

Albuca crisper and *A. grandis* (Hyacinthaceae: Ornithogaloideae), two new species of subgenus *Albuca*, the rediscovery of *A. albucoides* (subgenus *Osmyne*), and the identity of *A. reflexa*

J.C. MANNING* and P. GOLDBLATT**

Keywords: *Albuca* L., *Drimia* Jacq., Hyacinthaceae, Ornithogaloideae, South Africa, taxonomy, Urgineoideae

ABSTRACT

Albuca crisper is a new species of section *Falconera* series *Trianthera* with crisulate leaves from the Great Karoo, known at least since 1947 but overlooked until now. A second new species, *A. grandis*, from the southwestern Cape was previously included in *A. fragrans* Jacq. (section *Falconera* series *Falconera*). It is a robust species that flowers in winter and early spring and the styles are rugulose with \pm isodiametric epidermal cells, unlike typical *A. fragrans* which is a more slender species flowering in early summer and with derived, smooth styles with fusiform epidermal cells. The recent discovery of a flowering population matching the type of *A. albucoides* (Aiton) J.C.Manning & Goldblatt (subgenus *Osmyne*) allows for a full description and illustration of this poorly known and taxonomically neglected species that has often been included in *A. suaveolens* (Jacq.) J.C.Manning & Goldblatt. Lastly, examination of the type of *A. reflexa* Krause & Dinter from Namibia shows it to be conspecific with *Drimia indica* (Roxb.) Jessop.

INTRODUCTION

Hyacinthaceae, which comprises 700–900 species of bulbous geophytes widely distributed through Africa and the Mediterranean, extending to Northern Europe, Asia and South America, is one of the larger geophyte families in southern Africa. The division of the family into the four subfamilies Hyacinthoideae, Ornithogaloideae, Oziroëoideae and Urgineoideae (Speta 1998; Manning *et al.* 2004) is now well established but generic circumscriptions in subfamily Ornithogaloideae in particular have undergone major revision since 1998 (Speta 1998; Manning *et al.* 2004, 2009). The description of *Ornithogalum* L. (Linnaeus 1753) was followed by that of *Albuca* L. (Linnaeus 1762), which was established to accommodate those species of *Ornithogalum* with distinctive *Galanthus*-like flowers in which the outer tepals are \pm spreading and the inner erect and \pm connivent. This distinction has been readily applied in most instances, with the notable exception of members of *Ornithogalum* subgen. *Osmyne* (Salisb.) Baker (Obermeyer 1978). The flowers of members of this group have fleshy, yellowish tepals with a dark median band that are highly reminiscent of flowers of *Albuca*, leading early workers to describe several species of this taxon in the latter genus.

The recent application of DNA techniques to the family suggested that neither *Albuca* nor *Ornithogalum* were monophyletic as then defined, leading Manning *et al.* (2004) to include both genera within a greatly expanded *Ornithogalum*. Further analysis provided greater resolution of relationships within the subfamily, enabling Manning *et al.* (2009) to develop a revised classification of the subfamily in which the genus *Albuca* is reinstated in a modified circumscription that includes several elements previously assigned to *Ornithogalum*, notably

subgen. *Osmyne* and most members of subgen. *Urophyllon* (Salisb.) Baker. In this circumscription *Albuca* is distinguished from *Ornithogalum* by thick-textured tepals with a broad median green band associated with a concentration of vascular traces around the midline, the style mostly longer than the ovary, and the generally larger seeds. This classification is followed here.

Within the enlarged circumscription of *Albuca*, those species previously treated as *Ornithogalum* subgen. *Osmyne* comprise *Albuca* subgen. *Osmyne* (Salisb.) J.C.Manning & Goldblatt and those of *Albuca sensu stricto* comprise subgen. *Albuca*.

1. Subgenus *Albuca*

Species of *Albuca* subgen. *Albuca* are distributed among the four sections *Albuca*, *Falconera* (Salisb.) J.C.Manning & Goldblatt, *Branciona* (Salisb.) J.C.Manning & Goldblatt (= sect. *Mitrotepalum* U.Müll.-Doblies ms.) and *Pallastema* (Salisb.) J.C.Manning & Goldblatt (Manning *et al.* 2009). The circumscription of these taxa at the level of subgenera was largely established by Müller-Doblies (1995), whose partial accounts of the species (Müller-Doblies 1994, 1995, 2006) constitute the most recent revisions of the group.

Albuca sect. *Falconera* comprises 18 species divided between the two series: *Trianthera* (U.Müll.-Doblies) J.C.Manning & Goldblatt (the outer whorl of stamens sterile); and *Falconera* (Salisb.) J.C.Manning & Goldblatt (both staminal whorls fertile) (Müller-Doblies 1995; Manning & Goldblatt 2006; Manning *et al.* 2009). Series *Trianthera* comprises just five species from eastern and southwestern South Africa. Several collections of a distinctive member of this series from the Great Karoo with unique, crisulate leaves represent an unnamed species that we describe here as *A. crisper*, making it the sixth member of the series.

Series *Falconera*, the largest of the two series in subgen. *Falconera*, currently includes 13 species from southern and south tropical Africa but is largely confined

* Compton Herbarium, South African National Biodiversity Institute, Private Bag X7, 7735 Claremont, Cape Town.

** B.A. Krukoff Curator of African Botany, Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166, USA.

MS. received: 2008-08-01.

to the winter rainfall region of southern Africa, including southwestern Namibia. Floral morphology in sect. *Falconera*, in contrast to that in other sections in the subgenus, is relatively diverse, which enabled Müller-Doblies (1995) to identify significant interspecific variation in androecial and especially gynoecial morphology. Vegetatively the species in the section are almost evenly divided between those with leaves (and often peduncle) variously covered with glandular trichomes, and those with the vegetative parts completely glabrous. Among the latter, *Albuca fragrans* Jacq. and *A. clanwilliamae-gloria* U.Müll.-Doblies are considered to be sister species on the basis of their unique styler morphology. In most species of subgen. *Albuca* the epidermal cells of the style are \pm isodiametric but in these two species they are fusiform, giving the style a distinctive, longitudinally striate surface under magnification. This condition was first identified by Müller-Doblies (1995), who described the cells as prosenchymatous, a term originally applied to tissues of elongate cells concerned with the specialized functions of support, protection or conduction, in contrast to parenchyma, which is concerned with more generalized vegetative aspects. The term is thus conventionally applied to the vascular tissue and to supporting sclerenchymatous strands and although now generally obsolete, it is still used to describe cells that are elongate and taper-pointed, thus spindle-shaped or fusiform (Eames & MacDaniels 1925).

