

Nomenclatural notes on the subsection *Bowieae* in *Aloe* (Asphodelaceae: Alooideae)

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A revision of *Chamaealoe* Berger revealed that it should best be regarded as a synonym of *Aloe* L. *A. bowiea* Schult. & J.H. Schult., previously known as *C. africana* (Haw.) Berger, is a distinctive species which shows organographic affinities with *Aloe* sect. *Graminialoe* Reynolds. However, it is clearly distinct from its nearest congeners by the combination of its dense, grass-like rosettes, lax, elongated racemes, shortly pedicellate flowers and much exserted anthers and style. By virtue of these characters the genus *Bowiea* Haw. non Harv. ex Hook f. *pro parte quoad A. myriacantha* (Haw.) Schult. & J.H. Schult. is here reinstated as a subsection in the section *Graminialoe*, namely, *Bowieae* (Haw.) G.F. Smith, with *A. bowiea* the only species. This taxon is described, typified and its position in the 'Key to sections, subsections and series' in Reynolds' The aloes of South Africa, is also indicated.

'n Hersiening van *Chamaealoe* Berger het aan die lig gebring dat hierdie genus 'n sinoniem van *Aloe* L. is. *A. bowiea* Schult. & J.H. Schult., voorheen bekend as *C. africana* (Haw.) Berger, is 'n eiesoortige spesie wat organografiese verwantskappe met *Aloe* seksie *Graminialoe* Reynolds toon. Hierdie spesie kan egter duidelik van verwante spesies onderskei word op grond van 'n kombinasie van sy digte, grasagtige rosette, yl, verlengde raseme, kort-gesteelde blomme en uitgestote meeldrade en style. Op grond van hierdie kenmerke word die genus *Bowiea* Haw. non Harv. ex Hook. f. *pro parte quoad A. myriacantha* (Haw.) Schult. & J.H. Schult. heringestel as 'n subseksie in die seksie *Graminialoe*, naamlik *Bowieae* (Haw.) G.F. Smith, met *A. bowiea* die enigste spesie. Hierdie takson word beskryf, getipeer en sy posisie in die 'Sleutel tot seksies, subseksies en series' in Reynolds se The aloes of South Africa word bespreek.

Keywords: *Aloe*, *Bowieae*, nomenclature, taxonomy, typification

Introduction

Modern students of *Aloe* L. owe much credit to Dr G.W. Reynolds who made the study of African and Madagascan aloes his life's work (Reynolds 1950, 1966). Reynolds (1950) recognized 132 southern African species in *Aloe* and arranged these in numerous sections, subsections and series. Towards the completion of his monographs on *Aloe* Reynolds apparently developed a much stricter species concept (Lavranos 1973). However, some of the taxa which he did not regard as warranting specific rank or considered to be separate genera, have since been recognized as good species, for example, *A. meyeri* van Jaarsveld and *A. bowiea* Schult. & J.H. Schult.

To stabilize aloeid taxonomy and to facilitate the identification of these and other newly discovered species, it is important that they are incorporated in Reynolds' infrageneric key to *Aloe*. This has been done by most of the recent authors of *Aloe* species, for example, Leach (1968, 1971a, b) for *A. tauri*, *A. cannelii*, *A. trigonantha*, *A. esculenta* and *A. inamara*; Giess (1973) for *A. dewinteri*; Hardy (1976) for *A. pictifolia* and van Jaarsveld (1981, 1982, 1985) for *A. meyeri*, *A. dabenorisana* and *A. komaggasensis*.

The genus *Aloe* in southern Africa is currently being revised by H.F. Glen and D.S. Hardy and it is the contention of the present author that the recognition of distinctive, natural categories will contribute toward a better understanding of relationships within the genus. One such a category is *Aloe* section *Graminialoe* subsection *Bowieae*.

The present paper emanates from a detailed taxonomic study of the smaller genera of the subfamily Alooideae, Asphodelaceae *sensu* Dahlgren *et al.* (1985). This study includes *Chamaealoe* Berger, which was previously upheld as a monotypic genus, and confirmed that it should best be regarded as a species of *Aloe*. However, the infrageneric classification of *A. bowiea* has not yet been clarified. The aim of this article is to correctly place *A. bowiea* in *Aloe* and for this purpose the *Bowieae* is reinstated at subsectional level in the section *Graminialoe*. This taxon is described, typified and its relationships with closely allied taxa are discussed.

