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Aloe immaculata and *A. affinis* (Asphodelaceae subfam. Alooideae), two endemics from northern and eastern South Africa, are different maculate aloe species

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Abstract

We show that *Aloe immaculata* and *A. affinis* (Asphodelaceae subfam. Alooideae) are two different species. *Aloe immaculata*, a Limpopo province, South Africa, endemic, is therefore reinstated and treated as distinct from *A. affinis*, an endemic of the eastern, mainly Drakensberg escarpment in Mpumalanga, South Africa, and southeastern Limpopo, and northwestern Eswatini. Vegetatively, the two species mainly differ in terms of leaf colour (dull green to brownish green in the case of *A. immaculata* and brighter green in the case of *A. affinis*). Reproductively, the species differ in inflorescence structure (subcapitate to conical and round-topped racemes in the case of *A. immaculata* and cylindric-acuminate ones in the case of *A. affinis*) and flower size and colour (pale flesh pink and 28–33 mm long in *A. immaculata* and scarlet red and 40–45 mm long in *A. affinis*). The two species are compared and illustrated, and descriptions for both species and a combined distribution map are provided.

Keywords: Eswatini; Limpopo province; Mpumalanga province; nomenclature; taxonomy

Introduction

Aloe Linnaeus (1753: 319) sect. *Pictae* Salm-Reifferscheidt-Dyck (1837: Sect. 23, page unnumbered), in which both *A. immaculata* Pillans (1934: 25) and *A. affinis* Berger (1908: 206) (Asphodelaceae subfam. Alooideae) are included, is an infrageneric group generally referred to as the 'maculate aloes' in the vernacular. In the *Flora of Southern Africa* treatment of *Aloe* (Glen & Hardy 2000), the maculate alooid species concept that was widely accepted following publication of Reynolds (1950) was discarded, and as one consequence the number of aloes recognised in the group was considerably reduced (see also Glen & Hardy 1987). However, several of the species recognised for most of the second half of the 20th century, i.e., since the publication of Reynolds (1950), have since been reinstated (Klopper *et al*. 2011, 2014, Smith *et al*. 2012, Smith *et al*. 2020a, 2021, Smith & Klopper 2021). In addition, *Aloe labiaflava* Groenewald (1936: 57) was separated from *A. davyana* Schönland (1905: 288) as an accepted species after it too had been treated as a synonym of *A. greatheadii* Schönland (1904: 121) var. *davyana* (Schönland 1905: 288) Glen & Hardy (1987: 490) or, speculatively, regarded as a nothospecies [*A. davyana* × *A. longibracteata* Pole Evans (1915: 25)] by Reynolds (1950: 293) (Smith & Klopper 2021).

Following recent fieldwork across the natural geographical distribution ranges of *A. affinis* in north-central Mpumalanga and *A. immaculata*, in central Limpopo, the taxonomic status of these two species was reassessed. We here reinstate *A. immaculata* (Fig. 1), which was included in the synonymy of *A. affinis* (Fig. 2) by Glen & Hardy (2000: 57), a view that we do not accept.

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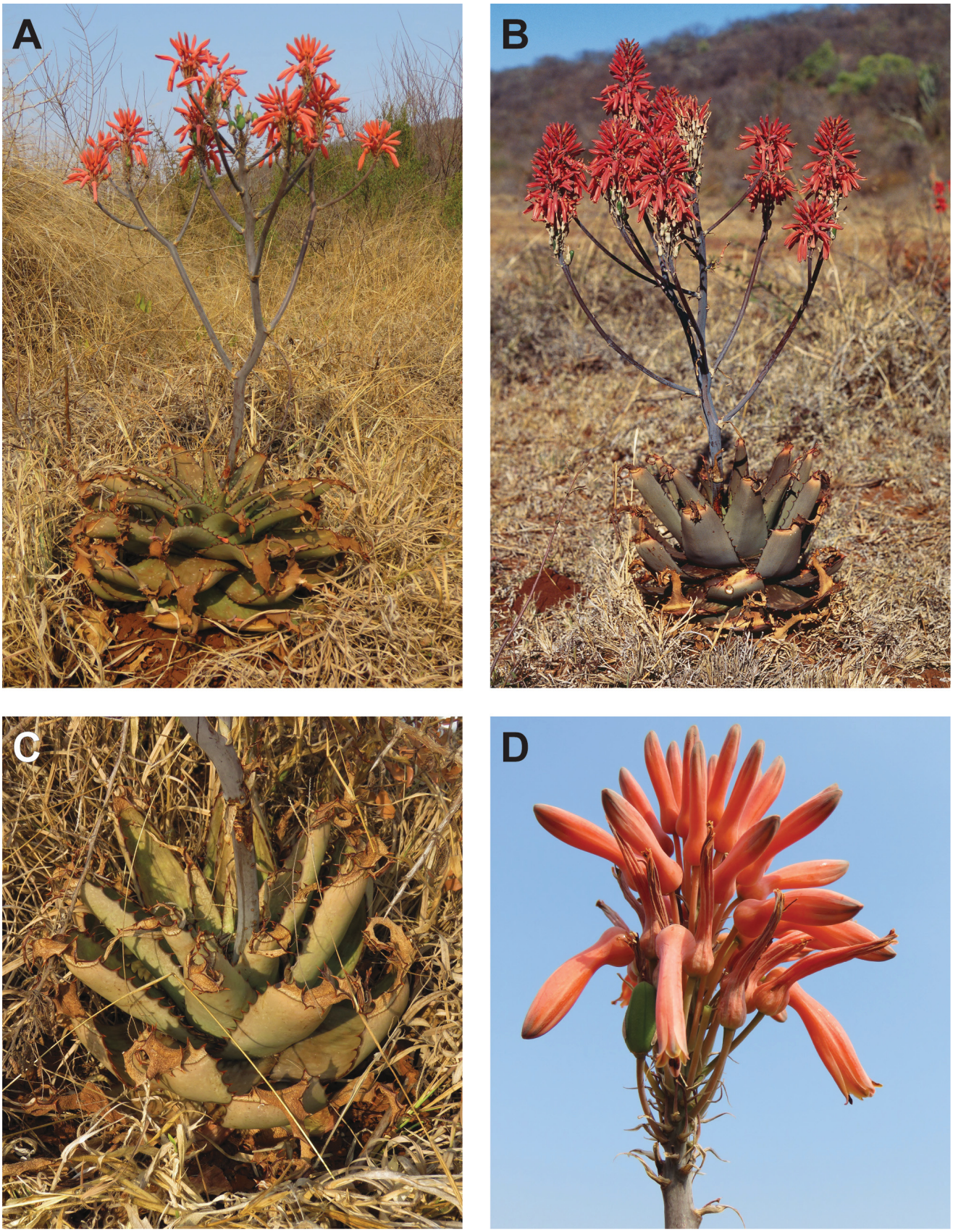

