i>Schimper 798</i>
Baker (1898: 421)	Accepted as an Ethiopian species, based on <i>Schimper 798</i>
Berger (1908: 214)	Accepted, excluding Ethiopian collections
Groenewald (1941: 48)	Accepted, closely related to <i>A. grandidentata</i>
Reynolds (1950: 293)	A doubtful species that could be <i>A. grandidentata</i> × <i>A. saponaria</i> (= <i>A. maculata</i>)
Reynolds (1966: 94)	Only ' <i>A. commutata</i> Engler non Todaro' is listed, as a synonym of <i>A. macrocarpa</i> Tod. var. <i>major</i> A.Berger
Jacobsen (1986: 153)	Accepted
Glen & Hardy (2000: 148)	An insufficiently known species, probably <i>A. maculata</i> × <i>A. grandidentata</i> .
Newton (2001: 105)	Name of unresolved application
Govaerts & Newton (2006)	Synonym of <i>A. maculata</i> All.
Grace (2009: 119)	Only ' <i>A. commutata</i> Engler' is listed, as a synonym of <i>A. macrocarpa</i> Tod.
Grace <i>et al.</i> (2011: 95, 181)	Synonym of <i>A. maculata</i> All.
Carter <i>et al.</i> (2011: 173, 710)	Only ' <i>A. commutata</i> Engler' is listed, as a synonym of <i>A. macrocarpa</i> Tod.

He cited '*A. commutata* Engler' as a synonym of this new taxon. Following this, subsequent authors also included what they referred to as '*A. commutata* Engler' in *A. macrocarpa* (e.g. Newton, 2001; Carter *et al.*, 2011).

Aloe commutata Tod. has been mostly cited as a doubtful or insufficiently known species (Reynolds, 1950; Glen & Hardy, 2000; Newton, 2001), as a synonym of *A. maculata* (Govaerts & Newton, 2006; Grace *et al.*, 2011) or omitted (Carter *et al.*, 2011) (see Table 2). Furthermore, Reynolds (1950) inexplicably regarded the plant depicted by Berger (1908: Fig 77 A–D; see Figure 5) as *A. commutata* as differing from Todaro's species in the shape of the perianth and that it could be a form of *A. grandidentata*. It is our view that these images closely coincide.

***Aloe macrocarpa* Tod.**

The description of *A. macrocarpa* was also published by Todaro in 1876. According to Baker (1881, 1898) this species was found initially in Ethiopia and introduced in cultivation in European gardens by Schimper in 1870. Later it was found in West Africa (Keay, 1968). It is known to occur from Sudan to Benin (Demissew & Gilbert, 1997). This species is characterized by the

maculate leaves with usually numerous pale spots and longitudinal darker lines and the distinct globose swelling of the perianth. The leaves are lanceolate to lanceolate-attenuate, reaching 40 cm in length. While this species has large fruit, for which it was named, *Aloe vanrooyenii* Gideon F.Sm. & N.R.Crouch, another maculate aloe, but from further south in KwaZulu-Natal, South Africa, easily competes with it as far as fruit size is concerned (Smith & Crouch, 2006).

***Aloe tricolor* Baker**

In *Flora capensis*, Baker (1897) recorded *A. tricolor* Baker as a species originating from South Africa; it was described from a living plant that flowered at Kew in April, 1877. *A. tricolor*, labeled as a Cape species, was described by Baker in 1877, before Todaro published his *A. commutata*. It was based on a plant received from the Oxford Botanic Garden, who in turn received it from a Mr Justus Corduroy of Blewbury. The name was illegitimate since there was a previous *A. tricolor* published in 1804 by Haworth (now a synonym of a *Haworthia*). Baker (1877) noted that the species differed from *A. saponaria* (= *A. maculata*) on the typically racemose not capitate inflorescence and constricted perianth tubes,



Figure 6. Colour plate of *Aloe commutata* (Todarò, 1876–1878: t.18).

and from *A. macrocarpa* on leaf shape and maculation. According to Berger (1908) the plant described by Baker is conspecific with *A. commutata* Tod., and he recognised it as a variety, *A. commutata* var. *tricolor* (Baker) A. Berger. This name has been omitted in recent treatments (e.g. Carter *et al.*, 2011) or wrongly cited as *A. commutata* var. *bicolor* (e.g. Govaerts & Newton, 2006).

***Aloe commutata* in cultivation**

Material of several hundred species of *Aloe* is today found in cultivation in the Desert Garden of the Huntington Botanical Gardens near Pasadena in California in the USA. One of these coincides closely with the description Todaro provided for *A. commutata*, in that the leaves are fairly short and somewhat deltoid, both surfaces are distinctly maculate, and the flowers lack the prominent bulbous swelling found in the flowers of most maculate aloes. The Desert Garden was established in 1907, at the suggestion of William Hertrich (Hertrich, 1940, 1988) who was ranch supervisor and later curator of that Garden for nearly 45 years (Houk, 1996; Lyons, 2007). Hertrich established links with Gardens around the world and it is possible that he obtained material of this *Aloe* from a garden such as La Mortola, near Ventimiglia in northwestern Italy, where Alwin Berger worked.

Conclusion

We conclude that *A. commutata* is distinct from *A. macrocarpa* and *A. maculata* and that it was variously synonymised with these species as a result of misinterpretations. The plant growing in England and described as *A. tricolor* and that growing at the same time in Palermo described as *A. commutata* appear to be the same entity. Both are illustrated in the literature (Todaro 1876–1878, tab. 18; Baker 1877: tab. 6324) and one herbarium specimen is known [s.c. s.n. (K, K000256650)]. The older name being illegitimate, the correct name for the entity is *A. commutata* Tod. The plant specimen referred to by Engler as *A. commutata* belongs to *A. macrocarpa*, an Ethiopian/West African species. Reynolds (1950) was correct in his assessment that *A. commutata* Tod. is likely a hybrid with *A. grandidentata* as one parent. This hybrid has distinct horticultural value and appeal and we here propose its formal recognition as *Aloe ×commutata* Tod. (Figures 3 and 4). Furthermore, at least one other interspecific hybrid in *Aloe*, *A. ×schoenlandii* Baker is known to be widely cultivated (and have become naturalized) in the USA (Holmes & White, 2002). In instances like this it is preferable to have a hybrid name with which to refer to the entity.

Accepted nomenclature:

***Aloe ×commutata* Tod.**

A. commutata Tod. (1876–1878: 75); Berger [1908: 214, excl. cit. Baker (1881, 1898) [see Figure 5]. Type: Illustration in Todaro (1876–1878: t. 18) [see Figure 6].

A. tricolor Baker (1877: tab. 6324), *nom. illeg.* Type: s.c. s.n. (K, K000256650).

A. commutata var. *tricolor* (Baker) A. Berger (1908: 214).

***Aloe macrocarpa* Tod.**

A. macrocarpa Tod. (1876–1878: 36). Type: Illustration in Todaro (1876–1878: t. 9).

A. commutata sensu auct. Baker (1881: 165; 1898: 421) *et* Engler (1892: 164).

A. macrocarpa Tod. var. *major* A. Berger (1908: 210). Type: *Schimper 798* (B hol.-; BM iso-).

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