

# A new species of *Aloe*

## (Asphodelaceae) from *Acacia* ‘woodlands of hardships’ in Adadley district, Somaliland

Ahmed Ibrahim Awale, Faisal Jama Gelle and Kennedy Wambua Matheka

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*Aloe kaysei* is described from dry *Acacia*-dominated vegetation in Adadley district, Somaliland. It is a short-stemmed species affiliated to *Aloe megalacantha* and *A. parvidens* but differs by having deeply incurved shiny, sparsely distributed white-spotted leaves and exudate rapidly turning from yellow to reddish-brown. An assessment of the species extinction risk is provided as being Critically Endangered. Photos as indicated.

### Introduction

The genus *Aloe* L. is probably the genus with most newly described species in Eastern Africa and the Horn of Africa following publication of the respective regional floras. It is largely tropical in distribution and predominantly African with more than 600 species recognised (Carter *et al.*, 2011; Klopper & Smith, 2013;

Newton, 2020). More species continue to be added to the genus over time as a result of new discoveries and descriptions in the past two or so decades. For instance, six new species were described from Kenya in a period of four years between 2017 and 2020 in addition to seven more preceding them (Newton & Carter, 2017; Matheka *et al.*, 2020). In the Flora of Somalia ten species were

▼ Fig. 1 *Aloe kaysei* at its type locality in a severely degraded *Acacia* woodland habitat (Photo: Ahmed Awale)





▲▼ Fig. 2 Adaxial (2A) and abaxial (2B) sides of *A. kaysei* displaying incurved, white-spotted leaves. Note the persistent dry lower leaves (Photos: Ahmed Awale)



described from mainly Somaliland between 1997 and 2019 (Lavranos, 1997, 1999 & 2006; Thulin, 2012; McCoy & Lavranos, 2007, 2008 & 2015; Barkworth *et al.*, 2019). Given this trend, more novel species are expected to be added to the genus based on the several partially identified herbarium specimens stored in various herbaria.

Although it is still regarded internationally as part of Somalia, Somaliland is a *de facto* state after declaring

its independence from Somalia in 1991. It lies along the southernmost side of the Gulf of Aden bordering Djibouti and Ethiopia to the north-west and south-west, and Somalia to the east in the Horn of Africa. Its flora is treated in the Flora of Somalia (Thulin, 1993–2006), which began before the secession of Somaliland from Somalia and the collapse of the central Somali government in 1988 (Thulin, 1993).

The fourth volume of the *Flora of Somalia* (Lavranos, 1995) included 31 species of *Aloe* that were collected before the above-mentioned unrest. These include *Aloe officinalis* Forssk., which is cultivated locally but native to south-west Arabia, and the endemic and endangered *Aloe eminens* Reynolds & Bally, which has been transferred to *Aloidendron* as *Aloidendron eminens* (Reynolds & P.R.O.Bally) Klopper & Gideon F.Sm., (Grace *et al.*, 2013). The unrest of the central Somali government in 1988 curtailed botanical exploration in the region. However, the unilateral declaration of independence by Somaliland restored some peace and stability which enabled the resumption of its floral and faunal research exploration. Since then, several discoveries of endemic species have been made, mostly from Somaliland, thereby increasing the number of known *Aloe*

species in the flora area. These include; *Aloe lindenbergii* Lavranos (Lavranos, 1997), *A. heybensis* Lavranos (Lavranos, 1999), *A. orlandi* Lavranos (Lavranos, 2006), *A. kahinii* T.A.McCoy & Lavranos, and *A. rubrodonta* T.A.McCoy & Lavranos (McCoy & Lavranos, 2007), *A. elegantissima* T.A.McCoy & Lavranos, (McCoy & Lavranos, 2008), *A. nugalensis* Thulin (Thulin 2012), *A. nigrimontana* T.A.McCoy & Lavranos and *A. anodonta* T.A.McCoy & Lavranos (McCoy & Lavranos, 2015), and most recently,

the clumping *A. sanguinalis* Awale & Barkworth (Barkworth *et al.*, 2019).