Early history of the *Bowieae*

After Medikus' (1786) abortive subdivision of the heterogeneous *Aloe sensu* Linnaeus (1753), Haworth (1804) produced the first real attempt to divide this genus into smaller, more natural units. Although Haworth (1804) still retained *Aloe* for all the genera of the subfamily Alooideae, he erected the infrageneric *Grandiflorae*, *Parviflorae* and *Curviflorae* for taxa currently classified in *Aloe*, *Haworthia* Duval and *Gasteria* Duval, respectively. Five years later Duval (1809) separated *Haworthia* and *Gasteria* from *Aloe* at generic level, thereby giving *Aloe* its current definition. The latter generic arrangement was, however, not universally accepted.

Salm-Dyck (1834), one of the authors who reverted to using the name *Aloe* in the broad Linnaean sense, published a catalogue of the plants which he cultivated in his gardens at Schloss Dyck. Salm-Dyck upheld

Haworth's (1804) *Parviflorae* and *Grandiflorae*, the latter being divided into two categories, respectively defined by 'Tubo recto' (*Aloe*) and 'Tubo curvato' (*Gasteria*). Within the *Parviflorae* he recognized 14 sections, unambiguously designated as such by the statement 'Sectionum characteres' on p. 312 of his *Hortus Dyckensis* (Salm-Dyck 1834). One of these sections, *Bowieae*, was based on *Bowiea* Haworth (1824), the genus in which *A. bowiea* was originally described as *B. africana*. A second species of *Bowiea*, namely *B. myriacantha*, was subsequently described by Haworth (1827), but two years later both these species were transferred to *Aloe* by Schultes & Schultes (1829).

Salm-Dyck (1834) established *Bowieae* on *A. bowiea* only, *A. myriacantha* apparently having been unavailable to him. In his monumental work on rosulate, petaloid leaf succulents and fig-marigolds, Salm-Dyck (1836) upheld the section *Bowieae* and also suggested that *A. myriacantha* should be included in this section which he regarded as transitional between *Haworthia* and *Aloe*. Kunth (1843) supported the latter point of view whilst Endlicher (1836) and Bentham & Hooker (1883) in their synoptic works simply listed *Bowiea* Haw. as a synonym of *Aloe* L. Baker (1880, 1896) accepted Duval's (1809) subdivision of *Aloe sensu* L. (1753) and replaced the sections proposed by Salm-Dyck (1834, 1836) with subgenera. Baker included both *A. bowiea* and *A. myriacantha* in group 1 *Acaules* of the subgenus *Eualoe*.

Although obviously related and belonging in the same genus, *A. bowiea* and *A. myriacantha* are quite distinct from each other and it is inexplicable why Haworth (1824, 1827) regarded these two species as warranting separate generic recognition in *Bowiea*. This is further illustrated by the fact that generic status was later suggested for both *A. bowiea* and *A. myriacantha* as *Chamaealoe africana* (Haw.) Berger (1905, 1908) and *Leptaloe myriacantha* (Haw.) Stapf (1933), respectively. The genus *Leptaloe* was short-lived, Reynolds (1947) including it in the synonymy of *Aloe*. However, Marloth (1915), Groenewald (1941) and Reynolds (1950, pp. 57–58, 94) upheld the monotypic *Chamaealoe*. Recently Obermeyer (1973) and Smith (1983) again suggested that *C. africana* should best be regarded as a synonym of *A. bowiea* Schult. & J.H. Schult.

Infrageneric affinities and systematic position of subsection *Bowieae*

Although *A. bowiea* shows superficial floral morphological affinities with the section *Anguialoe* Reynolds (Obermeyer 1973; Court 1981), all members of this infrageneric category, with the exception of *Aloe vryheidensis* Groenewald (1936) attain tree-like dimensions (Reynolds 1940; Dyer 1941; von Breitenbach 1986). *A. bowiea* on the other hand is an acaulescent, miniature aloe and does not exceed 130 mm (Figure 1).