FIGURE 1. *Aloe immaculata*. **A.** Plant in habitat at Chuenespoort, Limpopo province, South Africa. **B.** Plant in habitat south of Polokwane, Limpopo province, South Africa. The flowers of this form are coral red. **C.** The colour of the immaculate leaves varies from dull green to brownish green. **D.** The racemes are sub-capitate to conical and round-topped. Photographs: Gideon F. Smith.

FIGURE 2. *Aloe affinis*. **A.** Plant in habitat along Schoemanskloof, Mpumalanga province, South Africa. **B.** Inflorescences are cylindrical-acuminate, i.e., more cylindrical than in *A. immaculata*, and round-topped. **C.** Leaves of the species are generally yellowish green. Photographs: Gideon F. Smith.

Material and methods

The descriptions of *A. immaculata* and *A. affinis* are based on detailed, comparative morphological studies of material of these species in the veld in the Limpopo and Mpumalanga provinces of South Africa, respectively. Where possible, specimens of and associated information on *A. immaculata* and *A. affinis* held in Herbs BOL, K, NBG, and PRE were studied. Measurements were taken by hand using a ruler, except for floral measurements below 4 mm, which were taken using hand-held magnifying equipment.

The descriptions of *A. immaculata* and *A. affinis* follow the Aloes of the World descriptive template (see Smith *et al*. 2008a, b).

Author attribution of scientific plant names cited follows IPNI (2022 [continuously updated]) although in the notation required by *Phytotaxa*, i.e., they are given as full bibliographic references. Herbarium codes follow Thiers (2022 [continuously updated]). Nomenclatural issues accord with the Shenzhen *Code* (Turland *et al*. 2018).

Results

There are several similarities in the character states of *A. immaculata* and *A. affinis* that point to a possible close relationship between these two species, which explain why, in the past, there was an attempt to treat them as conspecific. Both species grow as solitary plants with the dense-leaved rosettes not forming clusters (Figs 1A–C, 2A, C). The usually unspotted leaves are distinctly lineate adaxially, but paler and not or only obscurely lineate abaxially. Inflorescences can be up to 10-branched from about the middle or below the middle in both species.

Despite the above-mentioned similarities, there are several differences between *A. immaculata* and *A. affinis* that support their recognition as distinct species. These manifest especially in the leaf characters, as well as in reproductive morphological characters (Table 1). The leaf surface micro-morphology of the two species is also different (Grace 2009, Grace *et al*. 2009) and, although not a convenient character to use for identification in the veld, further supports their segregation.

TABLE 1. Differences among *Aloe immaculata* and *A. affinis*.

#	Character	*Aloe immaculata*	*Aloe affinis*
A.	Vegetative		
1	Leaf width (cm)	6–8	9–11
2	Leaf colour and markings adaxially	Dull green to brownish green; immaculate; distinctly deep green- to brownish green-lineate	Yellowish green; immaculate; distinctly dark-lineate
3	Leaf colour and markings abaxially	Greyish green, paler than adaxially; immaculate; unlined, or sometimes obscurely and finely green-lineate	Paler green than adaxially; immaculate; more obscurely lineate
4	Leaf margin	Horny*, brownish to reddish brown; teeth 4–5 mm long	Prominent, horny, reddish brown; teeth 5–8 mm long
5	Leaf exudate	Dries purple	Dries pale yellow
B.	Reproductive		
6	Raceme shape	Sub-capitate to conical, round-topped	Cylindrical-acuminate
7	Raceme length (cm)	10–13	Up to 25
8	Flower length (mm)	28–33	40–45
9	Perianth colour externally	Coral red to pale flesh pink	Scarlet red

*The leaf margin being described as "horny" references especially the spaces between the teeth.

Especially in *A. immaculata* there is great variation in the characters of the leaves (unspotted to obscurely or even, less commonly, clearly spotted) and inflorescences (especially in terms of the raceme shape). This is mostly attributed to hybridisation with other maculate aloe species with which it often grows sympatrically (see 'Notes' under the taxonomic treatment of *A. immaculata*, below, for more details).