In this paper, we describe yet another species, so far known only from Somaliland. Its recognition raises the current total number of aloes native to Somaliland and Somalia to 40 species, excluding *Aloidendron emimens*. The fertile plant described here is a cultivated living collection from the type locality, in Adadley district. Herbarium specimens were prepared by the second author when it flowered, and were deposited at the Biodiversity Museum of the University of Hargeisa (UoH).

On 22 July 2022, Awale left Hargeisa, the capital of Somaliland, for an area in the south-eastern direction from the city, in search of a ‘somewhat peculiar’ *Aloe* that had been noticed by Kayse Ali, a pastoralist friend who knew of Awale’s passion for aloes and was curious about the *Aloe* that was growing within the grazing land of his livestock. Awale, as a representative of Somaliland Biodiversity Foundation (SBF), had a permit to collect plants for research study and to deposit any collections in the Biodiversity Museum at the University of Hargeisa, managed by SBF. They were accompanied by Abdi Haybe, another interested aloe enthusiast who also served as the driver. At the time, only two *Aloe* species, *Aloe megalacantha* Bak. and *A. parvidens* M. Gilbert & Sebsebe had been recorded from areas with similar vegetation characteristics towards the south and south-east of Hargeisa.

The route out of Hargeisa led through several small towns (Aw Barkhadle, Diinqal, Bender-Wanaag and Haan-Kidiile) to a location known to pastoralists as Dabaquud, a sloping side of a small hill dominated by *Balanites aegyptiaca* (L.) Delile. The literal meaning of ‘Dabaquud’ is ‘the sloping end of the hill vegetated with *Balanites*’.

Ecologically, the area lies within the southern fringe of the Hawd plateau which extends southwards to the Somali-Ethiopian border and beyond. Floristically, according to C F Hemming’s classification (Hemming, 1966), the area lies in the *Vachellia bussei* (Harms ex Y.Sjöstedt) zone. The location is a part of a wider area known as ‘*Geli-darxumo*’, literally ‘woodlands of hardships’, referring to the scarcity of water and a high tree density dominated by *V. bussei* which makes it easy to become lost in the woods. The woody vegetation has changed dramatically during the past several decades, having been destroyed by charcoal production,



▲▼ Fig. 3 *Aloe kaysei* showing the inflorescence branching (3A) and a close-up of the flowers (3B) (Photos: Ahmed Awale)





Fig. 4 Sequence of *A. kaysei* flower development from bud to an immature undeveloped fruit (Photo: Faisal Gelle)

debarking, root-cutting and branch lopping for use as biomass fuel, traditional medicine, fibre production, shelter, and livestock feed. The soil is reddish-buff sandy loam.

Overgrazing and overuse of the rangeland resources were evident during the field studies. Grasses like *Sporobolus variegatus* Stapf and *Chrysopogon aucheri* (Boiss.) Stapf, which used to abound in the area, are now very rare. In addition to *V. bussei*, other woody species present include occasional *Boscia minimifolia* Chiov., and shrubs such as *Vernonia cinerascens* Sch. Bip., *Solanum somalense* Franch., and *Solanum cordatum* Forssk.

### Taxonomic treatment

*Aloe kaysei* Awale, Gelle & Matheka **sp. nov.**, (Figs. 1–7), with affinity to *Aloe megalacantha* and *A. parvidens* but differs by having shiny deeply incurved leaves with sparsely distributed white spots diminishing towards the apex and exudate rapidly turning from yellow to reddish-brown.

**Type:** Somaliland, Adadley district, 85km south east of Hargeisa, near Shaarub village, 1,073m, 22 July, 2022, Gelle & Awale 826 [HARG000660]; (holo., HARG; iso., EA).

### Description

**Plant** erect, unbranched, short-stemmed to 20cm high, solitary or usually in small groups. **Leaves** 15–20, cauline and dispersed along the stem, lanceolate, flexuous or spreading, falcate and incurved under water stress, shiny, greenish-brown to purplish-green with whitish spots which decrease towards the apex, 52–70cm×9–10cm, persistent upon drying, margins with pinkish-brown teeth at the tips, 2–3mm long and

10–20mm apart; exudate initially yellow but rapidly turning reddish-brown. **Inflorescence** erect panicles, 90–120cm tall, 18–22mm in diameter at the base, with 7–9 branches; racemes ascending or slightly spreading, cylindrical-conical, 7–15cm long; floral bracts triangular, papery, tapering at apex, 12×9mm. **Pedicels** 6–10mm long. **Flowers** erect when young, pendulous at anthesis; **Perianth** reddish-brown with a waxy coating, 20–25mm×9mm across the ovary, outer tepals free for ca. 12mm, stigma exerted by 4mm, ovary 9mm in diameter. **Fruit** 14–17mm long, 7–10mm in diameter, ellipsoid to narrowly ovate, with 3 segments enwrapped with the dry perianth. **Seeds**, including wing, 8mm long, 4mm wide.