In terms of stature and gross morphology, *A. bowiea* is more closely related to the section *Graminialoe*, Reynolds. As in the case of most members of the *Graminialoe*, *A. bowiea* also possesses relatively short,

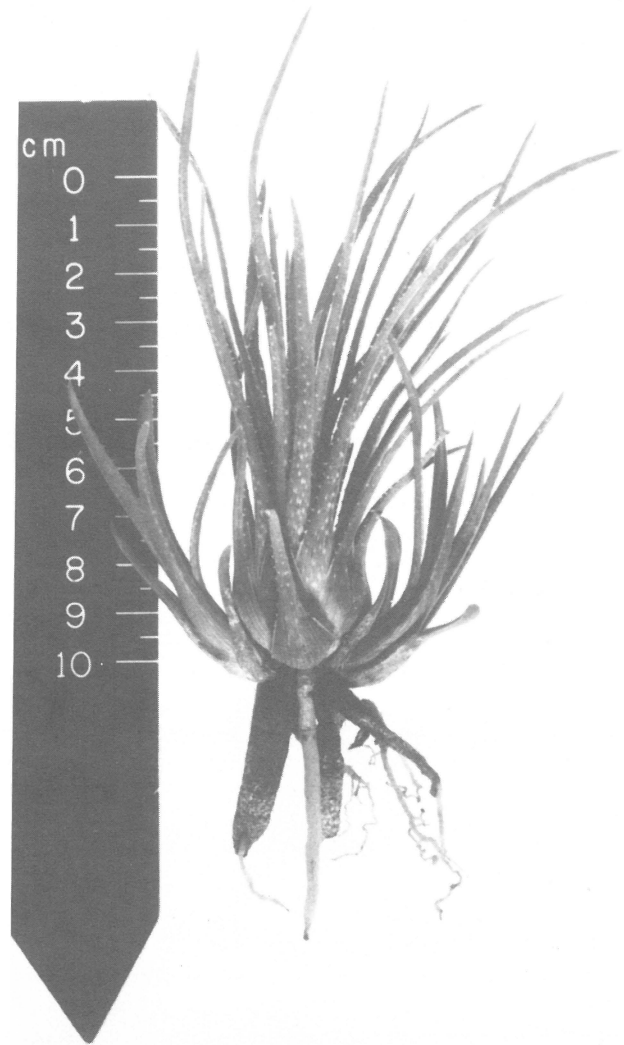


Figure 1 Growth form of *Aloe bowiea* showing dense, grass-like rosettes of narrowly linear leaves and fusiform roots. (Specimen from Coega, eastern Cape Province).

narrowly linear, erect leaves. The leaves of *A. bowiea* are, however, borne in a dense, grass-like rosette (never distichous) and are distinctly succulent. Like all the representatives of the *Graminialoe*, *A. bowiea* also has fleshy, fusiform roots. However, amongst the grass aloes the floral morphology of *A. bowiea* is unique in that the small, shortly pedicellate, spreading, greenish-white flowers are laxly dispersed in a slender raceme (Figure 2). Furthermore, in all the other species of the section *Graminialoe* the anthers and style are included or very shortly exerted whilst, in contrast, those of *A. bowiea* are always much exerted. Since this species does not fit into existing infrageneric aloeid categories and to emphasize its aberrant nature, *A. bowiea* is here considered to be best treated as the only species of a monotypic subsection. For this purpose the genus *Bowiea* Haw. is reinstated as *Aloe* sect. *Graminialoe* subsect. *Bowieae* (Haw.) G.F. Smith. Outstanding organographic differences between the subsections *Graminialoe* and *Bowieae* are summarized in Table 1.