Albuca clanwilliamae-gloria is one of the most distinctive species in the genus (Manning *et al.* 1999), readily recognized by its height and large, dull yellow flowers with suberect tepals. *A. fragrans*, in contrast, is far less distinguished and has until now included two very different elements. The first comprises slender, late-flowering plants with the distinctive fusiform styler cells that characterize the species. The second element consists of robust plants that flower in winter and early spring and have a rugulose style with \pm isodiametric epidermal cells. The latter plants are common and conspicuous along the West Coast and have been illustrated under the name *A. fragrans* in several popular accounts of the flora (Manning & Goldblatt 1994; Manning *et al.* 2002).

The type of *Albuca fragrans* is an illustration in Jacquin (1797) and although it is not possible to distinguish cellular details, the style is depicted as smooth, not rugulose. The rather elongate, slender inflorescence and the development of a secondary raceme are also consistent with *A. fragrans* as circumscribed by Müller-Doblies (1995). This fixes the application of the name *A. fragrans* to the more slender, late-blooming plants and excludes the robust, earlier-blooming plants with rugulose styles that were previously identified with the species.

Among the remaining species of sect. *Falconera* with glabrous leaves and rugulose styles, *Albuca papyracea* J.C.Manning & Goldblatt and *A. robertsoniana* U.Müll.-Doblies are characterized by a papery or fibrous neck sheathing the base of the stem and both are currently known only from the Robertson and Little Karoo; *A. bifoliata* R.A.Dyer from Grahamstown has unique, recurved stigmatic horns; *A. monophylla* Baker from southern Angola and Namibia has a single leaf and a style that is at least twice as long as the ovary; and *A. kirstenii* (J.C.Manning & Goldblatt) J.C.Manning & Gold-

blatt is a much smaller species from the southern Cape that flowers in late autumn and winter. The large West Coast taxon is accordingly described here as the new species, *A. grandis*. We provide a full description and illustration of *A. fragrans* for comparison.

***Albuca crispa* J.C.Manning & Goldblatt, sp. nov.**

Geophytum deciduum usitate 0.1–0.3 m altum, bulbo solitario subgloboso 25–30 mm diam., tunicis externis papyraceis, foliis 2–4 erectis ad basem caulem vaginantibus lineari-lanceolatis attenuatis forte undulato-crispatis, usitate 90–140 \times 3–10 mm, marginibus anguste hyalinis, inflorescentia 2–10-flora erecta, bracteis lanceolato-acuminatis, bractea inferiore ad 25 \times 5 mm, superiore 7–8 \times 4 mm, floribus pendentibus pedicellis arcuatis, tepalis albis vel cremeis carinis viridibus ad basem usque ad 1 mm connatis, externis anguste oblongis \pm 15 \times 4 mm apicibus papillatis, internis oblongo-ellipticis concavis 13–14 \times 4 mm apicibus cucullatis parum incrassatis, staminibus ad perianthium per \pm 1 mm adnatis, dimorphis erectis, externis sterilibus filamentis anguste lanceolatis \pm 11 \times 1.5 mm, internis fertilibus lateraliter expansis in quarta parte inferiore contractis \pm 9 \times 1.5 mm, antheris \pm 6 mm longis, ovario oblongo 3-alato \pm 5 mm longo breviter stipitato, stylo obpyramidali trigono transverse rugoso \pm 16 mm longo, stigma acuta trigona papillosa, capsulis ovoideis 3-angulatis \pm 14 \times 10 mm. Semina ignota.

TYPE.—Western Cape, 3222 (Beaufort West): Karoo National Park Camp at main entrance gate, 840 m, (–BC), 9 December 2005, Bester 6220 (NBG, holo.; PRE, iso.).

Deciduous geophyte, mostly 0.1–0.3 m high. *Bulb* solitary, subglobose, 25–30 mm diam.; outer tunics papery, greyish brown, inner tunics tightly overlapping, white, forming a translucent, papery collar around base of leaves, marked with transverse lines of thickening. *Leaves* 2–4, erect, slightly shorter than to \pm as long as inflorescence, fleshy, clasping stem at base, linear-lanceolate, mostly 90–140 \times 3–10 mm, attenuate, strongly undulate-crispulate, glaucous, margins narrowly hyaline. *Inflorescence* corymbose at first but elongating and becoming cylindrical, up to 60 mm long, 2–10-flowered; raceme erect, 1.5–3.0 mm diam. at base; bracts lanceolate-acuminate, lowermost up to 25 \times 5 mm, uppermost 7–8 \times 4 mm, prominently 3-veined, glaucous with narrow whitish margins; pedicels recurved at anthesis, 12–15 mm long, suberect to erect and lengthening in fruit, ultimately 25–30 mm long. *Flowers* pendulous on arching pedicels; tepals biseriate with blades of outer series overlapping inner, united basally for \pm 1 mm, white or cream-coloured with green keels, outer tepals narrowly oblong, \pm 15 \times 4 mm, apices papillate, inner tepals oblong-elliptical, concave, 13–14 \times 4 mm, apices cucullate, slightly swollen and fleshy with longitudinal band of papillae on outer face. *Stamens* adnate to perianth for \pm 1 mm, dimorphic, erect; outer stamens sterile, filaments narrowly lanceolate, \pm 11 \times 1.5 mm; inner stamens fertile, filaments laterally expanded and pinched in lower fourth, \pm 9 \times 1.5 mm; anthers \pm 6 mm long at anthesis, cream-coloured. *Ovary* oblong, 3-winged, \pm 5 mm long, shortly stipitate, paraseptal ridges diverging below; style obpyramidal, trigonous, transversely rugose, \pm 16 mm

long, acute with trigonous, papillate stigma. *Capsule* ovoid, 3-angled, $\pm 14 \times 10$ mm. *Seeds* unknown. *Flowering time*: late November and December. Figure 1.

Distribution and ecology: *Albuca crispa* appears to be endemic to the Great Karoo, where it has been found between Beaufort West, Graaff-Reinet and Steytlerville (Figure 2). It has been recorded on rocky flats, and flowers in midsummer.

Diagnosis and relationships: a very distinct species, *Albuca crispa* is characterized by its undulate-crispulate leaves, unique in the genus, and nodding, white and green flowers. The sterile outer stamens place it in the small series *Trianthera*. Among the five species currently recognized in series *Trianthera*, just one, *A. goswinii* U.Müll.-Doblies, is known with the combination of eglandular leaves and nodding flowers. Endemic to the coastal belt of the southwestern Cape, from the Hot-tentots Holland Mountains to Mossel Bay, it has leaves with straight margins, and yellow and green flowers

with unusual, lorate outer filaments. Glabrous leaves and nodding flowers are, however, probably ancestral in the subgenus and thus not necessarily indicative of a close relationship between species. Possibly more useful in this regard is flower colour. White and green flowers are relatively rare among the members of subgenera *Falconera* and *Albuca*, where yellow and green flowers are more normal. In section *Falconera* series *Trianthera*, white and green flowers are known elsewhere only in *A. decipiens* U.Müll.-Doblies, a species from Namaqualand and the Olifants River Valley. Although distinctive in its erect flowers, *A. decipiens* also shares with *A. crispa* the markedly obpyramidal style (rugulose in *A. crispa* and papillate in *A. decipiens*) with an apiculate stigma and diverging paraseptal crests, possibly indicative of a relationship between the two species.