Notwithstanding the variation in leaf morphology and markings, the leaves of pure *A. immaculata* are generally

a dull green to brownish green with deep green to brownish green lines adaxially (Fig. 1A–C), as opposed to the yellowish green, more fleshy leaves with dark lines of *A. affinis* (Fig. 2A, C). In *A. immaculata* the leaves are narrower (6–8 cm) than those of *A. affinis* (9–11 cm). The reddish leaf margin in *A. affinis* is more prominent and with longer teeth (5–8 mm) than the brownish to reddish brown margin with 4–5 mm long teeth of *A. immaculata*. Another distinctive character is the leaf exudate of *A. immaculata* that dries purple, while that of *A. affinis* dries a pale yellow.

There are also distinct differences in the raceme shape and dimensions, and flowers of the two species. In *A. immaculata* the racemes are sub-capitate to conical and round-topped (Fig. 1D), and 10–13 cm long, whereas those of *A. affinis* are cylindrical-acuminate and up to 25 cm long (Fig. 2A–B). The coral-red to pale flesh pink flowers of *A. immaculata* are shorter (28–33 mm) than the scarlet red flowers of *A. affinis* (40–45 mm).

The natural geographic distribution ranges of these two species also do not overlap (Fig. 3).

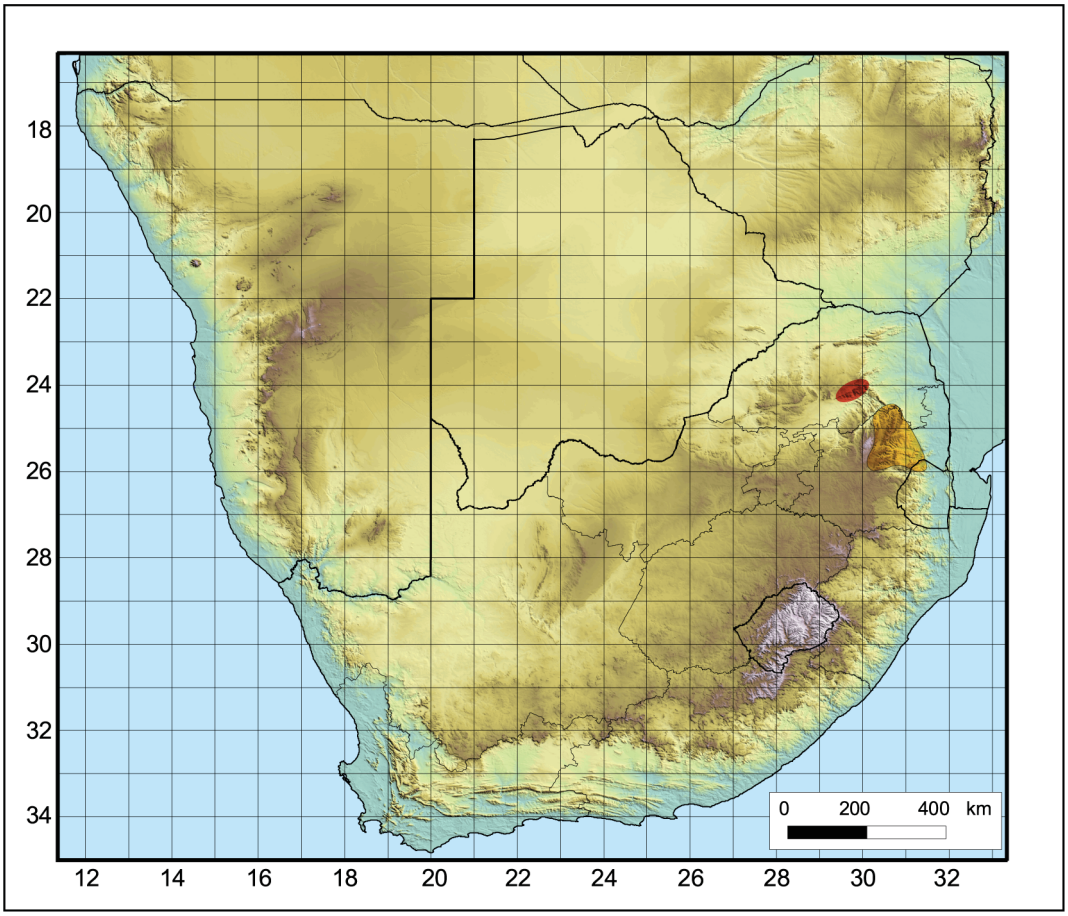

FIGURE 3. Known natural geographical distribution range of *Aloe immaculata* (red on the map) and *A. affinis* (orange on the map).

To accurately reflect the concepts of *A. affinis* and *A. immaculata* of previous workers on *Aloe*, we here provide such references for the two species.

Nomenclature of *Aloe immaculata*

Aloe immaculata Pillans (1934: 25) (Fig. 1). Also treated in: Groenewald (1941: 134), Reynolds (1950: 239), Judd (1967: 28, plate 7), Jeppe (1969: 81), Bornman & Hardy (1971: 101), Jacobsen (1977: 84), Jacobsen (1986: 170), Van Wyk & Smith (1996: 200), Newton (2001: 143), Smith (2003: 32), Van Wyk & Smith (2003: 204), Smith & Van Wyk (2008: 89), Carter *et al*. (2011: 185), Van Wyk & Smith (2014: 240), Klopper (2015: 342, 592), Newton (2020: 579). *Type*:—SOUTH AFRICA. Limpopo province, Pietersburg [Polokwane] district, Malips Drift, s.d., *s.c. s.n.*, Flowered in Stellenbosch University Garden, August 1933, *H. Herre SUG6774* (holotype BOL [Image available at https://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.bol140159]).

