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# Revision of the Genus *Aloe* L. in Saudi Arabia

**Abstract:** An account of fourteen taxa of the *Aloe* species with two natural hybrids occurring in the flora of Saudi Arabia is given, their taxonomy is discussed, a key is provided and six species of Lavranose & Collenette, *A. hijazensis*, *A. edentata*, *A. parvicoma*, *A. cephalophora*, *A. brunneodentata* and *A. parvicapsula* have been reduced to synonymy.

**Keywords:** Saudi Arabia, Flora, Genus *Aloe* L., Natural hybrids, Geographical distribution.

## Introduction

About 350 species have been described for the genus *Aloe* L., with a distribution ranging from the Arabian peninsula and throughout Africa. This is a complex genus and the species are not easily separated from each other but are more distinct in the field than in the herbarium specimens. Herbarium material of *Aloe* is often poorly prepared and is without adequate field notes on habitat, size, texture and marginal teeth of the leaves, inflorescence height and branching, bract and pedicel length, perianth length, color and shape. Photographs to show the habit are thus valuable. For the successful preparation of herbarium specimens, it is important to kill the flowers as quickly as possible before an abscission layer is formed at the base of each perianth. The whole inflorescence should be dipped into petrol for about 5-10 minutes. Leaves can be easily prepared by carefully cutting the lower surface around the edge, just inside the marginal teeth, peeling it off and scraping away the waste storage tissue, after which drying is easy.

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دراسة تصنيفية لجنس الصبار *Aloe* L. في المملكة العربية السعودية  
فهد بن محمد الحميد

المستخلص: جنس الصبار من الأجناس المعقدة تصنيفياً، حيث أن تمييز الأنواع داخل هذا الجنس ليس من السهولة بمكان خصوصاً عند التركيز على العينات المعشبية الجافة. اعتمدت هذه الدراسة على دراسة العينات الطازجة من خلال الزيارات الحقلية، إضافة إلى دراسة سابقة للباحث على العينات المحفوظة في المحاليل الكيميائية في معشبة حدائق كيو بلندن، وفحص العينات الأصلية والعينات الطازجة في الصوب الزجاجية بحدائق كيو أيضاً. أكدت الدراسة مجدداً أن جنس الصبار *Aloe* L. يحتوي على أربعة عشر نوعاً مع تمييز نوعين تمثل الهجين الطبيعي بالمملكة العربية السعودية. كما قدمت الدراسة مفتاحاً تحليلياً للأنواع، ووصفاً شاملاً لها داخل هذا الجنس. كما شملت على توزيعها الجغرافي محلياً وعالمياً ووصفاً للموقع. من نتائج هذه المراجعة التصنيفية تم تحويل ستة أنواع من الصبار لكل من Lavranose & Collenette التي مرادفات وهي على النحو التالي:

*A. hijazensis*, *A. edentata*, *A. parvicoma*, *A. cephalophora*,  
*A. brunneodentata* and *A. parvicapsula*

كلمات مدخلة: السعودية، نبات، جنس الصبار، الهجين الطبيعي، التوزيع الجغرافي.

All measurements in the descriptions and key are based on either fresh material, herbarium specimens or spirit collections which the author examined at Kew during his summer study visit to the Royal Botanic Gardens, Kew, England in 1998.

A survey of literature related to the *Aloe* of Arabian peninsula, such as Reynolds (1962, 1966), Lavranose (1965a, 1965b, 1995), Forssk. (1975), Migahid & Hammouda (1974), Lavranose and Newton (1977), Wood (1983, 1997), Collenette (1985, 1999), Glen and Smith (1995), Lavranose and Collenette (2000a, 2000b) and Rahman *et al.* (2002), showed that the genus *Aloe* is represented in the flora of Saudi Arabia with 20 species and two natural hybrids, of which 6 are endemic. The genus has never been subject to the revision for the flora. Hence, the present study has been conducted for the taxonomic revision of the genus for the flora of Saudi Arabia.

The present study with the fresh specimens in the field and herbarium specimens, including spirit collections, available at BM, E, K, RIY and the herbaria of the College of Pharmacy and the Department of Botany and Microbiology, King Saud University reveals that the genus is represented in the flora with 14 species and 2 natural hybrids. Six species, *A. brunncodentata*, *A. edentata*, *A. cephalophora*, *A. hijazensis*, *A. parvicapsula* and *A. parvicoma*, which have been described by Lavranose and Collenette from the flora of Saudi Arabia as an endemic taxa, are now reduced here as synonyms of *A. vacillans*, *A. fleurentinorum*, *A. sheilae*, *A. castellorum*, *A. woodii* and *A. rivierei* respectively.

### Generic Description

*Aloe* L., Sp. pl. 1: 319 (1753); Baker in Fl. Cap. 6: 302 (1896); Reynolds, Aloes South Africa, pp. 538 (1950) & Aloes Trop. Afr. & Madag., pp. 537 (1966); Collenette, Wildflowers Saudi Arabia, pp.