Other specimens examined

EASTERN CAPE.—3223 (Rietbron): SW of Aberdeen, (–DB), 3 December 1950, *W.F. Barker 7119* (NBG). 3224 (Graaff-Reinet): near Graaff-Reinet, (–AD), 2 December 1950, *W.F. Barker 7095* (NBG).

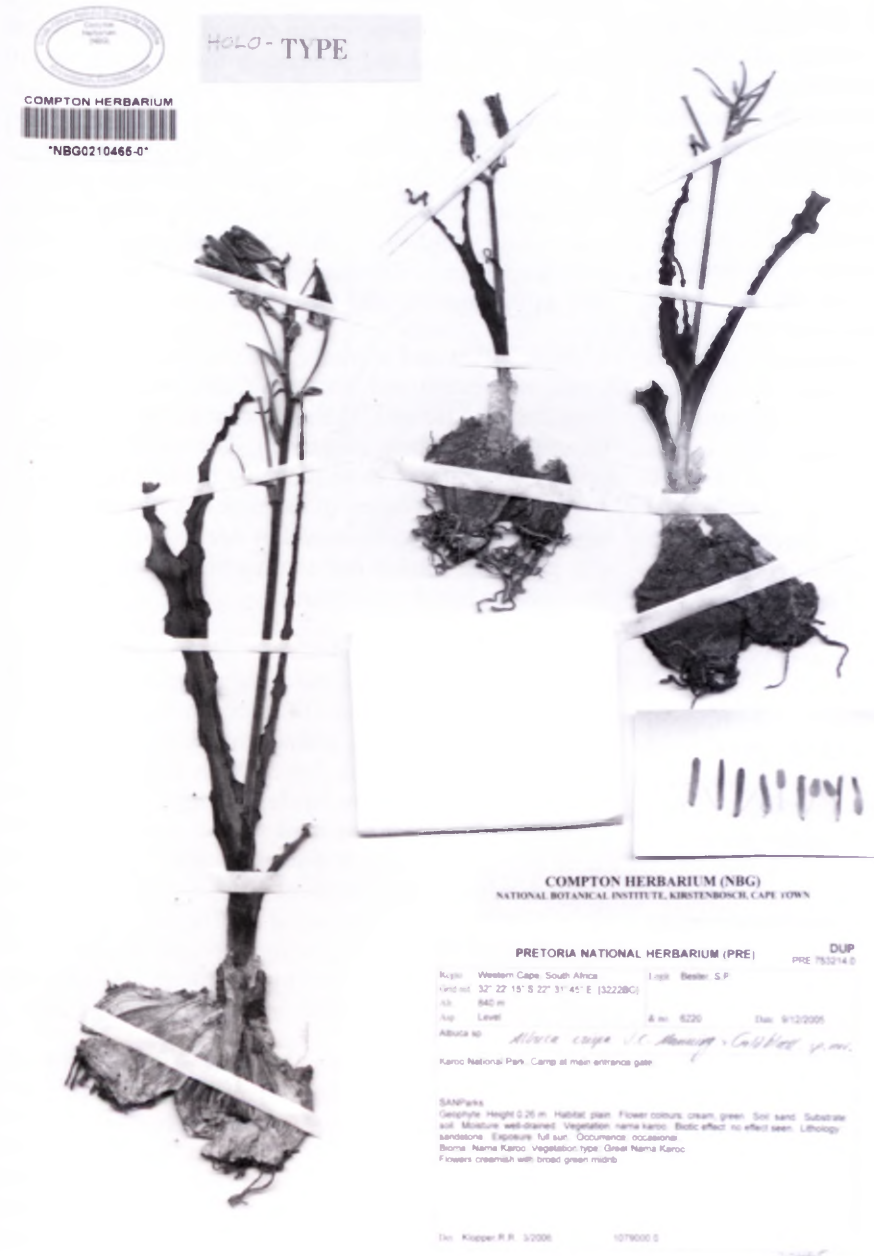


FIGURE 1.—*Albuca crispa*, holotype.

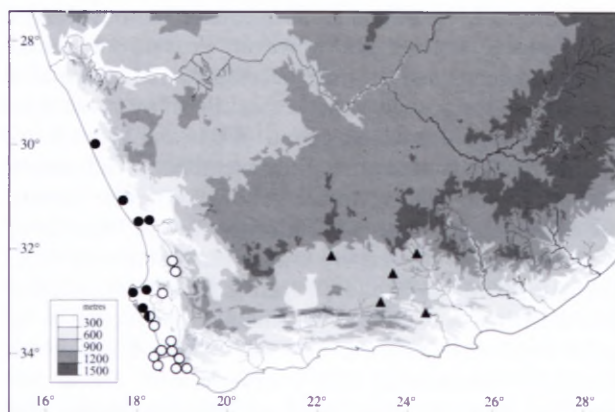


FIGURE 2.—Known distribution of *Albuca crispa*, ▲; *A. grandis*, ●; and *A. fragrans*, ○.

3323 (Willowmore): Miller, (–BB), 5 December 1947, *W.F. Barker 9174* (NBG). 3324 (Steytlerville): Kleinpoort, (–BD), 2 December 1947, *W.F. Barker 9173* (NBG).

***Albuca grandis* J.C. Manning & Goldblatt, sp. nov.**

Geophytum deciduum 0.9–1.3 m altum, bulbo depresso-turbinato longitudinaliter striato 40–60 mm diam., tunicis membranaceis albescentibus, foliis \pm 4 erectis inflorescentia brevioribus succulentis lanceolato-convolutis, inflorescentia valida racemiformi congesta primo \pm 300 mm postremo ad 500 mm longa ad 50-flora (5–)8–15 mm diam. ad basem, bracteis lanceolato-acuminatis manifeste 3-venosis submembranosis postea siccis papyraceis, pedicellis primo suberectis per anthesin recurvatis 25–40 mm longis postremo 60–90 mm longis, floribus nutantibus vanillariodoris tepalis externis flavo- viridibus carinis viridibus internis albescentibus carinis viridibus, tepalis biseriatis connatis usque ad \pm 1 mm, externis per \pm 45° patentibus anguste ovato-oblongis 22–27 \times 8–10 mm apicibus papillosis, internis erectis leviter ringentibus oblongo-ellipticis concavis 20–25 \times 8–10 mm apicibus parum incrassatis tumidis externe vitta longitudinali papillarum, staminibus dimorphis erectis, externis filamentibus anguste lanceolatis in dimidio proximali canaliculatis 17–18 \times 2–3 mm antheris \pm 5 mm longis per anthesin cremeis, internis filamentibus lateraliter expansis infima quarta compressis 15–17 \times 3.5 mm antheris \pm 7 mm longis per anthesin cremeis, ovario oblongo 3-alato \pm 10 mm longo breviter stipitato porcis paraseptalibus parallelibus, stylo columnari trigono transverse rugoso flavo-viride \pm 12 mm longo, stigmatibus trigono papilloso, capsulis ovoideis 3-angulatis 25–28 \times 15–20 mm; seminibus discoideis colliculatis ateribus \pm 6.5 mm diam.