Nomenclatural note on the type of the name *Aloe immaculata*:—Reynolds (1950: 240) noted that the type specimen of *A. immaculata* is not typical of the species. This could be because the plant was cultivated outside of its natural distribution range or as a result of possible hybridisation at the original collecting site (see further under 'Notes'

below). It is not known by who and when the plant that provided the type material was collected in the field. When it flowered in August 1933 in the Stellenbosch University Botanical Garden, a specimen was prepared by the then curator of the garden, Hans Herre. This specimen was designated as type when Pillans (1934) described *A. immaculata* as a new species.

Description:—Plants medium-sized, low-growing, solitary, rosette erect, up to 450 mm tall. *Stem* ± absent or short, to 100(–150) mm long, simple, thickened lower down if present, clothed in persistent, twisted, dried leaves. *Leaves* very densely rosulate, erect at first, then horizontally spreading, lanceolate-attenuate, (150–)250(–300) mm long, (60–)70(–80) mm wide at base, apical portion dry, twisted; *adaxial surface* dull green to brownish green, usually immaculate, or with very few scattered spots towards base, faintly to distinctly longitudinally brownish- to greenish- to purplish-lined, lines narrow, not confluent, adaxially flat to canaliculate, texture smooth; *abaxial surface* dull greyish green to brownish green, immaculate, paler than adaxial surface, sometimes very finely greenish-lined; *margins* shiny brown to shiny reddish brown, armed with prominent, short, very pungent, elongated deltoid, shiny-brown, yellowish-tipped teeth, 4–5(–6) mm long, (7–)10(–5) mm apart, straight to variously curved towards leaf base; *exudate* drying purple. *Inflorescence* usually only one produced per season, to ± 1 m tall, erect to slightly leaning, (6–)10(–16)-branched panicle, usually branched below middle, branches gracefully curved upwards; peduncle stout, lacking sterile bracts below racemes, panicle branches subtended by prominent fertile bracts of 15–50 mm long, irregularly deltoid to lanceolate-triangular, dull light brown to creamy white, drying rapidly, distinctly longitudinally dark brown lined. *Racemes* subcapitate to conical and round-topped, tapering upwards or round-topped, 100–130 mm long, 80–90 mm wide where flowers are at anthesis, rather densely flowered; buds erect to erectly spreading, flowers pendulous at anthesis. *Floral bracts* narrowly lanceolate, variously twisted,8–12 mm long, much narrower than fertile bracts, as long as or slightly shorter than pedicels, creamy white, drying rapidly, 3–many dark brown-nerved. *Pedicels* (10–)12–15 mm long, orange to reddish orange when young, light green with age. *Flowers*: *perianth*: buds ± uniformly coral red to dull pink, dark-tipped; open flowers ± uniformly coral red, orange or pink for basal ⅔, alternately light pink and dark-coloured in apical ⅓, ± 28–34 mm long, ± 6–7 mm across ovary, narrowed above ovary to yield bulbous base, distinctly enlarged towards mouth, middle ± straight to down-curved, widening towards mouth; tips of segments slightly spreading, outer segments free for ⅓ of their length; *stamens* with filiform-flattened filaments, uniformly light yellow, exserted for up to 1–2 mm; *ovary* 6–7 mm long, 3 mm in diam., light green; *style* well-exserted, uniformly light yellow; *stigma* tiny, very slightly capitate, yellowish. *Fruit* a light green to purplish green capsule, 15–20 × 8–10 mm, dry remains of perigone persistent for long time. *Seed* not seen. *Chromosome number*: $2n = 14$ (Riley & Majumdar 1979: 46).

Flowering time:—*Aloe immaculata* flowers between May and August (winter in the southern hemisphere), and often into September (spring).

Habitat:—*Aloe immaculata* grows in often very dense grassy patches in bushveld (savanna) vegetation.

Distribution:—*Aloe immaculata* is only known with certainty from the Chuenespoort and Malipsdrift areas in Limpopo province, South Africa (Fig. 3). Outlying forms resembling *A. immaculata* have been recorded from Makapan's Valley further to the west.

Notes:—From unpublished correspondence (held at Herb. BOL) between G.W. Reynolds and N.S. Pillans, it is evident that Reynolds spent many hours studying the aloes at and near the type locality of *A. immaculata* during several visits to that area. Reynolds (1950) concluded that there is a high incidence of hybridisation among the winter-flowering maculate aloes [namely *A. immaculata*, *A. greatheadii*, *A. davyana*, and *A. mutans*] in the region between Chuenespoort and the Olifants River (near Malipsdrift)—the natural geographic distribution range of *A. immaculata*. However, Reynolds was convinced, as are we, that *A. immaculata* represents a distinct species that is characterised by unspotted, distinctly brown-lined leaves in solitary rosettes, with racemes that are cylindrical and round-topped, and longer than in *A. greatheadii*, but shorter and not as pyramidal as in *A. davyana*. He concluded that, where plants have leaves with few to many, usually obscure spots, the inflorescences are either more capitate or more pyramidal, leading Reynolds to believe that these plants represent hybrids between *A. immaculata* and *A. greatheadii* or *A. davyana*, respectively (Reynolds 1950, and unpublished correspondence and notes held at Herbs BOL and PRE).