799 (1999); Carter in Fl. Trop. E. Afr. pp.60 (1994); Lavranos in Fl. Somalia 4: 35-42 (1995); Demissew & Gilbert in Fl. Ethiopia 6: 117-135 (1991); Wood in Kew Bull. 38:13-31 (1983) and in Handb. Yemen Fl. pp.434 (1997).

Perennial herbs, shrubs or small trees, acaulescent or with stem short or long, solitary or forming clumps. Leaves succulent, often lanceolate, entire or with toothed margins, crowded into rosettes or clustered at the apex of the stems with orange, red, yellow, purple or colorless sap. Inflorescences axillary, simple or branched. Bracts papery. Perianth zygomorphic, tubular, straight or curved, lobes 6 partially free, the outer usually slightly longer than the inner, glabrous or hairy, red, orange, pink, brown or yellow, rarely white. Stamens 6, free, the outer 3 usually longer than the inner 3; anthers linear, exerted or included. Styles filiform, longer than the filaments, stigmas capitate, exerted or included. Ovary superior; ovules numerous. Fruit a dry capsule. Seeds irregular, 3-sided to flattened, winged; black or brown.

### Key to the species of *Aloe* in Saudi Arabia

- |  |                                  |
|--|----------------------------------|
| 1. Plants with distinct stems  | 2                                |
| Plants stemless or with very short stems (up to 50 cm)   | 6                                |
| 2. Plants with erect stems   | 3                                |
| Plants with decumbent or prostrate stems   | 4                                |
| 3. Stems short, up to 200 cm; Leaves erect, up to 55 cm long, margins with reddish brown teeth; Inflorescence long, 100-120 cm; Perianth long, 30-33 mm, pinkish red | 6. <i>A. rivierei</i>            |
| Stems long, 300 cm; Leaves pendulous, 60-80 cm long, margins with whitish teeth; Inflorescence short, up to 70 cm; Perianth short, 22-26 mm, red-brown               | 8. <i>A. sabaea</i>              |
| 4. Inflorescence short, up to 40 cm  | 5                                |
| Inflorescence long, 85-120 cm; Leaves bluish green, margins with white teeth; Pedicels 3 mm long; Bracts up to 7 mm long; Perianth 32-40 long, bright red            | 5. <i>A. pseudorubroviolacea</i> |
| 5. Leaves red-violet, 40-55 cm long, margins with green teeth; Bracts long, 25-30 mm; Pedicels short, up to 2 mm; Perianth deep red, puberulent; Stigma exerted      | 7. <i>A. rubroviolacea</i>       |
| Leaves yellow-green, up to 35 cm long, margins with brown teeth; Bracts short, up to 10 mm; Pedicels long, 8-10 mm; Perianth pink, glabrous; Stigma included         | 14. <i>A. yemenica</i>           |
| 6. Leaf margins entire or occasionally with a few weak teeth   | 7                                |
| Leaf margins always with distinct teeth  | 8                                |

- |   |  |
|---|--|
| 7. Leaves blackish green; Inflorescence short, up to 55 cm, racemes laxly few flowered; Bracts ovate, 6-7x3-4 mm; Pedicels up to 15 mm long; Perianth 26-30 mm long, red                              |  |
| Leaves pale green; Inflorescence long, 100 cm, racemes simple; Bracts lanceolate, 8-10x3-4 mm; Pedicels 17-20 mm; Perianth 30-35 mm long, pinkish red   |  |
| 8. Perianth glabrous  |  |
| Perianth densely covered with white hairs; Leaves 15-20 cm, spreading to ascending, glaucous; Perianth 26-33 mm long, cream to yellow with green longitudinal stripes; anthers and stigma not exerted |  |
| 9. Leaves glaucous green, margins with brown teeth  | 10   |
| Leaves not glaucous green, margins with white, brown or yellow teeth  | 11   |
| 10. Inflorescence up to 100 cm long; Perianth colour variable, red or yellow; anthers included and stigma exerted   |  |
| Inflorescence more than 120 cm (120-170 cm) long; Perianth yellow; anthers and stigma included  |  |
| 11. Leaf margins with white teeth; anthers and stigma exerted   | 12   |
| Leaf margins with brown or yellow teeth; anthers included and stigma included or exerted  | 13   |
| 12. Leaves yellow green; Perianth yellow; Bracts short, up to 10 mm   | 2. <i>A. castellorum</i>                   |
| Leaves bluish green; perianth bright red; Bract long, 12-15 mm  | 4. <i>A. porphyrostachys</i>               |
| 13. Leaves pinkish gray; Perianth pale pink; Stigma exerted   | 9. <i>A. shadensis</i>                     |
| Leaves pale yellow green; Perianth red or yellow; Stigma included   | 12. <i>A. vera</i> var. <i>officinalis</i> |

1. *Aloe armatissima* Lavranos & Collenette in Cactus & Succ. J. (U.S.) 72 (1): 22; figs. 10, 11, 12 (2000). Type: Saudi Arabia, south west of Taif, near Ash-Shafa view point, 4.8.1982, Collenette 3738 (K; holo. !)