TYPE.—Western Cape, 3318 (Cape Town): along R27 near Rondeberg, deep sandy soil in coastal scrub, (–AD), 30 August 2007, *Manning & Goldblatt 3123* (NBG, holo.; MO, iso.).

Deciduous geophyte, mostly 0.9–1.3 m high. *Bulb* solitary or in small clusters, depressed-turbinate, 40–60 mm diam., longitudinally ribbed; outer tunics membranous, whitish, inner tunics tightly overlapping, white. *Leaves* \pm 4, erect, shorter than inflorescence, fleshy, clasping stem in basal half, lanceolate-convolute, attenuate, mostly 500–1 000 \times 30–40 mm, dull green. *Inflorescence* a stout, congested raceme, conical at first but

elongating and becoming cylindrical, \pm 300 mm when young but ultimately up to 500 mm long, up to 50-flowered; raceme erect when young but inclining slightly with age and flowers then subsecund, (5–)8–15 mm diam. at base; bracts lanceolate-acuminate, lowermost up to 50 \times 10 mm, uppermost \pm 20 \times 5 mm, prominently 3-veined, submembranous when young but soon drying and becoming papery and dark brown with broad whitish margins; pedicels recurved at anthesis, 25–40 mm long, suberect to erect and lengthening in fruit, ultimately 60–90 mm long, becoming subsecund through gradual inclination of the rachis during fruiting. *Flowers* pendulous on arching pedicels, vanilla-scented; tepals biseriate with blades of outer series overlapping inner, united basally for \pm 1 mm, outer tepals spreading at \pm 45°, narrowly ovate-oblong, 22–27 \times 8–10 mm, greenish yellow with green keels, apices papillate, inner tepals erect, gaping slightly, oblong-elliptical, concave, 20–25 \times 8–10 mm, whitish with green keels, apices slightly swollen and fleshy with longitudinal band of papillae on outer face. *Stamens* adnate to perianth for \pm 1 mm, dimorphic, erect; outer filaments narrowly lanceolate, channelled in basal half, 17–18 \times 2–3 mm with anthers \pm 5 mm long at anthesis, cream-coloured, inner filaments laterally expanded and pinched in lower fourth, 15–17 \times 3.5 mm, anthers \pm 7 mm long at anthesis, cream-coloured. *Ovary* oblong, 3-winged, green, \pm 10 mm long, shortly stipitate, paraseptal ridges parallel; style columnar, trigonous, transversely rugulose, yellowish green, \pm 12 mm long, acute with trigonous, papillate stigma. *Capsule* ovoid, 3-angled, 25–28 \times 15–20 mm. *Seeds* discoid, \pm 6.5 mm diam., colliculate, dull black. *Flowering time*: (late July) August to mid-October. Figure 3.

Distribution and ecology: distributed along the West Coast of Western and Northern Cape, with collections from north of Hondeklip Bay in central Namqualand as far south as Koeberg (Figure 2). The species is poorly collected despite, or more probably because of, its large size, and the exact extent of its range has still to be determined. *Albuca grandis* occurs in deep sandy soils, usually in coastal thicket and scrub where plants are often sheltered by bushes and shrubs.

Diagnosis and relationships: *Albuca grandis* is a robust species, typically reaching a metre or more in height, with a characteristic thick peduncle, usually more than 10 mm in diameter, and a dense, conical raceme of large, dull greenish white flowers with tepals 22–27 mm long. All six stamens are fertile, although the anthers of the outer whorl are \pm one third smaller than those of the inner whorl. The ovary is conspicuously 3-lobed, almost winged, with parallel paraseptal ridges, and a rugulose style. The bulb tunics are not at all fibrous. *A. grandis* is distinguished from other glabrous species of series *Falconera* with rugulose styles by its stature and the relatively early flowering, mainly in August and September.

The species has until now been confused with *Albuca fragrans* but the two differ in details of morphology and in ecology and phenology. Generally less than 800 mm tall, *A. fragrans* may reach up to 1 m but is always a slender plant with the rachis at most 5 mm in diameter. Its flowers are smaller than those of *A. grandis* in all respects and the inner tepals, which are deeply concave and almost saddle-shaped, are bright yellow distally,



FIGURE 3.—*Albuca grandis*, Manning & Goldblatt 3123 (NBG). A, inflorescence; B, bulb; C, outer tepal; D, outer stamen; E, inner tepal; F, inner stamen. G, H, gynoecium: G, side view, H, top view. I, capsules; J, seed. Scale bar: A, B, I, J, 10 mm; C–H, 4 mm. Artist: John Manning.

unlike those of *A. grandis* which are shallowly concave and whitish. The most characteristic feature of *A. fragrans* is the style, which shows no trace of the rugulose epidermis of most species in the section and is, in contrast, smooth and covered with longitudinally fusiform epidermal cells. *A. fragrans* is a component of sandplain fynbos and flowers in late spring and early summer, in November and December.

The earliest collection of *Albuca grandis* that we have traced appears to be that made by horticulturist Harry Hall near Vredendal as late as 1970. Ready access to the coastal portions of the West Coast north of Yzerfontein was only possible after the completion of the R27 road in 1980 but even so the species is surprisingly poorly collected despite its large size, conspicuous inflorescence, and proximity to Cape Town.

Other specimens examined

NORTHERN CAPE.—3017 (Hondekliipbaai): Koingaas, Skulpfontein, dunes west of road, 200 m, (–AB), 24 August 1999, *Desmet 234* (NBG); S of Farm Rondawel on Groenrivier road, in woody succulent bushes in loose reddish sand, (–DB), 20 July 2005, *Snijman 2003* (NBG); Groen River Mouth, sandveld behind lighthouse, 10 m, (–DC), 15 August 2002, *Rourke 2253* (NBG).

WESTERN CAPE.—3118 (Vanrhynsdorp): 2 miles [3 km] NE of Vredendal, in deep red sandveld, (–DA), 22 July 1970, *Hall 3661* (NBG); Farm 246 north of Vanrhynsdorp, open shrubland, 184 m, (–DA), 12 July 2001, *Boucher 6733* (NBG); 10 km N of Vanrhynsdorp, deep red sand, (–DA), 18 November 1995 [fruiting], *Goldblatt & Manning 10408* (MO, NBG). 3217 (Vredenburg): coast south of Pateroster, (–DD), 24 August 1997, *Goldblatt & Manning 10680A* (MO, NBG). 3218 (Clanwilliam): Veldrif, ± 6 km along road to Piketberg, sandy strandveld, ± 50 m, (–CC), 14 October 1986 [fruiting], *O'Callaghan 1239* (NBG).