Since the spellings 'Chunies Poort' or 'Chuniespoort' were used historically, including on specimen labels, these spellings are retained for the place names from where the specimens cited below were collected. Note though that the standardised spelling is 'Chuenespoort' (Raper *et al*. 2014: 71).

Additional specimens investigated:—SOUTH AFRICA. Limpopo province. Malips River Valley, 11 July 1937, *G.W. Reynolds 2518* (K; PRE, 2 sheets). Malips River Valley, Bewaarkloof road, 11 July 1937, *G.W. Reynolds 2516* (K; PRE); *G.W. Reynolds 2517* (PRE). Mphatlele's location, 15 May 1914, *I.B. Pole Evans 169* (PRE). Near Chuniespoort, May 1935, *G.W. Reynolds 1347A & B* (PRE, 2 sheets). East of Chunies Poort Police Post, 11 August 1935, *G.W.*

Reynolds 1530 (K; PRE). East of Chunies Poort Police Post on road to Malips Drift, 21 May 1936, *G.W. Reynolds 1582* (GRA; K; PRE). East of Chuniespoort, 28 June 2007, *O. Grace, E. van Wyk, L.A. Nkuna & W.F. Mabatha 62* (K; PRE); *O. Grace, E. van Wyk, L.A. Nkuna & W.F. Mabatha 64* (K, 2 sheets). South of Chuniespoort, 28 June 2007, *G.F. Smith 1159* (PRU).

Specimens resembling *A. immaculata*:—SOUTH AFRICA. Limpopo province. Makapan Valley, 20 July 1951, *B. Maguire 907* (K; NBG, 4 sheets; PRE). Between Lydenburg & Chuniespoort, May 1932, fl. June 1934 in Garden at DPI [Pretoria], *I.B. Pole Evans PRE38083* (PRE). [These localities are not included in the distribution map presented in Fig. 3.]

Nomenclature of *Aloe affinis*

Aloe affinis Berger (1908: 206) (Fig. 2). Also treated in: Groenewald (1941: 69, 131, 156–158, 167, Figs14–17), Reynolds (1950: 243), Judd (1967: 14, plate 4), Jeppe (1969: 80), Bornman & Hardy (1971: 105), Jacobsen (1977: 70), Jacobsen (1986: 140), Van Wyk & Smith (1996: 182), Glen & Hardy (2000: 57, pro parte excl. *A. immaculata*), Newton (2001: 106), Van Wyk & Smith (2003: 186), Smith & Van Wyk (2008: 84), Grace (2009: 111, pro parte excl. *A. immaculata*), Carter *et al*. (2011: 186), Grace *et al*. (2011: 7, pro parte excl. *A. immaculata*), Van Wyk & Smith (2014: 210), Klopper (2015: 324, 573), Newton (2020: 494). *Type*:—SOUTH AFRICA. Mpumalanga province, near Mashishing [Lydenburg], August 1894, *F. Wilms 1490* (holotype B†; lectotype P P02053262 [https://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.p02053262]; isolectotype E E00193926 [https://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.e00193926] and E E00200122 [https://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.e00200122], Z Z-000086741). Lectotype designated by Smith *et al*. (2020b). [Note: The specimen kept at Herb. Z is filed under the name *Aloe dyeri* Schönland (1905: 289).]

Nomenclatural note on the type of the name *Aloe affinis*:—The typification of the name *A. affinis* was discussed in detail by Smith *et al*. (2020b: 79).

Description:—Plants medium-sized, low-growing, solitary, rosettes erect, 0.2–0.3 m tall. *Stem* absent or very short. *Leaves* densely rosulate, arcuate-erect to suberect, slightly spreading, ± 300–450 mm long, usually with additional 100 mm dried twisted reddish brown apex, 90–110 mm wide at base; *adaxial surface* yellowish green, immaculate or occasionally obscurely spotted, distinctly dark-lined, mostly flat, sometimes concave; *abaxial surface* usually paler green, immaculate, more obscurely lineate; *margin* very prominent, horny, reddish brown to dark brown, with pungent deltoid reddish brown teeth, 5–8 mm long, 10–15 mm apart, straight or slightly curved towards leaf base; *exudate* drying pale yellow. *Inflorescence* 1–2 per rosette simultaneously or consecutively, up to 1 m high, erect, 5–10-branched panicle, branched from about middle or below, branches widely spreading to arcuate-erect; *peduncle* stout, deep green to brownish with grey powdery bloom, without sterile bracts below first branch, with few bracts below racemes, narrowly deltoid, up to 70 mm long, dry. *Racemes* cylindrical-acuminate, apex rounded, up to 250 mm long, erect, rather densely flowered; buds erect to spreading, flowers pendent at anthesis. *Floral bracts* narrowly deltoid, spreading and recurved, sometimes coiled backwards, 15–20 mm long, 3 mm wide, as long as or longer than pedicels, very thin, scarious, ± 5-nerved. *Pedicels* 15–20 mm long. *Flowers*: *perianth*: dull brick-red to coral-red, 40–45(–50) mm long, 9–10 mm across ovary, abruptly constricted above ovary to 5–6 mm to yield bulbous base, widening to 8–9 mm towards slightly upturned mouth, slightly decurved, outer segments free for 10 mm, tips slightly spreading; *stamens* with filiform-flattened filaments, not or very shortly exserted; *ovary* 9 mm long, 3 mm diam., green; *style* exserted 2–4 mm. *Fruit* a bluish grey capsule, ± 17 × 8 mm, dry remains of perigone persistent for long time. *Seed* not seen. *Chromosome number*: 2*n* = 14 (Groenewald 1941: 156–158, 167, Figs14–17).