### Diagnosis

*Aloe kaysei* resembles *A. megalacantha* in the overall shape of the inflorescence and leaves but differs significantly from the latter in its short stem, leaf spots sparsely distributed and diminishing towards apex, smaller fruit capsules with dried perianths almost enclosing the capsules prior to dehiscence, and incurved leaves, particularly in times of water stress and exposure to intense heat. The leaf surfaces of *A. kaysei* are more smooth and shiny, and turn greenish-purple during water stress. In addition, the former has a yellow exudate which rapidly turns reddish-brown while the latter has yellow slowly turning dark brown (Fig. 6B).

On the other hand, *A. kaysei* resembles *A. parvidens* in its spotted leaves. However, the spots of *A. kaysei* are spatially less crowded and decrease towards the apex. In the overall plant size (height and spread), *A. parvidens* is smaller and its leaves are narrower and recurved, while those of *A. kaysei* are falcately incurved. They also differ in the colour of leaf exudate (see Table 1).

**Table 1: Comparison of *A. kaysei* with closely affiliated taxa**(measurements for *A. megalacantha* and *A. parvidens* are taken from Carter *et al.*, 2011)

	<i>Aloe megalacantha</i>	<i>Aloe parvidens</i>	<i>Aloe kaysei</i>
<b>Stem</b>	Branching at the base to form sprawling clumps, with stems ascending 50–200cm high.	Stemless, solitary or in small groups.	Short-stemmed 20cm high, solitary or in small groups.
<b>Leaves</b>	24 or more, extending up the stem, crowded, deeply channelled, lanceolate-attenuate, spreading, strongly recurved, 60–80cm×13–15cm, rough, dull, light green to bluish-green.	12–16, basal rosette, lanceolate-attenuate, spreading and recurved, 25–42cm×4.5–6.5cm, usually deeply channelled, dark-green to brownish with numerous elliptical spots.	15–20, spreading to falcately incurved, cauline and dispersed along the stem, deeply furrowed above, 52–70cm×9–10cm, shiny, greenish-brown to purplish-green with whitish spots which decrease towards the apex.
<b>Teeth on leaf margins</b>	Pinkish-brown 5–6mm long, 14–20mm apart.	Brown-tipped whitish teeth 1–2.5mm long, 8–13mm apart.	Pinkish-brown, 2–3mm long, 10–20mm apart.
<b>Drought response of leaves</b>	Turn pale yellow, strongly recurved, deeply channelled. Outer surface dull green.	Recurved and deeply channelled (sometimes with sideways curvature) with teeth clenching, turning to dull brown.	Strongly incurved, channelled. Outer surface turning to shiny greenish-purple.
<b>Leaf exudate</b>	Yellow, slowly turning dark brown.	Yellow, rapidly turning crimson.	Yellow rapidly turning reddish-brown.
<b>Inflorescence</b>	50–100cm tall with 6–10 branches turning inwards.	100–140cm tall with 2–10 suberect branches.	90–120cm tall with 7–9 branches, 18–22mm in diameter at the base.
<b>Raceme</b>	Cylindrical-conical, 5–14cm long.	Cylindrical to subsecund, 9–20cm long, laxly flowered.	Cylindrical-conical, 7–15cm long.
<b>Flowers</b>	Yellow, orange or scarlet, cylindrical-trigonous, 23–28mm long, 5–7mm across the ovary.	Pale pink, outer tepals with paler margins, yellowish towards the mouth, cylindrical-trigonous, 26–30mm long, 6–8mm across the ovary.	Reddish brown 20–25mm long, 9mm across the ovary.
<b>Outer tepals</b>	Free for ca. 13mm.	Free for 6–8mm.	Free for ca. 12mm.
<b>Stigma</b>	Exserted, 4mm.	Exserted, 3–4mm.	Exserted, 4mm.
<b>Anthers</b>	Exserted, 3mm.	Exserted, 2–3mm.	Exserted, 2–3mm.