Albuca fragrans Jacq., *Plantarum rariorum horti caesarei schoenbrunnensis* 1: 44 (1797). Type: South Africa, [Western Cape], without locality or date, illustration in Jacquin, *Plantarum rariorum horti caesarei schoenbrunnensis* 1: t. 84 (1797).

Deciduous geophyte, (25–)40–80(–1 000) mm high, usually with second inflorescence following first. *Bulb* solitary, depressed-globose or depressed-turbinate, 30–50 mm diam., longitudinally ribbed and wrinkled, developing numerous bulbils on surface and at base; outer tunics membranous, whitish, inner tunics tightly overlapping, white. *Leaves* 2–4(–6), erect, shorter than inflorescence, fleshy, clasping stem in basal half, linear-convolute, attenuate, mostly 200–600 × 5–10(–25) mm, drying distally at flowering, bright to dull green, usually flushed dull red basally. *Inflorescence* a slender, moderately dense to lax, cylindrical raceme, ultimately up to 300 mm long, up to 20-flowered; raceme erect but nodding apically in bud, inclining slightly with age and capsules thus subsecund, 2–5 mm diam. at base; bracts lanceolate-acuminate, lowermost up to 25 × 6 mm, uppermost ± 15 × 5 mm, submembranous when young but soon becoming papery, with ± 9-veined central, brown portion and broad whitish margins; pedicels suberect in bud but recurved at anthesis, 12–25 mm long, becoming subsecund in fruit and suberect to erect, lengthening slightly and ultimately 20–30 mm long. *Flowers* pendulous on arching pedicels, vanilla-scented; tepals biseriate with blades of outer series overlapping inner, united basally for ± 1 mm, outer tepals spreading ± horizontally or up to 30°, elliptical, 20–22 × 8–9 mm, pale yellow with

green keels, apices papillate, inner tepals erect, gaping slightly, oblong-obovate, 15–17 × 5–8 mm, deeply concave with margins ± erect, pale yellow but bright yellow apically with green keels, apices fleshy and inflexed but not hinged with elliptical area of papillae on outer face. *Stamens* adnate to perianth for ± 1 mm, dimorphic, erect; outer filaments narrowly lanceolate-subulate, 12–14 × 2 mm with anthers ± 4 mm long at anthesis, cream-coloured, inner filaments laterally expanded and pinched in lower fourth, ± 12 × 2 mm with anthers ± 6 mm long at anthesis, cream-coloured. *Ovary* weakly hourglass-shaped, 3-lobed, green, 6–8 mm long, shortly stipitate, paraseptal ridges parallel; style columnar, trigonous, longitudinally striate with testal cells fusiform, yellowish green, 8–9 mm long, obtuse with trigonous, papillate stigma. *Capsule* ovoid, 3-angled, 15–20 × 10–15 mm. *Seeds* flattened, D-shaped, 4–5 mm diam., colliculate, dull black. *Flowering time*: late October to December. Figure 4.

Distribution and ecology: mainly coastal in the southwestern Cape, from north of Citrusdal in the Olifants River Valley southwards along the West Coast to the Cape Peninsula and eastwards to Kleinmond (Figure 2). The species grows in deep sand in sandplain fynbos.

Diagnosis and relationships: *Albuca fragrans*, along with *A. clanwilliamae*, is distinguished from other species in the subgenus by its distinctive, smooth style with fusiform epidermal cells and a ± acute stigma. The ovary is obscurely hourglass-shaped and the paraseptal ridges are parallel. Both species are also characterized by the development of numerous bulbils on the surface of the bulb. All other species in section *Falconera* have rugulose styles with ± isodiametric epidermal cells.

Other specimens examined

WESTERN CAPE.—3218 (Clanwilliam): between Citrusdal and Clanwilliam, (–BD), 26 October 2001, *Manning 2651C* (NBG); Citrusdal, sand camp across from De Klerk Street, 170 m, (–CA), 29 October 1998, *Hanekom 3102* (NBG). 3318 (Cape Town): 2 miles [3 km] down new road from Yzerfontein, (–AC), 1 December 1970, *Barnard s.n.* (NBG); Darling District, Rondeberg Farm, (–AD), October 1998, *Manning 2184* (NBG); Cape Town, Rondebosch Common, (–CD), 20 November 2007, *Manning 3124* (NBG); Durbanville Racecourse, moist sandy flats, (–DC), 23 November 2004, *Ebrahim CR84* (NBG). 3418 (Simonstown): Silvermine, (–AB), 10 December 1944, *Compton 16613* (NBG); Steenberg, (–AB), 12 December 1945, *Compton 17866* (NBG); near Olifantsbosch, (–AC), 14 November 1945, *Leighton 1502* (NBG); Buffels Bay, (–AD), November 1935, *Compton 6383* (NBG); Cape Point, (–AC), 22 November 1941, *Compton 12525* (NBG); Strandfontein, near swamp, (–BA), 21 December 1941, *Compton 12790* (NBG); Seekoei Vlei, (–BA), 29 December 1917, *Purcell s.n.* (SAM98105); Gordons Bay, (–BB), November 1949, *Davis s.n.* SAM64681 (SAM); Cape Hangklip, near hotel, (–BD), 16 November 1963, *Rourke s.n.* (NBG). 3419 (Caledon): Kleinmond, Rooisand parking area east of town on lagoon, (–AC), 15 November 2007, *Manning 3122A* (NBG).

2. Subgenus *Osmyne*

Albuca subgen. *Osmyne* (Salisb.) J.C.Manning & Goldblatt [= *Ornithogalum* subgen. *Osmyne* (Salisb.) Baker] comprises ± 30 species from the winter rainfall region of southern Namibia and South Africa (Müller-Doblies & Müller-Doblies 1996; Manning *et al.* 2009). In the current classification of the subgenus, all but five of the ± 30 species of *Osmyne* are placed in section *Osmyne*, which is characterized by the presence of