Flowering time:—*Aloe affinis* flowers between May and June(–July) (winter in the southern hemisphere),

Habitat:—*Aloe affinis* grows in dense grassy patches in very fire-prone habitats and is often found on gentle slopes in rocky, hilly places or on open grassy slopes. Some areas where *A. affinis* used to occur are densely planted with exotic pine and eucalyptus species for the commercial paper and pulp industry.

Distribution:—*Aloe affinis* mainly occurs from northwestern Eswatini, and Airlie and White River in the south along the eastern escarpment to the Mariepskop area in the Mpumalanga province, and to near the Echo Caves (north of Ohrigstad), Limpopo province, South Africa (Fig. 3). Outlying forms resembling *A. affinis* are known from Ermelo, Mpumalanga province, in the south, and north to Tzaneen, Limpopo province, South Africa. In the latter instance the specimen could not be located in Herb. PRE to verify its identity.

Additional specimens investigated:—ESWATINI. Mtutusi River, Havelock, 29 June 1961, *R.H. Compton 29121* (K; NBG, 2 sheets). Havelock, 3 July 1963, *R.H. Compton 29121* (NBG, 2 sheets).

SOUTH AFRICA. Mpumalanga province. East of Airlie, and along road to Godwan River, 6 May 1935, *G.W.*

Reynolds 1284 (K, 2 sheets; PRE, 2 sheets). Nort-northwest of White River, August 1955, flowered at Greendale, Salisbury [Harare, Zimbabwe], May 1957, *L.C. Leach 244* (K). Rosehaugh, 8 May 1935, *G.W. Reynolds 1302* (PRE, 3 sheets); 17 June 1941, *G.W. Reynolds NBG 1119/35* (NBG). Schoemanskloof, June 1932, *J.C. Smuts 308* (PRE); *J.C. Smuts 309* (K; PRE); 4 May 1938, *F.Z. van der Merwe 1687* (K; PRE, 2 sheets). Schoemans Kloof, east of Machadodorp, Flowered in Johannesburg 7 July 1935, *G.W. Reynolds 1122* (PRE). Schoemans Kloof road, east of Lydenburg turn-off, 8 August 2003, *R. Klein, L.A. Nkuna & E. van Wyk 700* (K, 3 sheets). Crocodile River Valley, northeast of Machadodorp, 21 June 1937, *G.W. Reynolds 2491* (K; PRE, 2 sheets). Wonderkloof Natuurreservaat, 12 September 1979, *J.P. Kluge 1944* (PRE). South of Sabie, 10 May 1935, *G.W. Reynolds 1305* (K, 2 sheets; PRE, 2 sheets). Vertroosting Nature Reserve, 15 June 1968, *D. Edwards 4034* (K; PRE). Lydenburg, flowered at Union Buildings [Pretoria], 21 August 1904, *I.B. Pole Evans* 18 (PRE). Lydenburg, collected 21 August 1914, flowered at [Botany] Laboratory, Pretoria, 22 May 1916, *I.B. Pole Evans 149* (K; PRE). Lydenburg, 6 August 1941, *E. Struben NBG 1153/30* (NBG). Near Lydenburg, August 1894, *F. Wilms TM10169* (PRE). Lydenburg, Witklip, 24 June 1974, *J.P. Kluge 585* (LNBG; PRE). Mt Anderson, 29 April 1980, *G.L. Mohle 334* (LNBG; PRE). Ohrigstaddam Nature Reserve, 22 May 1973, *N.H.G. Jacobsen 2873* (PRE). Ehlanzeni, Mac Mac Falls, between Sabie and Graskop, 11 July 2007, *O. Grace, E. van Wyk, L.A. Nknuna & W.F. Mabatha 87* (K; PRE). Between Sabie and Graskop, 8 August 2003, *E. van Wyk, R.G. Klein & L.A. Nkuna 698* (PRE). North of Graskop, 24 June 2002, *M. MacMahan MM00127* (PRE). Pilgrims Rest, 5 May 1916, *Mr Ellor 153A & B* (PRE). East of Pilgrims Rest, 18 June 1937, *G.W. Reynolds 2468* (K; PRE, 2 sheets). The Berg, west of Pilgrims Rest, 11 May 1935, *G.W. Reynolds 1309* (PRE, 2 sheets). Mariepskop, *s.d.*, *J.F. van der Schijff 4930* (PRE).

SOUTH AFRICA. Limpopo. Near Echo Cave, 24 May 1961, *R.G. Strey 3768* (K, PRE).

Specimens resembling *A. affinis*:—SOUTH AFRICA. Mpumalanga province. Carolina, Buffelspruit, 12 August 1969, *I.C. Verdoorn 2521* (PRE). Midway between Ermelo and Carolina, *s.d.*, *A. Hertzog PRE38084* (PRE, 3 sheets).

SOUTH AFRICA. Limpopo province. East of Tzaneen, road to Leydsdorp, 5 May 1961, *D.R.J. van Vuuren 1218* (PRE [specimen not located]). [The latter three localities are not reflected on the distribution map presented in Fig. 3.]

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References

Berger, A. (1908) 8. *Aloe* L. *In*: Engler, A. (ed.) Liliaceae-Asphodeloideae-Aloineae. *Das Pflanzenreich* IV. 38. III. II. Heft 33. Verlag von Wilhelm Engelmann, Leipzig, pp. 159–326. [https://www.biodiversitylibrary.org/item/68230#page/165/mode/1up]

Bornman, H. & Hardy, D.[S.] (1971) *Aloes of the South African veld*. Voortrekkerpers, Johannesburg, 299 pp.