Solitary, acaulescent or with a short prostrate stem 20-50 cm long. Leaves spreading in a rosette, glaucous green, with yellow-orange sape; lamina lanceolate, 30-50 cm long, 9-17 cm broad towards the base; margins with creamy teeth tipped with brown, teeth 2-5 mm long and spaced by 8-17 mm. Inflorescence erect, 120-170 cm long with 4-8 branches; racemes 25-55 cm long, cylindrical. Bracts lanceolate, 10-12 x 5-7 mm. Pedicels 6-8 mm long. Perianths yellow, rarely red, 32-38 mm long, 6-7 mm in diameter across the ovary, outer segments free for 22 mm; stamens 25-27 mm long; anthers 3 mm long, exerted; styles 26-28 mm long, stigmas exerted by 3.5 mm; ovary cylindrical, 6 x 3 mm; capsules cylindrical, 20-26 x 7-10 mm. Seeds 3-angled, 5-6 x 3 mm, black with pale narrow wings. Flowers May-August.

Habitat: Among granite boulders, Alt. 1800-2300 m.

Occurrence: South Taif, Al-Hada, Ash Shafa and between Jabal Ibrahim and Al-Baha.

Geographical distribution: Endemic to Saudi Arabia

2. *Aloe castellorum* Wood in Kew Bull. 38: 23-26, plate 2A. (1983). Type: Yemen, Shahrarah, 22-9-1978, Wood 2504 (K; holo. !). *A. hijazensis* Lavranos & Collenette, in Cactus & Succ. J. (U.S.) 72 (1) 23, figs. 13, 14 (2000) - Syn. nov.

Acaulescent. Leaves yellow green occasionally flecked with white, sap hyaline; lamina narrow, lanceolate 35-45 mm long, 7-10 cm. broad towards the base, margins with white spiny teeth tipped with chestnut-brown teeth 2-3 mm long spaced by 8-10 mm. Inflorescence erect, 120-150 cm long with 3-5 branches; racemes cylindrical. Bracts lanceolate, 8-10 x 4-6 mm. Pedicels 4-6 mm long. Perianths lemon yellow, 23-25 mm long, 5-6 mm across over the ovary, outer segments free for 12-18 mm; stamens 22-28 mm long, anthers 2.5-3 mm long,

exerted; styles 15-25 mm long, stigmas exerted; ovary 5-6 x 2 mm cylindrical; capsules cylindrical, 13-16 x 5-6 mm. Seeds 3-angled, 3.5 x 2.5 mm, black with pale narrow wings. Flowers July-November.

Habitat: Low basalt hill below scarp, alt. 1700-2200 m.

Occurrence: Near Farshah, north Abha and Jabal Fayfa

Geographical distribution: Saudi Arabia and Yemen.

*Notes:* Lavranos and Collenette (2000) described *A. hijazensis* as an affinity to *A. vacillans*, whereas it is closer to *A. castellorum* and is treated here as its synonym because the characteristics shown below in Table 1 do not warrant considering it as a separate species.

**Table 1.** A comparison of the holotypes of *A. castellorum* with *A. hijazensis* and populations of *A. castellorum* from different localities

Characters	<i>Aloe castellorum</i> Holotype Jabel Sahara Yemen 2504 km JRI Wood	<i>A. hijazensis</i> Population 1 Holotype Near Al Baha way to Taif 842 km Collenette	<i>A. castellorum</i> Population 2 6 km north of Abha. Taif Rd 7255 km Collenette	<i>A. castellorum</i> Population 3 Jabal Souda (Othroban) FM Al- Hemaïd	<i>A. castellorum</i> Population 4 Jabal Faydah 3167 km
Inflorescence	100 - 150 cm long	up to 150 cm long 2 - 3 branches	150 cm long with 3 - 5 branches	100-140 cm long with 2-4 branches	100 - 120 cm long
Bract	10 x 6 mm long	15 - 18 mm long	10 x 5 mm long	8 - 12 mm long	12 - 6 mm long
Pedicel	5 mm long	6 - 8 mm long	6 mm long	5 - 6 mm long	4 - 6 mm long
Perianth	25 mm long	25 - 30 mm long	23 - 25 mm long	25 - 30 mm long	32 mm long

**3. *Aloe fleurentinorum*** Lavranos & Newton in Cactus & Succ. J. (U.S.) 49: 113, figs. 1,3. (1977). Type: Saudi Arabia, Wadi Dahr, 12 km north of Sana'a, Lavranos 11386 (E; holo. !).