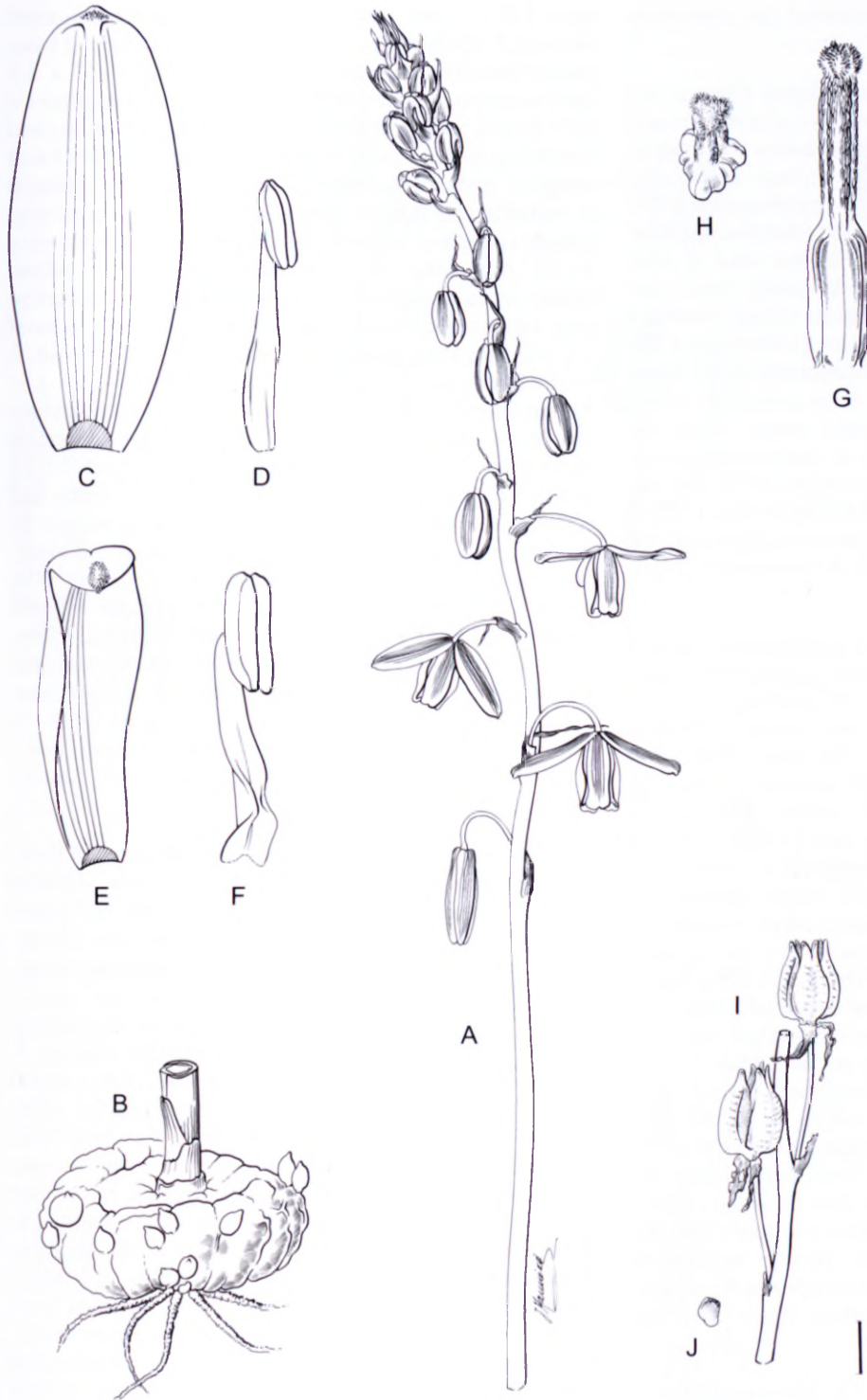


FIGURE 4.—*Albuca fragrans*, Manning 3124 (NBG). A, inflorescence; B, bulb; C, outer tepal; D, outer stamen; E, inner tepal; F, inner stamen. G, H, gynoecium: G, side view; H, top view. I, capsules; J, seed. Scale bar: A, B, I, J, 10 mm; C–H, 3 mm. Artist: John Manning.

several, mostly narrow and not highly succulent leaves. Distinctions between many of these species are based primarily on differences in leaf number, orientation and morphology. The taxonomic treatment of the group by Obermeyer (1978) was hampered by inadequate collections of many of the taxa, with the result that species were often treated rather broadly. A more recent taxonomy of the group (Müller-Doblies & Müller-Doblies 1996) has benefited from much more extensive field knowledge but many of the species are not supported by adequate descriptions nor, in several cases, by the deposition of type specimens, making their assessment difficult if not impossible.

An extensive population of autumn- and early winter-flowering plants from the lowlands at the foot of the Elandsberg Mountains between Malmesbury and Tulbagh in Western Cape could not be assigned to any of the species of the subgenus generally recognized from the West Coast, and it was initially considered that they might represent an undescribed species. The leaves of these plants, which are absent or incompletely developed at flowering, number between 3–5, are erect and ± subterete or terete, and the abaxial surface is adorned with longitudinal rows of minute papillae. Semi-terete forms have a translucent adaxial band down the middle of the blade and the margins are

scabridulous. The flowers are suberect but otherwise unexceptional in the group.

More than half of the species in subgen. *Osmyne* are confined to Namaqualand, with just five of the currently named species recorded in the southwestern Cape south of Clanwilliam. Among these, only *Albuca albucooides* (Aiton) J.C.Manning & Goldblatt (= *Ornithogalum albucooides* (Aiton) Thunb.) approaches the Elandsberg plants in having subterete or semiterete leaves, and is also reported to be hysteranthous. Non-flowering plants that are attributed to the species have been widely recorded by Müller-Doblies & Müller-Doblies (1996) along the West Coast, from the Bokkeveld Mountains to the Cape Peninsula but no specimens have been located in South African herbaria. Known in flower solely from the type, the species was included in *A. suaveolens* (Jacq.) J.C.Manning & Goldblatt by Obermeyer (1978) but was resurrected by Müller-Doblies & Müller-Doblies (1996). In the absence of any further collections, however, we continued to include the species in *A. suaveolens* (Manning & Goldblatt 2006).

Albuca albucooides is based on a single plant collected by Francis Masson from the Western Cape, most likely from either the Paardeberg near Malmesbury or from near Piketberg according to the conclusions of Müller-Doblies & Müller-Doblies (1996). The plant flowered in cultivation in Britain and the type specimen comprises five detached leaves and a single raceme. The date of flowering is given as September and October. This is almost certainly based on its flowering in cultivation in the northern hemisphere, which would correlate to March or April in the southern hemisphere. The leaves of the species are very characteristic at close inspection (Müller-Doblies & Müller-Doblies 1996), being semi-terete, 2–6 mm wide, stiff and succulent, shallowly canaliculate above, with an asperulous margin and with papillate ridges on the dorsal (sic) surface. This description is a perfect match for the Elandsberg plants, apart from the location of the papillate ridges on the morphologically ventral surface. Examination of the type specimen confirms that it matches the Elandsberg plants very well in the leaves and also in the few-flowered raceme with suberect flowers. There is thus no doubt that the Elandsberg plants represent the poorly understood *Albuca albucooides* and we take this opportunity of providing a full description and illustration of this 'lost' species.