Carter, S., Lavranos, J.J., Newton, L.E. & Walker, C.C. (2011) *Aloes. The definitive guide.* Kew Publishing, Royal Botanic Gardens, Kew / British Cactus & Succulent Society, London, 719 pp.

Glen, H.F. & Hardy, D.S. (1987) Nomenclatural notes on three southern African representatives of the genus *Aloe*. *South African Journal of Botany* 53 (6): 489–492.
https://doi.org/10.1016/S0254-6299(16)31383-7

Glen, H.F. & Hardy, D.S. (2000) Aloaceae (First part): *Aloe*. *In*: Germishuizen, G. (ed.) *Flora of southern Africa*, Vol. 5, Part 1, Fasc. 1. National Botanical Institute, Pretoria, pp. 1–167.

Grace, O.M. (2009) *Contributions to the systematics and biocultural value of* Aloe *L. (Asphodelaceae)*. Ph.D. thesis, University of Pretoria, Pretoria, 158 pp.
https://hdl.handle.net/2263/26261

Grace, O.M., Klopper, R.R., Figueiredo, E. & Smith, G.F. (2011) *The aloe names book*. Strelitzia 29. South African National Biodiversity Institute, Pretoria, and Royal Botanic Gardens, Kew, 232 pp.
https://hdl.handle.net/20.500.12143/270

Grace, O.M., Simmonds, M.S.J., Smith, G.F. & Van Wyk, A.E. (2009) Taxonomic significance of leaf surface morphology in *Aloe* section *Pictae* (Xanthorrhoeaceae). *Botanical Journal of the Linnean Society* 160 (4): 418–428.

https://doi.org/10.1111/j.1095-8339.2009.00982.x

Groenewald, B.H. [as "B.H.G."] (1936) 'n Nuwe aloesoort van Pretoria distrik [*Aloe labiaflava*]. *Tydskrif vir Wetenskap en Kuns* 14: 57–59.

Groenewald, B.H. (1941) *Die aalwyne van Suid-Afrika, Suidwes-Afrika, Portugees Oos-Afrika, Swaziland, Basoetoeland, en 'n spesiale ondersoek van die klassifikasie, chromosome en areale van die* Aloe Maculatae. Die Nasionale Pers Beperk, Bloemfontein, 172 pp.

IPNI. (2022 [continuously updated]) *The International Plant Names Index*. Available from: https://www.ipni.org/ (accessed August 2022).

Jacobsen, H. (1977) *Lexicon of succulent plants. Short descriptions, habitats and synonymy of succulent plants other than Cactaceae*. Blandford Press Ltd, Poole, Dorset, 682 pp.

Jacobsen, H. (1986) *A handbook of succulent plants. Descriptions, synonyms and cultural details for succulents other than Cactaceae. Vol. 1*. Abromeitiella *to* Euphorbia. Blandford Press Ltd, Poole, Dorset, 464 pp.

Jeppe, B. (1969) *South African aloes*. Purnell & Sons S.A. (Pty) Ltd, Cape Town, Johannesburg, London, 144 pp.

Judd, E. (1967) *What aloe is that?* A Purnell Pocketbook. Southern African Series. Purnell, Cape Town & Johannesburg, 76 pp.

Klopper, R.R. (2015) *Contributions to the systematics of the genus* Aloe *L. (Asphodelaceae: Alooideae) in southern Africa*. Ph.D. thesis. University of Pretoria, Pretoria, 712 pp.

Klopper, R.R., Grace, O.M., Smith, G.F. & Figueiredo, E. (2011) Reinstatement of *Aloe graciliflora* Groenew. (Asphodelaceae: Alooideae), a maculate aloe from north-east South Africa. *Bradleya* 29: 125–130. https://doi.org/10.25223/brad.n29.2011.a15

Klopper, R.R., Smith, G.F., Grace, O.M. & Crouch, N.R. (2014) Reinstatement of *Aloe barbertoniae* Pole-Evans (Asphodelaceae: Alooideae) from northeastern South Africa. *Bradleya* 32: 70–75. https://doi.org/10.25223/brad.n32.2014.a21

Linnaeus, C. (1753) *Species plantarum, exhibentes plantas rite cognitas, ad generarelatas, cum differentiis specificis, nominibus trivialibus, synonymis selectis, locis natalibus, secundum systema sexuale digestas*. Vol. 1. Salvius, Stockholm. [*Aloe* L. treated on pp. 319–323]. https://www.biodiversitylibrary.org/item/13829#page/333/mode/1up

Newton, L.E. (2001) *Aloe*. *In*: Eggli, U. (ed.) *Illustrated handbook of succulent plants: Monocotyledons*. Springer-Verlag, Berlin, pp. 103–186.

Newton, L.E. (2020) *Aloe*. *In*: Eggli, U. & Nyffeler, R. (eds.) *Illustrated handbook of succulent plants: Monocotyledons*, Vol. 1. Springer-Verlag, Berlin, pp. 485–696.

Pillans, N.S. (1934) Plants: new or noteworthy. *South African Gardening* 24: 25–27.