Table 1 Summary of main organographic distinctions between subsections *Graminialoe* and *Bowieae* (Haw.) G.F. Smith of the section *Graminialoe* Reynolds

Character	Section <i>Graminialoe</i>	
	Subsection <i>Graminialoe</i>	Subsection <i>Bowieae</i>
Leaves		
number	14–16	18–25
arrangement	distichous or rosulate-multifarious	rosulate-multifarious
Racemes	capitate or conic-capitate; rarely cylindrical	lax, elongate
Flowers		
pedicel length (mm)	lowest > 10; rarely absent	1–2 throughout
anthers and stigma	included or very shortly exserted	much exserted

Discussion

After the publication of Reynolds' (1950) key to the sections, subsections and series of *Aloe*, two species apparently related to members of the section *Graminialoe*, namely *A. modesta* Reynolds (1956) and *A. inconspicua* Plowes (1986), were described. Both these species appear to be transitional between the sections *Graminialoe* Reynolds (1947) and *Leptoaloe* Berger (1908). *A. bowiea* is, however, clearly distinguished from *A. modesta* and *A. inconspicua* by its lax, elongated racemes and the lack of an underground, ovoid bulb-like swelling. *A. modesta* has densely congested, subcapitate racemes and pedicels shorter than that of *A. bowiea*. *A. inconspicua* has dense, cylindrical racemes and sessile flowers. The underground bulb-like swelling present in *A. modesta* and *A. inconspicua* is more reminiscent of *A. kniphofioides* Bak. of the section *Leptoaloe* Berger.

Although obviously related and monophyletic, these two sections can be readily separated on gross morphology (Bornman 1970; Laubscher 1973a; Jeppe 1977). However, in the case of taxa which have such wide geographical distributions as the *Graminialoe* and *Leptoaloe* (Bornman & Hardy 1971; Laubscher 1973b) the existence of apparent transitional species between and within these sections are to be expected. This clearly points to some of the difficulties surrounding infrageneric aloecoid classification. Furthermore, as Glen & Hardy (1987) justifiably remark, certain of the series which Reynolds (1950) recognized in the section *Eualoe* might well also warrant sectional recognition. These problems of classification in *Aloe* are not restricted to southern African taxa, but also apply to the tropical aloes at all levels of the hierarchy (Lavranos & Newton 1976). *Aloe* is taxonomically complex and the description of new species or infrageneric categories in this genus [or any other Alooideae genus for that matter, cf. Bayer (1970, 1972) on *Haworthia*] should be done with great caution.

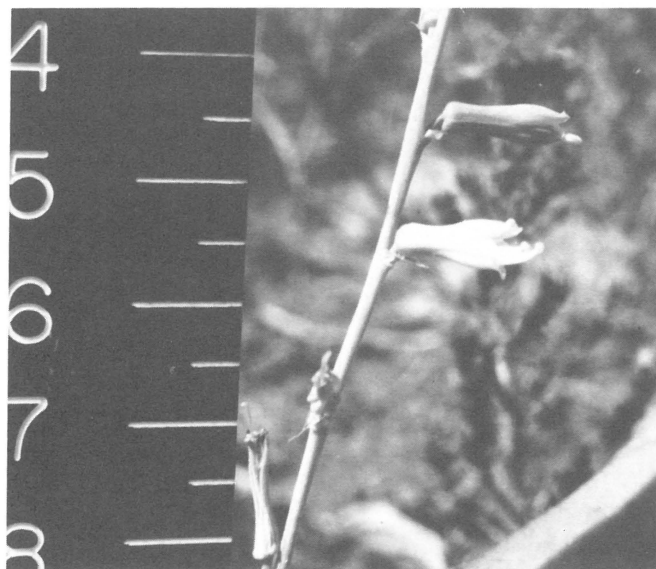


Figure 2 Part of inflorescence of *Aloe bowiea*. Note lax raceme and small, ventricose flowers with anthers and style much exserted. (Specimen from Coega, eastern Cape Province).

Nomenclatural notes and description of subsections of *Graminialoe*

***Aloe* L.** in *Species Plantarum* 1: 319 (1753) *pro parte fide* Duval (1809). For generic description and synonymy see Reynolds (1950), Dyer (1976), Webb (1980) and Forster & Clifford (1986).

***Aloe* section *Graminialoe* Reynolds** in *J. S. Afr. Bot.* 13: 104 (1947); Reynolds: 110 (1950); Reynolds: 6 (1966); Jacobsen: 65 (1977). Type species: *A. myriacantha* (Haw.) Schult. & J.H. Schult., designated by Reynolds: 104 (1947).

Genus *Leptoaloe* Stapf: t. 9300 (1933).