***Albuca albucooides* (Aiton) J.C.Manning & Goldblatt** in *Taxon* 58: 94 (2009). *Anthericum albucooides* Aiton: 449 (1789). *Ornithogalum albucooides* (Aiton) Thunb.: 62 (1794). Type: South Africa, [Western Cape], without precise locality or date, *Masson s.n. ex cult. hort. Kew 1788* (BM, holo!).

Deciduous geophyte, 0.10–0.18 m high. *Bulb* solitary, pyriform, 12–20 mm diam.; outer tunics dry and thinly leathery, brownish, inner tunics tightly overlapping, white. *Leaves* absent or emergent at flowering, lateral to flowering stem and up to \pm half as long, 3–5, tufted, suberect, fleshy, not clasping below, terete or hemiterete and then adaxially flattened or weakly canaliculate with translucent median longitudinal strip, rounded abaxially with minutely scabrid longitudinal ribs, acute, 50–

80 \times 1.0–1.5 mm, dull green. *Inflorescence* a lax, erect raceme, 3–10-flowered; rachis 1.5–2.5 mm diam. at base; bracts lanceolate-acuminate, lowermost up to 12 \times 2.5 mm, sometimes with toothed basal auricles, uppermost \pm 10 \times 2 mm, submembranous when young but drying and becoming papery and dark brown with broad whitish margins; pedicels suberect in bud but curving apically at anthesis and flowers spreading, (8–)10–15 mm long, straightening and lengthening slightly in fruit, ultimately 15–25 mm long. *Flowers* held horizontally, rotate, lightly scented; tepals biseriate with outer series overlapping inner, united basally for \pm 0.5 mm, suberect in basal 1.5–2.0 mm then spreading, pale yellow with broad, \pm brown keels, outer tepals oblong-elliptical, 13–15 \times 2.5–3.0 mm, penicillate with conspicuously papillate-pubescent apex, with 5 centrally congested veins, outermost veins extending \pm halfway, inner tepals elliptical, 13–15 \times 3.0–3.5 mm, concave, apices swollen and fleshy and conspicuously papillate-pubescent, papillae separated by median glabrous band, with 3 centrally congested veins. *Stamens* adnate to perianth for \pm 1 mm, suberect; filaments awl-shaped, 4–5 \times 0.8 mm with anthers \pm 3 mm long at anthesis, yellow. *Ovary* ovoid, 3-angled, green, \pm 3 mm long, shortly stipitate; style slightly declinate, slender, 3-angled, \pm 4 mm long, acute with capitate, papillate-pubescent stigma. *Capsule* ovoid, 3-angled, 8–10 \times 6–7 mm. *Seeds* deltoid (rarely discoid), \pm 2 mm diam., colliculate, dull black. *Flowering time*: (late March) April (early May). Figure 5.

Distribution and ecology: thus far collections of flowering material of *Albuca albucooides* have been made at only two sites, one the type made in the late eighteenth century and the other the recent collections from Elandsberg Farm at the western foot of the Elandsberg Mountains east of Riebeeck-Kasteel (Figure 6). The type is thought to have been collected either on the Paardeberg near Malmesbury or near Piketberg (Müller-Doblies & Müller-Doblies 1996), and the two fully documented localities for the species are thus both from the small area along the West Coast known as the Swartland, between Malmesbury and Piketberg. Nonflowering plants, which were assigned to the species, have been collected from several additional localities along the West Coast, ranging from near Mamre in the south to Nieuwoudtville in the north (Müller-Doblies & Müller-Doblies 1996). The plants at Elandsberg occur in local colonies on stony alluvium in the highly localized Swartland Alluvial Fynbos vegetation (Mucina & Rutherford 2006). The nonflowering plants assigned to the species have been collected primarily from rock ledges in fynbos but also from deep sands and gravelly flats. The full extent of the range and ecology of *A. albucooides* remains to be adequately documented.

Flowering in the Elandsberg population takes place in the late autumn and early winter, from late March to early May, and we have observed more than one flush of emergence, presumably under the influence of environmental stimuli such as the passage of cold fronts. Early flowering plants appear without the leaves but those that are stimulated into flower later in the season are accompanied by the appearance of a tuft of young leaves lateral to the flowering stem. Seeds are shed soon after flowering, within two or three weeks, and thus plants with dehisced



FIGURE 5.—*Albuca albucooides*, Manning 3175 (NBG). A, inflorescence and flowering plant; B, fruiting plant; C, outer tepal; D, outer stamen (lateral and adaxial view); E, inner tepal; F, inner stamen (lateral and adaxial view); G, gynoecium; H, seeds. Scale bar: A, B, 10 mm; C–H, 3 mm. Artist: John Manning.

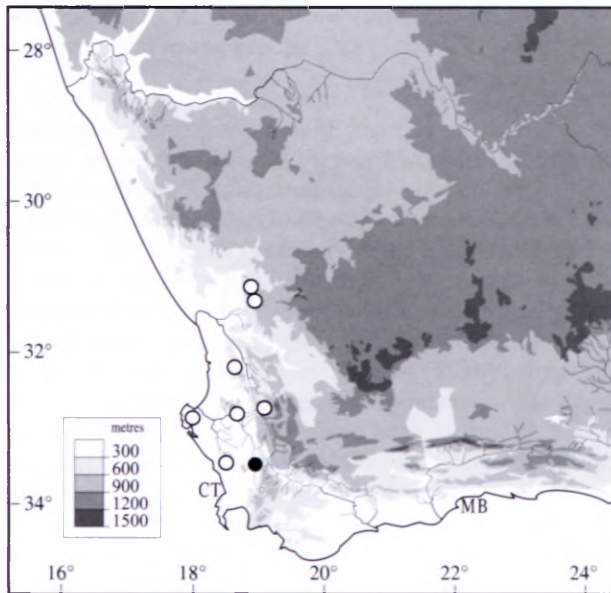


FIGURE 6.—Known distribution of *Albuca albucooides*. Flowering specimens, ●; and non-flowering collections cited in Müller-Doblies & Müller-Doblies (1996), ○.

capsules can be found within the same population as those with emerging flowering stems. Most plants have dehiscent capsules and a well-developed tuft of leaves by mid-May.