*A. edentata* Lavranos & Collenete in Cactus & Succ. Journ. (U.S.) 72 (2): 86, figs, 22, 23. (2000) - Syn. nov.

Solitary, acaulescent. Leaves blackish green, slightly twisted; lamina lanceolate, 40-50 cm long, 6-8 cm broad towards the base, margins entire, occasionally with a few weak teeth. Inflorescence erect, 45-55 cm long with 4-6 branches; racemes 12-20 cm. long. Bracts ovate, 6-8 x 3-4 mm. Pedicels 10-13 mm long. Perianths pinkish-red, 26-32 mm long, 6-8 mm across over the ovary; outer segments free for 13 mm; stamens 23-25 mm long, anthers 2-3 mm long, exerted; styles 22 mm long, bright yellow, stigmas included; ovary cylindrical 5x2.5 mm. Capsules and seeds not seen. Flowers November - January.

Habitat: A limestone capped sandstone massif (Jabal Qahar), alt. 1100-1800 m.  
Occurrence: Jabal Abu Hassan, Bani Malik.  
Geographical distribution: Saudi Arabia and Yemen.

*Notes:* Lavranos & Collenete (2000) regarded *A. edentata* as a new species. The characteristics of this species are similar to *A. fleurentinorum* as shown in Table 2 except that the inflorescence of *A. edentata* are longer than those in *A. fleurentinorum*. Field observations over the past few years showed that the inflorescence length varied according to the yearly rainfall. During drought years, shorter inflorescences were produced as compared to those of a good rainy season. This variation warrants regarding *A. edentata* as a synonym of *A. fleurentinorum*.

**Table 2.** Comparison between *Aloe edentata* and *A. fleurentinorum*

Characters	<i>Aloe edentata</i>	<i>A. fleurentinorum</i>
Inflorescence	60 - 100 cm high with 3 branches	45 - 55 high with 4 - 6 branches
Bract	6 x 2-3 mm	6 - 7 x 3 - 4 mm
Pedicel	12 - 14 mm long	11 - 16 mm long
Perianth	20 - 25 x 5 - 6 mm	26 - 30 x 6 - 8 mm
Anthers exerted by	2-3 mm	1- 2 mm

**4. *Aloe porphyrostachys*** Lavranos & Collenette in Cactus & Succ. J. (U.S.) 72 (1): 18, figs. 4,5. (2000). Type: Jabal Radhwa, 70 km. North of Yanbu. 10-10-1981, Collenette, 2900, (K; holo. !).

Solitary, acaulescent. Leaves bluish gray; lamina narrow, 33-40 (50) cm. long, 5-7 cm broad towards the base, margins with white teeth, occasionally tipped brown 3-5 mm long and spaced by 25-35 mm. Inflorescence erect, up to 110 cm long with 1-5 branches, racemes cylindrical. Bracts lanceolate, 12-15 x 6-8 mm. Pedicels 7 mm long. Perianths bright red, 28-30 mm long, 7 mm across over the ovary, outer segments free for 18 mm; stamens 26-28 mm long, anthers 3 mm long, exerted; styles 29-31 mm long, stigmas exerted; ovary cylindrical, 5 x 2 mm; capsules cylindrical, 20-22 x 8-10 mm. Seeds 5 x 3 mm, black with pale narrow wings. Flowers April - Sept.

Habitat: Rocky hillsides, alt. 1800-2500 m

Occurrence: Jabal Radhwa and Harrat Shabanah

Geographical distribution: Endemic to Saudi Arabia

**5. *Aloe pseudorubroviolacea*** Lavranos & Collenette in Cactus & Succ. J. (US) 72 (1): 17, figs. 1, 2,3 (2000). Type: Saudi Arabia, Taif, near Ajalta, Collentte 4409 (K; holo. !).

Solitary with long prostrate stems up to 4 m long. Leaves bluish gray, slightly glaucous, sap orange; lamina lanceolate, 40-60 cm long, 12-18 cm broad towards the base, margins with white teeth 2-3 mm long, 10-13 mm apart. Inflorescence erect or curved, 85-120 cm long with 4-20 (52) branches. Bracts lanceolate, 24-34 x 7-8 mm. Pedicels 7-8 mm long. Perianths bright red and occasionally dark yellow or orange, 32-40 mm long, 9-11 mm across over the ovary, outer segments free for 22 mm; stamens dark purple, filaments 38-42 mm long, anthers 5-6 mm long, exerted; styles 27-33 mm long, stigmas

exerted; ovary cylindrical, 8 x 3 mm. Capsules and seeds not seen. Flowers in April.

Habitat: Rocky hillside, alt. 1800 - 2300 m.

Occurrence: Al-Hadda, Hema Fiqra, Raidah, Ajalta and Jabal Ibrahim.