Description

Plants small, acaulescent. *Roots* fusiform. *Leaves* 4–25, narrowly linear, mostly rosulate-multifarious, sometimes distichous. *Inflorescence* simple. *Peduncle* slender, sterile bracteate in upper two-thirds. *Racemes* capitate, conic-capitate or lax. *Flowers* pedicellate. *Pedicels* 1–2 mm long (subsection *Bowieae*), 10–20 mm long (subsection *Graminialoe*) or rarely absent. *Perianth* 8–20 mm long, basally substipitate, ventricose, the mouth trigonous upturned or bilabiate. *Segments* free. *Anthers* and *style* included, very shortly exserted or much exserted (subsection *Bowieae*).

In southern Africa species of the section *Graminialoe* occur widespread in grassland in the eastern Transvaal, Natal and the eastern Cape Province. The type species, *A. myriacantha* has the second widest geographic distribution of known *Aloe* species, ranging from Grahamstown in the eastern Cape northwards to Kenya and Uganda (a distance of about 5 000 km between the extremes). Other taxa included are: *A. albida* (Stapf)

Reynolds; *A. minima* Bak. var. *minima*; *A. minima* var. *blyderivierensis* (Groenewald) Reynolds; *A. parviflora* Bak. [probably a synonym of *A. minima*; cf. Addendum I in Reynolds (1982)] and *A. saundersiae* (Reynolds) Reynolds — all confined to southern Africa.

Key to subsections of *Graminialoe*

- 1a Raceme dense, capitate to conic-capitate (rarely cylindrical); pedicels over 10 mm long (rarely absent); anthers and style included; leaves 4–16 subsection *Graminialoe*
 1b Raceme lax, elongate; pedicels 1–2 mm long; anthers and style much exserted; leaves 18–25 subsection *Bowieae*

Section *Graminialoe* Reynolds subsection *Graminialoe*

Nomenclature and type as for the section.

Description

Plants small, acaulescent. *Roots* fusiform. *Leaves* 4–16, narrowly linear, mostly rosulate-multifarious, sometimes distichous. *Inflorescence* simple. *Peduncle* slender, sterile bracteate in upper half. *Racemes* capitate or conic-capitate. *Flowers* pedicellate. *Pedicels* 10–20 mm long (rarely absent). *Perianth* 10–20 mm long, basally substipitate, the mouth trigonous upturned or bilabiate. *Segments* free. *Anthers* and *style* included or very shortly exserted.

Section *Graminialoe* Reynolds subsection *Bowieae* (Haw.) G.F. Smith, comb. et stat. nov.

Type species: *A. bowiea* Schult. & J.H. Schult., here designated.

Genus *Bowiea* Haw.: 299 (1824), 122 (1827) *pro parte quoad A. myriacantha*, non Harv. ex Hook. f. in Hooker: t. 5619 (1867).

Genus *Aloe* section *Bowieae* (Haw.) Salm-Dyck: 313 (1834); Salm-Dyck: Sect. 14, t.1 (1836) *pro parte quoad A. myriacantha*; Kunth: 515 (1843) *pro parte*.

Genus *Chamaealoe* Berger: 43 (1905); Berger: 120 (1908); Jacobsen: 144 (1977).

Description

Plants small, acaulescent. *Roots* fusiform. *Leaves* 18–25, narrowly linear, rosulate-multifarious. *Inflorescence* simple. *Peduncle* slender, sterile bracteate in upper two-thirds. *Racemes* elongate, lax. *Flowers* pedicellate. *Pedicels* 1–2 mm long. *Perianth* 8–15 mm long, basally substipitate, ventricose, the mouth trigonous upturned. *Segments* free. *Anthers* and *style* much exserted (Figures 1–2).

The monotypic subsection *Bowieae* is based on *A. bowiea*, a species previously considered by many authors to be somewhat aberrant within the genus *Aloe*. This rare and endangered plant is endemic to the eastern Cape Province. It is known only from two populations, one in the vicinity of Coega (Figure 3) and the other near Kariega. It recently became extinct at a locality in the neighbourhood of Uitenhage.

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Figure 3 Valley Bushveld vegetation (*sensu* Acocks 1988), in habitat of *Aloe bowiea* at Coega, eastern Cape Province. This locality is one of only two known for the species.

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