3. *Albuca reflexa*

Albuca reflexa Krause & Dinter was based on a collection made by Dinter near Tsumeb in northern Namibia (Krause 1914). Examination of the isotype material at SAM, however, shows it to have the distinctly spurred lower floral bracts that are diagnostic for subfamily Urgineoideae (Manning *et al.* 2004), a feature that was overlooked in the original diagnosis. With the recent removal of the genus *Igidia* Speta to Ornithogaloideae (Wetschnig *et al.* 2007), Urgineoideae now comprises the two genera *Bowiea* Harv. ex Hook.f., characterized by a ramified, voluble inflorescence and long-lived flowers, and *Drimia* Jacq., with unbranched racemes of short-lived flowers. The racemose inflorescence of *A. reflexa*, combined with the shallowly campanulate flowers, are consistent with its placement in the genus *Drimia*. Among the southern African representatives of the genus, the relatively large flowers with narrow, recurved tepals, elongate filaments with \pm basifixed anthers, and the long pedicels > 20 mm long, place the species among the small group of taxa previously segregated as the genus *Thuranthos* C.H. Wright (Jessop 1977). Among these species the dimensions of the flowers of *A. reflexa* match those of *Drimia indica* (Roxb.) Jessop (Jessop 1977; Stedje & Thulin 1987). The narrow, linear leaves described in the description are consistent with this identification. Unfortunately the holotype, which presumably contained the bulb and leaves that were described in the protologue, could not be located at B, making it impossible to check for the characteristic mottling on leaf bases that is diagnostic of *D. indica* and the closely allied *D. angustifolia* Baker. The flowering specimens that constitute the isotype, however, are an excellent match with material of *D. indica* from South Africa. *D. indica* is widespread across the northern parts of South Africa, extending through tropical Africa

as far north as Ethiopia and Mauritania, and in India. It has been recorded from the northern parts of Namibia, in the Cunene Gorge and near Ondonga, and the type locality of *A. reflexa* at Tsumeb is little more than 100 km SE of the latter. We accordingly have no hesitation in regarding *Albuca reflexa* as a synonym of *Drimia indica*.

***Drimia indica* (Roxb.) Jessop**, in *Journal of South African Botany* 43: 272 (1977). *Scilla indica* Roxb.: 147 (1824).

Albuca reflexa Krause & Dinter in Krause: 445 (1914), syn. nov. Type: Namibia, Tsumeb, auf tiefgründigem Lehmboden um kleine, flache Wassermulden, [without date], *Dinter 2694* (B[†], holo.; SAM, iso.! [2 sheets]).

ACKNOWLEDGEMENTS

This study was supported by grant 8428-07 from the National Geographic Society (US), and we thank Elizabeth Parker for her assistance with locating material of *Albuca albucooides*. We are also grateful to Dr R. Vogt, Curator of the herbarium of the Botanischer Garten und Botanisches Museum Berlin-Dahlem, for confirming that no material of *Albuca reflexa* currently exists in their collection. Mr Koos Claassens very kindly researched the date of completion of the R27 for us, contacting James Wilkinson, a civil engineer who worked on the project. Material was collected under permits from Cape Nature and Northern Cape Nature Conservation.

REFERENCES

- AITON, W.H. 1789. *Hortus kewensis*, edn 1. London.
- EAMES, A.J. & MACDANIELS, L.H. 1925. *An introduction to plant anatomy*. McGraw-Hill Book Company, New York.
- JACQUIN, N.J. VON. 1797. *Plantarum rariorum horti caesarei schoenbrunnensis* 1. Wappler, Vienna.
- JESSOP, J.P. 1977. Studies in the bulbous Liliaceae in South Africa: 7. The taxonomy of *Drimia* and certain allied genera. *Journal of South African Botany* 43: 265–319.
- KRAUSE, K. 1914. Liliaceae africanae V. *Botanische Jahrbücher* 51: 440–450.
- LINNAEUS, C. 1753. *Species plantarum*. Salvius, Stockholm.
- LINNAEUS, C. 1762. *Species plantarum* edn 2. Salvius, Stockholm.
- MANNING, J.C., FOREST, F., DEVEY, D.S., FAY, M.F. & GOLDBLATT, P. 2009. A molecular phylogeny and a revised classification of Ornithogaloideae (Hyacinthaceae) based on an analysis of four plastid DNA regions. *Taxon* 58: 77–107.
- MANNING, J.C. & GOLDBLATT, P. 1994. *West Coast*. South African Wild Flower Guide 7. Botanical Society of South Africa, Cape Town.
- MANNING, J.C. & GOLDBLATT, P. 2006. *Ornithogalum kirstenii* (*Albuca* group) (Hyacinthaceae) from Western Cape, South Africa, and new combinations in the group. *Bothalia* 36: 86–89.
- MANNING, J.C., GOLDBLATT, P. & ANDERSON, F. 1999. *Albuca clanwilliamigloria* [sic]. *Flowering Plants of Africa* 56: 9–12, t. 2142.
- MANNING, J.C., GOLDBLATT, P. & FAY, M.F. 2004. A revised generic synopsis of Hyacinthaceae in sub-Saharan Africa, based on molecular evidence, including new combinations and the new tribe Pseudoprosperaeae. *Edinburgh Journal of Botany* 60: 533–568.
- MANNING, J.C., GOLDBLATT, P. & SNIJMAN, D. 2002. *The color encyclopedia of Cape bulbs*. Timber Press, Oregon.
- MUCINA, L. & RUTHERFORD, M.C. 2006. The vegetation of South Africa, Lesotho and Swaziland. *Sretlitzia* 19. South African National Biodiversity Institute, Pretoria.
- MÜLLER-DOBLIES, U. 1994. Enumeratio Albucaum (Hyacinthaceae) Austro-Africanarum adhuc cognitarum 1. Subgenus *Albuca*. *Feddes Repertorium* 105: 365–368.
- MÜLLER-DOBLIES, U. 1995. Enumeratio Albucaum (Hyacinthaceae) Austro-Africanarum adhuc cognitarum 2. Subgenus *Falcon-*

- era (Salisb.) Baker emend. U.M-D. 1987. *Feddes Repertorium* 106: 353–370.
- MÜLLER-DOBLIES, U. 2006. Enumeratio Albucarum (Hyacinthaceae) Austro-Africanarum adhuc cognitarum 3. Additions and additional notes to *Albuca* subgenus *Falconera* and *A.* subgenus *Albuca*. *Feddes Repertorium* 117: 96–138.
- MÜLLER-DOBLIES, U. & MÜLLER-DOBLIES, D. 1996. Revisionula incompleta Ornithogalorum Austro-Africanorum (Hyacinthaceae). *Feddes Repertorium* 107: 361–548.
- OBERMEYER, A.A. 1978. *Ornithogalum*: a revision of the southern African species. *Bothalia* 12: 323–376.
- ROXBURGH, W. 1824. *Flora indica* 2. Serampore.
- SPETA, F. 1998. Hyacinthaceae. In K. Kubitzki, *The families and genera of vascular plants* 3. *Flowering plants. Monocotyledons*: 261–285. Springer-Verlag, Berlin.
- STEDJE, B. & THULIN, M. 1987. A revision of the genus *Drimia* (Hyacinthaceae) in East Africa. *Nordic Journal of Botany* 7: 655–666.
- THUNBERG, C.P. 1794. *Prodromus plantarum Capensium*. Uppsala.
- WETSCHNIG, W., KNIRSCH, W., ALI, S.S. & PFOSSER, M. 2007. Systematic position of three little known and frequently misplaced species of Hyacinthaceae from Madagascar. *Phyton* 47: 321–337.