Geographical distributions: Endemic to Saudi Arabia

**6. *Aloe rivierei*** Lavranos & Newton in Cactus & Succ. J. (US) 49: 114, figs. 2,4. (1977). Type: Yemen, Taiz Province, 1 km South of Dhabab Market, Lavranos & Newton 13121 (holo; E, iso; K!). *A. parvicoma* Lavranos & Collenette in Cactus & Succ. J. (US) 72 (1): 21, figs. 8, 9 (2000) - Syn. nov.

Perennial stoloniferous herb with erect gray stems 3.5 cm wide and 100-200 cm long. Leaves in a dense cluster at the top of the stems, pale green, sap orange; lamina lanceolate, 40-55 cm long, 6-8 cm broad towards the base, margins with reddish brown tipped teeth 2 mm long spaced by 10-14 mm. Inflorescence erect, 100-120 cm long with 1-2 branches, racemes cylindrical. Bracts 11-13 x 6-7 mm. Pedicels 10 mm long. Perianths pinkish red, 30-33 mm long, 6-7 mm across over the ovary. Capsules and seeds not seen. Flowers in Sept.

Habitat: Sandstone rubble, alt. 2000 m.

Occurrence: Jabal Qahar.

Geographical distribution: Saudi Arabia and Yemen.

*Notes:* The characters of *A. parvicoma* are more or less closely similar to *A. rivierei* as shown in Table 3 except that the variation in the length of inflorescences. In Saudi Arabia, the drought period remains for several years and it does affect the growth of inflorescences. I prefer to regard *A. parvicoma* as a synonym of *A. rivierei*.

**Table 3.** Comparison between *A. rivierei* and *A. parvicoma*

Characters	<i>Aloe rivierei</i>	<i>A. parvicoma</i>
Inflorescence	100-120 cm long with 1-2 branches	60 cm long with 1-2 Branches
Bract	11 - 13 x 6 - 7 mm	8 - 10 x 4 -7 mm
Pedicel	10 mm	13-17 mm
Perianth	30 - 33 mm	25 - 28 mm
Anther exerted by	5 mm	3 mm
Stigma exerted by	5 mm	4 mm

**7. *Aloe rubroviolacea*** Schweinf. in Bull. Herb. Boiss. 2: 71 (1895). Type: Yemen, summit of Jabal Shibam, Manakhah, Schweinfurth 1658 (K; iso !); Reynolds, the Aloes of Trop. Afri. & Madagascar, p.245, figs, 246, 247 (1966).

Solitary, stems prostrate up to 100 cm long. Leaves red-violet with a purplish margins, sap orange; lamina lanceolate, 40-55 cm long, 10-18 cm broad towards the base, margins with green teeth 2-5 mm long and widely spread. Inflorescence with an upward curving simple, rarely branched, racemes cylindrical, 30-40 cm long. Bracts large, 25-32 x 12 mm. Pedicels 2 mm long. Perianths very crowded, plump, deep red, puberulent, 25-35 mm long, 10 mm across over the ovary, outer segments free for 20 mm; stamens 34-38 mm long, anthers 6 mm; styles 35 mm long, stigmas exerted; ovary cylindrical, 6 x 3 mm. Capsules and seeds not seen. Flowers in December

Habitat: Cliffs & steep hillsides, alt. 2600 m.

Occurrence: Raidah escarpment.

Geographical distribution: Saudi Arabia and Yemen.

**8. *Aloe sabaea*** Schweinf. in Bull. Herb. Boiss., 2: 74 (1894). Type: Yemen, Wadi Abyad, 30.1.1989, Schweinfurth 941 (K; iso.); *Aloe gillilandii* Reynolds in J. S. Afr. Bot. 28: 4 (1962); Reynolds, Aloes Trop. Afri. & Madagascar, p385, figs. 389 & 390 (1966).

An erect shrub with stout stems up to 3 m long. Leaves pale green, clustered at the top of the stems, pendulous; lamina lanceolate, 60-80 cm long, 7-10 cm broad towards the base, margins with whitish teeth 1-2 mm long spaced by 8-12 mm. Inflorescence erect, 60-70 cm long with 2-6 branches, racemes cylindrical. Bracts lanceolate, 10-17 x 7-13 cm. Pedicels 10-13 mm long. Perianths red brown, 22-26 mm long, 8-10 mm across over the ovary; stamens 20-24 mm long; anthers 3-4 mm, exerted; styles 21-23 mm long, stigmas exerted by 5-7 mm; ovary 8 x 3 mm, capsules cylindrical, 24 x

12 mm. Flowers Oct.-March.

Habitat: Among volcanic boulders, alt.150-1200 m.

Occurrence: Mohayl, Raidah escarpment, King Khalid descent, Jabal Shada (near Al-Bahah)

Geographical distribution: Saudi Arabia and Yemen.

**9. *Aloe shadensis*** Lavranos & Collenette in Cactus & Succ. J. (US) 72 (2): 82, figs. 15, 16. (2000). Type: Saudi Arabia, Jabal Shada, 22.4.1988, Collenette 6718 (K; holo.!).