Pole Evans, I.B. (1915) Descriptions of some new aloes from the Transvaal [including *Aloe longibracteata* Pole-Evans on p. 25]. *Transactions of the Royal Society of South Africa* 5: 25–35, + Plates V–XV. [https://www.biodiversitylibrary.org/page/47226163#page/87/mode/1up]

Raper, P.E., Möller, L.A. & Du Plessis, L.T. (2014) *Dictionary of Southern African place names*. Jonathan Ball Publishers, Johannesburg & Cape Town, 566 pp.

Reynolds, G.W. (1950 [December]) *The aloes of South Africa*. The Trustees, The Aloes of South Africa Book Fund, Johannesburg, 520 pp.

Riley, H.P. & Majumdar, S.K. (1979) *The Aloineae. A biosystematic survey*. The University of Kentucky Press, place of publication not stated, 180 pp. ["Index of Families, Genera & Species" only partially numbered; https://www.jstor.org/stable/j.ctt130jhd1]

Salm-Reifferscheidt-Dyck, J.F.M.A.H.I. (1837 [probably June]) *Monographia generum aloes et mesembryanthemi*, Fasc. 1. Maximillian Cohen, Bonn, 60 plates, 72 pp. https://doi.org/10.5962/bhl.title.153143

Schönland, S. (1904) On some new and some little known species of South African plants. II. *Records of the Albany Museum* 1: 114–124. [https://www.biodiversitylibrary.org/item/31254#page/132/mode/1up]

Schönland, S. (1905) On some South African species of *Aloe* with special reference to those represented in the Herbarium of the Albany Museum. II. *Records of the Albany Museum* 1: 282–295. [https://www.biodiversitylibrary.org/item/31254#page/308/mode/1up]

Smith, G.F. (2003) *First field guide to aloes of southern Africa*. Struik Nature, Cape Town, 57 pp.

Smith, G.F., Figueiredo, E. & Esser, H.-J. (2020b) The aloes of Friedrich Wilms: notes on *Aloe wilmsii* Diels ex Hausen, *A. affinis* A.Berger, and *A. cinnabarina* Diels ex A.Berger (Asphodelaceae subfam. Alooideae), with a biographical sketch of Wilms. *Bradleya* 38: 75–83. https://doi.org/10.25223/brad.n38.2020.a10

Smith, G.F., Figueiredo, E., Klopper, R.R. & Crouch, N.R. (2012) Summer-flowering species of maculate *Aloe* L. (Asphodelaceae: Alooideae) in the *Aloe zebrina*-complex from South Africa: reinstatement of four names, and description of *A. braamvanwykii* Gideon F.Sm. & Figueiredo. *Bradleya* 30: 155–166.

https://doi.org/10.25223/brad.n30.2012.a19
Smith, G.F. & Klopper, R.R. (2021) Reinstatement of *Aloe labiaflava* (Asphodelaceae subfam. Alooideae), a distinctive species of maculate aloe endemic to the western Mpumalanga province of South Africa. *Phytotaxa* 512 (3): 179–189. https://doi.org/10.11646/phytotaxa.512.3.5
Smith, G.F., Klopper, R.R., Crouch, N.R. & Figueiredo, E. (2020a) Reinstatement of *Aloe davyana* (Asphodelaceae subfam. Alooideae), a winter-flowering species endemic to central-northeastern South Africa. *Phytotaxa* 475 (3): 201–208. https://doi.org/10.11646/phytotaxa.475.3.4
Smith, G.F., Klopper, R.R., Crouch, N.R. & Figueiredo, E. (2021) Reinstatement of *Aloe davyana* var. *subolifera* (Asphodelaceae subfam. Alooideae), a distinctive variety of an endemic South African aloe. *Phytotaxa* 482 (2): 208–212. https://doi.org/10.11646/phytotaxa.482.2.9
Smith, G.F. & Van Wyk, B. (2008) *Aloes in southern Africa*. Struik Publishers, Cape Town, 136 pp.
Smith, G.F., Walters, M., Klopper, R.R. & Crouch, N.R. (2008a) Aloes of the world: African Plants Initiative. An international web-based collaboration to promote scholarly research on *Aloe* L. *Bradleya* 26: 121–128. https://doi.org/10.25223/brad.n26.2008.a2
Smith, G.F., Walters, M., Crouch, N.R. & Klopper, R.R. (2008b) Aloes of the world: a comprehensive collaboration to consolidate knowledge on the genus *Aloe* L. *Aloe* 45 (1): 19–20.
Thiers, B. (2022 [continuously updated]) *Index herbariorum: a global directory of public herbaria and associated staff.* New York Botanical Garden's Virtual Herbarium. Available from: http://sweetgum.nybg.org/ih/ (accessed August 2022).
Turland, N.J., Wiersema, J.H., Barrie, F.R., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Kusber, W.-H., Li, D.-Z., Marhold, K., May, T.W., McNeill, J., Monro, A.M., Prado, J., Price, M.J. & Smith, G.F. (2018) *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen*, China, July 2017. [Regnum Vegetabile 159]. Koeltz Botanical Books, Glashütten, 254 pp. https://doi.org/10.12705/Code.2018
Van Wyk, B-E. & Smith, G.[F.] (1996) *Guide to the aloes of South Africa*. 1st edition. Briza Publications, Pretoria, 302 pp.
Van Wyk, B-E. & Smith, G.[F.] (2003) *Guide to the aloes of South Africa*. 2nd edition. Briza Publications, Pretoria, 304 pp.
Van Wyk, B-E. & Smith, G.F. (2014) *Guide to the aloes of South Africa*. 3rd edition. Briza Publications, Pretoria, 376 pp.