### Phenology

Flowering in *A. kaysei* occurs in late September after the rains during the Hagaa season and just before the autumn (Deyr) rains which begin in October. The optimum time for seed production is during the first two weeks of November.

### Etymology

The species is named for Kayse Ali, a pastoralist whose keen observation led to the discovery of the species by bringing it to the attention of the first author of this article. The naming acknowledges the contribution of the local community to the advancement of science.

### Distribution and conservation status

To date, the small population of *A. kaysei* encountered is currently known only from the type locality, but a wider field search for additional populations may reveal its presence in nearby localities to the east and west of the site, growing sympatrically with *A. parvidens* and *A. megalacantha*. The species is rare in its locality as established by the first two authors who counted only 24 individuals within 1.5km<sup>2</sup> in the type locality from two field trips in the area. Threats to *A. kaysei*, like most other species of the same genus, include collections for medicinal and cosmetic use, overgrazing, and damage by animals like baboons. Three living collections collected from the type locality were planted at the University of

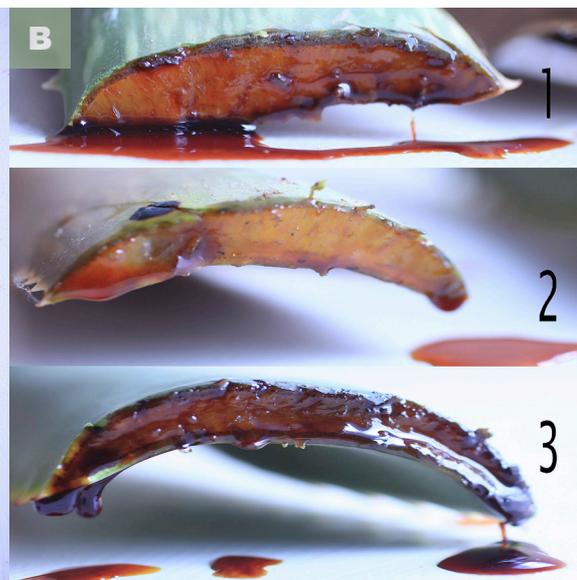


▲► Fig. 5 *Aloe kaysei* infructescence branchlets (5A) at an immature undehisced fruit stage and a close-up of the fruits hidden in dried perianths (5B) (Photos: Faisal Gelle)

Hargeisa (UoH) succulent garden and a farm outside Hargeisa as an *ex situ* conservation effort and for future studies. Given the restricted distribution, small Area of Occurrence (AOO) and Extent of Occupancy (EOO), a low number of mature individuals and the threats to the species and its habitat, it is hereby preliminarily

assessed as Critically Endangered (CR) under criteria B1ab(i,ii,iii,v) + B2ab(i,ii,iii,v) and C2a(i). A detailed targeted search for the species is recommended to establish whether there are any additional populations in the vicinity of the type locality and in similar habitats.

▼► Fig. 6 Leaf shape (6A) and exudate (6B) comparison between: 1) *A. kaysei*, 2) *A. parvidens* and 3) *A. megalacantha* (Photos: Faisal Gelle)



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**Ahmed Awale. Biodiversity Museum, University of Hargeisa, Hargeisa, Somaliland.**  
Email: aiawaleh@gmail.com

**Faisal Gelle. Biodiversity Museum, University of Hargeisa, Hargeisa, Somaliland.**  
Email: faisaljama24@gmail.com

**Kennedy Matheka. East African Herbarium, Botany Department, National Museums of Kenya, Museum Hill Road, P.O. Box, 40658–00100, Nairobi, Kenya.**  
Email: kennedoz06@gmail.com



▲▼ Fig. 7 Comparison between a young *A. kayssei* growing under shade with little water stress (7A) and a different plant in the open sun (7B) with limited water availability (Photos: 7A – Faisal Gelle, 7B – Ahmed Awale)