Solitary, acaulescent. Leaves pinkish gray; lamina 60 cm long and 15 cm broad towards the base, margins with brown teeth 1-3 mm long spaced by 11-22 mm. Inflorescence erect, 100-150 cm long with 2-5 branches, racemes cylindrical. Bracts small, 7-9 x 3-4 mm. Pedicels 7-11 mm long. Perianths pale pink, curved, mouth 30-35 mm long, 6-7 mm across over the ovary, outer segments free for 17 mm; stamens 25-29 mm long, anthers 3 mm long, included; styles 18-25 mm long, stigmas exerted by 2-3 mm; ovary 6-8 x 3 mm; capsules cylindrical, 25-27 x 5-6 mm. Seeds 3-angled, 5 x 3 mm, black with pale narrow wings. Flowers in April.

Habitat: On an exposed granite hillside near the summit, alt. 730-1500 m.

Occurrence: Jabal Shada, Wadi Taruf and Thee-ain near Mikhwa.

Geographical distribution: Endemic to Saudi Arabia

**10. *Aloe sheilae*** Lavranos in Cactus & Succ. J. (US), 57: 71-72 (1985). Type: Saudi Arabia, 72 km West of Bishah, 16.2.1982, Collenette 3397 (K; holo.); Collenette, Wildflowers of Saudi Arabia, p29, fig. 29, (1999). *A. cephalophora* Lavranos & Collenette in Cactus & Succ. J. (US) 72 (1): 20, figs. 6,7. (2000).

Solitary, acaulescent. Leaves pale green; lamina 40-50 cm long, 9-12 cm broad towards the base, margins entire, occasionally with 2-4 weak teeth. Inflorescence erect, up to 100 cm long with 2-4 (7) branches, racemes in semi-capitate heads, 8-10 cm long. Bracts lanceolate, 8-10 x 3-4 mm. Pedicels 17-20 mm long. Perianths dark pinkish-red, 30-35 mm long, 8-9 mm across over the ovary, outer segments free for 19 mm; stamens 24-28 mm long, anthers 3-5 mm long, exerted; styles 25 mm long, stigmas exerted by 3-4 mm; ovary 5 x 2.5 mm, capsules 28-30 x 10-12 mm. Seeds 3-angled, 9 x 4 mm, black with pale narrow wings. Flowers usually Nov. - Dec.

Habitat: Granite mountains, in crevices among tumbled boulders, alt. 1760 m.

Occurrence: 71 km west of Bishah

Geographical distribution: Endemic to Saudi Arabia

*Notes:* All the measured characters of bracts, pedicels and perianths shown in Table 4 are the same except that the length of inflorescence in *A. cephalophora* is shorter than in *A. sheilae*. This variation on the length of inflorescences is insufficient despite the fact that Collenette collected only one specimen (no. 4981) of *A. cephalophora* and propagated it in the green house obtaining much shorter inflorescence length, whereas the length of the inflorescence of *A. Sheilae* is from field data. In addition, the habitat of both species is similar in remote elevations and on the same granite rocks. Such differences do not warrant a distinction of *A. cephalophora* from *A. sheilae*.

**11. *Aloe vacillans*** Forssk. in Fl. Aegypt-Arab.; 74 (1775). Type: Yemen, Kurmah, Forssk. s.n. (C); Reynolds, Aloes Trop. Afri. & Madagascar p156, figs. 157, 158. (1966). *A. dhalenis* Lavranos in J. S. Afr. Bot. 31: 62 (1965). *A. andhalica* Lavranos & Hardy in Journ. S. Afr. Bot. 31: 65 (1965).

*A. brunneodentata* Lavranos & Collente in Cactus & Succ. Journ (US) 72 (2): 84, fig. 21 (2000) - Syn. nov.

Solitary, acaulescent. Leaves small, glaucous green; lamina lanceolate, 20-35 cm long and 5-6 cm broad towards the base, margins with brown teeth 1-2 mm long and 7-10 mm apart. Inflorescence erect, 50-100 cm long with 4-8 branches, racemes cylindrical. Bracts 8-12 x 5-7 mm. Pedicels 5-7 mm long. Perianths orange, red or yellow, 23-27 mm long, 5-6 mm across over the ovary; outer segments free for 8 mm; stamens 20-27 mm long; anthers 2-2.5 mm long, included; styles 18-20 mm long, stigmas exerted by 2-3 mm; ovary 4-5 x mm, capsules cylindrical, 15-19 x 6-8 mm. Seeds 3-angled, 4 x 3 mm, black with pale narrow wings. Flowers Aug. - Dec.

Habitat: On rocky hillsides, alt. 1300-2300 m.

Occurrence: Tanomah, Jabal Sawdah,

Raidah, Abha and Wadi Marabah

Geographical distribution: Saudi Arabia and Yemen.

*Notes:* It is clear from the characters shown in Table 5 that *A. brunneodentata* of Lavranos & Collente differs from *A. vacillans* only for its shorter inflorescence size based on Collenette's only collection, deposited at Kew (Collenette 5826), which I myself examined and found to be the same as *A. vacillans*.

**Table 4.** Comparison of characters of *Aloe cephalophora* and *A. sheilae*

Characters	<i>Aloe cephalophora</i>	<i>A. sheilae</i>
Inflorescence	25 cm long with 1-2 braches	100 cm long with 2-4 branches
Bract	8 - 10 mm long	8-10 mm long
Pedicel	12 - 14 mm long	17 - 20 mm long
Perianth	35 mm long	30 - 35 mm long

**Table 5.** Comparison of characters among *Aloe vacillans* and *A. brunneodentata*

Characters	<i>Aloe vacillans</i>	<i>A. brunneodentata</i>
Inflorescence	50 - 100 cm long	60 cm long
Bract	8 -12 mm long	12 -15 mm long
Pedicel	5 - 7 mm long	6 -8 mm long
Perianth	23 - 27 mm long	24 -26 mm long

**12. *Aloe vera*** (L.) Burm. f. var. *officinalis* (Forssk.) Bak. in J. Linn. Soc. 18: 176 (1880). Type: Yemmen: Wadi Mawr (Mor) Forsskal s.n. ( C); Reynolds, *Aloe Trop. Africa & Madagascar* p157, fig, 159. (1966); *Aloe officinalis* Forssk. Fl. Aegypt-Arab: 73 (1775); *A. maculata* Forssk. Fl. Aegypt-Arab. 73 (1775); *A. vera* var. *angustifolia* Schweinf. in Bull. Herb. Boiss. 2: 62 (1894).

Plants erect, suckering freely to form large loose clumps. Stems absent or very short up to 30 cm. Leaves pale yellow green, sap orange; lamina narrow, lanceolate, 50-60 cm long, 8-10 cm broad towards the base, margins with creamy to yellowish green teeth 3-5 mm long spaced by 10-11 mm. Inflorescence erect, 80-100 cm long, single or sparsely 2-branched. Bracts lanceolate, 10-12 x 5-6 mm. Pedicels 6-8 mm long. Perianths red or yellow, 30-34 mm long, 6-8 mm across over the ovary, outer segments free for 20 mm; stamens 25-29 mm long, anthers 3-4 mm long, included; styles 18-22 mm long, stigmas included; ovary cylindrical, 8 x 3 mm. Capsules and seeds not seen. Flowers Dec. - Feb.

Habitat: Lowland on a wide sandy plain, alt. from sea level to 500 m.

Occurrence: Farasan Islands, Jizan Barzah and Muhayl.

Geographical distribution: Saudi Arabia, Yemen and Somalia.

**13. *Aloe woodii*** Lavranos & Collenette in Cactus & Succ. J. (US) 72 (2): 85 figs. 17, 18 (2000). Type: Saudi Arabia, Abha, Jabal Sawdah, anno 1956 lectus, Vesey-Fitzerald 16076/6 (BM; holo!).

*A. parvicapsula* Lavranos & Collenette in Cactus & Succ. J. (US) 72 (2): 84, figs. 19, 20 (2000) - Syn.

nov.

Solitary, acaulescent sometimes suckering to form clumps. Leaves glaucous green, sap dark yellow; lamina lanceolate, 45-50 cm long, 9-15 cm broad towards the base, margins with brown tipped teeth 2-3 mm long spaced by 8-12 mm. Inflorescence erect, 80-100 cm long with 5-7 branches, racemes cylindrical. Bracts lanceolate, 15-18 x 5-10 mm. Pedicels 7-10 mm long. Perianths creamy with green stripes, densely covered with white hairs, 26-33 long, 6-10 mm across over the ovary, outer segments free for 8-10 mm; stamens 19-29 mm long, anthers 2-4 mm long, included; styles 17-24 mm long, stigmas included; capsules cylindrical, 22-30 x 9-13 mm. Seeds 3-angled, 7-11 x 4-5 mm, black with pale narrow wings. Flowers April-May.

Habitat: Among granite boulders.

Occurrence: Abha, Jabal Fayfa, Khamis Mushayt, Jabal Qahar and north and north west of Najran.

Geographical distribution: Saudi Arabia and Yemen

*Notes:* Based on a comparison of the characteristics of *A. woodii* and *A. parvicapsula* (Table 6), it is apparent that the two species are synonymous in spite of the variation in capsule size which is longer in *A. woodii* (22-30 mm) than in *A. parvicapsula* (14-20). The perianth size in the original descriptions of the two species given by Lavranos and Collenette (2000) is almost same. Only a minor variation in capsule size however, does not warrant sufficient distinction to regard *A. parvicapsula* as a separate species.

**Table 6.** Comparison of characters among *Aloe woodii* and *A. parvicapsula*

Characters	<i>Aloe woodii</i>	<i>A. parvicapsula</i>
Inflorescence	80 - 100 cm high	75 - 95 cm high
Bract	15 - 18 x 5 - 10 mm	12 - 15 x 5 - 6 mm
Pedicel	7 - 10 mm long	6 - 7 mm long
Perianth	26 - 33 mm long	28 - 35 mm long
Anther and stigma	included	included
Capsule	22 - 30 mm long	14 - 20 mm long



**14. *Aloe yemenica*** Wood in Kew Bull. 38: 23-26, Plate 2B (1983). Type: Rotibaan, Mahwit, 27.9.1978, Wood 2537 (K; holo.!).

White slender stems often pendent, up to 1.5 m long, suckering and growing in clumps. Leaves loosely clustered at the top of the stems, yellow-green; lamina lanceolate, 25-35 cm long with small fine teeth tipped with brown 1 mm long spaced by 6-8 mm. Inflorescence erect, up to 40 cm long with 1-2 branches. Bracts 8-10 x 5-7 mm. Pedicels 8-10 mm long. Perianths salmon-pink, 22-25 mm long, 5-6 mm across over the ovary; outer segments free for 13 mm; stamens 19-21 mm long, anthers 2-2.5 mm long, included; styles 16 mm long, stigmas included, ovary 4.5 x 2 mm. Capsules and seeds not seen. Flowers Sept. - March

Habitat: Pendent from calcareous sandstone cliffs, alt. 1500 m.

Occurrence: Jabal Qahar

Geographical distribution: Saudi Arabia and Yemen.

### Natural Hybrids

**1. *A. pseudorubroviolacea*** Lavranos & Collenette. *X A. edentata* Lavranos & Collenette.; *A. X abhaica* Lavranos & Collenette in Cactus & Succ. Jour. (US) 72(2): 87, figs.24,25 (2000). Type: Saudi Arabia, Raidah escarpment, north west of Abha, 30.4.1989, Collenette 7165 (K; holo.!).

Acaulescent, solitary. Leaves dark green, spreading in a rosette, sap purple-red; lamina lanceolate, 45-75 cm long, 7-8.5 cm broad towards the base, margins with small pale teeth 1-3 mm long and spaced by 0.6-1.2 cm. Inflorescence 85-105 cm long with 8-12 branches curving upwards, racemes cylindrical, 25-35 cm long. Bracts lanceolate, 11-14 x 5-6. Pedicels 7-15 mm long. Perianths salmon-pink, 30-33 mm long, 8-10 mm across over the ovary, outer segments free for 18 mm; stamens 24-28 mm long, anthers 3-4 mm long, included; styles 24-26 mm long, included; ovary rounded at base, 7x3 mm. Capsules and seeds not seen. Flowers Sept. - Oct.

Habitat: Rocky hillside among *Tarchonanthus*, alt. 1500 m.

Occurrence: Raidah, northwest of Abha.

Endemic.

Geographical distribution: Endemic to Saudi Arabia

*Notes:* Collenette (1989) points out a possible hybrid between *A. pseudorubroviolacea* and *A.*

*edentata*, The leaf colour and the flowers are very similar to *A. edentata* which flowers in Oct-Nov. The flowers of one plant are similar to *A. pseudorutrovialacea*. Only 4 plants seen.

**2. *A. woodii*** Lavranos & Collenette *X fleurentinorum* Lavranose & Newton; *A. X qaharensis* Lavranos & Collenette in Cactus & Succ. J. (US) 72 (2): 87, figs, 26, 27 (2000). Type: Saudi Arabia, Jabal Qahar, 30.3.1991, Collenette 7749 (K; holo.!).

Solitary, acaulescent. Leaves spreading in a rosette, dark green, slightly rough, sap orange; lamina lanceolate, 40-50 mm long; margins with teeth spaced by 20-27 mm.. Inflorescence erect, 75-125 cm long with many branches; racemes cylindrical. Bracts lanceolate, 10-15 x 8 mm. Pedicels 6-13 mm long. Perianths salmon-pink, 25-27 mm long, 5-8 mm across over the ovary, outer segments free for 13 mm; stamens 20-22 mm long, anthers 3 mm long, included; styles 12-21 mm long, included; ovary cylindrical, 6 x 3 mm; capsules cylindrical, 22 x 9 mm. Seeds black, 7 x 3 mm with pale narrow wings. Flowers in March.

Habitat: Among sandstone. slabs in the Juniper zone. Alt. 2000 m.

Occurrence: Jabal Qahar

Geographical distribution: Endemic to Saudi Arabia

*Notes:* According to Collenette (1991), this taxon is a hybrid between *A. woodii* and *A. fleurentinorum*. Examination of the spirit collection at Kew showed some stamens with very thin structures which may reflect hybridity.

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