

HYACINTHACEAE

ALBUCA GARIEPENSIS (ORNITHOGALOIDEAE), A NEW SPECIES OF *A.* SUBGEN. *NAMIBIOGALUM* FROM GORDONIA, SOUTH AFRICA, AND *A. PRASINA* TRANSFERRED TO *ORNITHOGALUM*

INTRODUCTION

Generic limits in Hyacinthaceae: Ornithogaloideae have been intensively reviewed in recent years using molecular techniques (Stedje 1998; Pfosser & Speta 1999; Manning *et al.* 2004, 2009; Martínez-Azorín *et al.* 2011). The broad patterns of phylogenetic relationships in the subfamily are now clear but various options exist for the translation of these patterns into a generic taxonomy (Manning *et al.* 2009; Martínez-Azorín *et al.* 2011). A recent solution, followed here, provides for the expansion of *Albuca* L. to include *Ornithogalum* subgen. *Osmyne* (Salisb.) Baker and *O.* subgen. *Urophyllon* (Salisb.) Baker (Manning *et al.* 2009). *Ornithogalum* is consolidated to include the genera *Galtonia* Decne. and

Neopatersonia Schönland, leaving *Dipcadi* Medik. and *Pseudogaltonia* (Kuntze) Engl. as the remaining genera in the subfamily. In this circumscription, *Albuca* is distinguished from *Ornithogalum* by flowers with thick-textured, whitish or yellowish tepals with a broad, green or brown longitudinal band on the adaxial surface associated with 3–5 mostly simple, medially aggregated veins (Manning *et al.* 2009). In *Ornithogalum*, the tepals are thin- or thick-textured with a narrow or indistinct median band and veins not tightly aggregated in the middle of the tepals, and the outer veins are often \pm branched.

Several collections of narrow-leaved plants from the middle reaches of the Orange River in Northern Cape,

with relatively short, pyramidal racemes of green-banded flowers and relatively large, depressed-globose or cordate capsules, have remained unnamed until now or have been identified as *Ornithogalum tenuifolium* subsp. *aridum* Oberm. [now *Albuca virens* subsp. *arida* (Oberm.) J.C.Manning & Goldblatt]. Their large capsules, however, preclude any association with *A. virens*, which has smaller, ovoid capsules, and it is now clear that they represent an undescribed species, which we describe here as *A. gariensis* after the Khoisan name for the Orange River, known to earlier inhabitants of the region as the *gariëp* or Great River.

Collections at KMG, NBG, PRE and SAM, the main herbaria with good representation of collections of Northern Cape species, were consulted for records of the new species (herbarium acronyms after Holmgren *et al.* 1990).

In addition, examination of herbarium specimens of *Ornithogalum prasinum* Ker Gawl., which was transferred to *Albuca* by Manning *et al.* (2009) on the strength of its supposedly close relationship to *O. seineri* (Engl. & K.Krause) Oberm. (now *A. seineri* (Engl. & K.Krause) J.C.Manning & Goldblatt), reveals that it lacks the perianth features that are diagnostic of *Albuca*. This, combined with its karyology with basic chromosome number $x = 8$, dictates its transfer back to the genus *Ornithogalum*, where its large, retuse capsules suggest a relationship with *O. xanthochlorum* Baker.

TAXONOMY

***Albuca gariensis* J.C.Manning & Goldblatt sp. nov.**

Geophyta decidua 0.03–0.20 m alta, foliis (4)5–8(9) racemo duplo ad sexies longior linearibus pauciter rotatis vel ad apicem tortis canaliculatis 70–200 × 1–4 mm, racemo subpyramidallo dense 8–25-florum, 30–80 mm longo, bracteis lanceolato-aristatis, inferioribus ad 20 × 3 mm submembranaceis ad papyraceis, pedicelis ± patentibus (5–)8–10(–15) mm longis, floribus rotatis tepalis liberibus albis carinis viridibus oblongo-ellipticis 7–10 × 2.5–3.5 mm, nervis centralibus tribus congestis, staminibus liberibus erectis, filamentis 4–5 mm longis inferioribus 1.5 mm expansis quadratiformis, ovario ovoideo breve stipitato ± 3 mm longo profunde 3-angulato, stylo erecto ± 3 mm longo, capsula ambita depresso-cordata profunde 3-lobata 10–12 × 15–20 mm diam., seminibus discoideis 5–8 mm diam.

TYPE.—Northern Cape: 2921 (Kenhardt):10–12 km NE of Putsonderwater along roadside, Farm Kareelaagte, (–BB), 6 Mar. 2010, Manning 3294 (NMG, holo.; MO, PRE, iso.).

Deciduous geophyte, 0.03–0.20 m high. *Bulb* solitary, pyriform, 10–25 mm diam.; outer tunics dry and thinly leathery, brownish, sometimes forming a loose neck and finely transversely barred, inner tunics tightly overlapping, white. *Leaves* overtopping raceme and two to six times as long, (4)5–8(9), suberect or spreading, not clasping below, linear, slightly coiled or twisted apically, canaliculate and rounded abaxially, 70–200 × 1–4 mm,

acute, fleshy, dull bluish green. *Inflorescence* usually solitary but up to 3 from a bulb, subpyramidal, densely 8–25-flowered, 30–80 mm long at flowering, elongating slightly and ± cylindrical in fruit, scape green and 1.5–3.0 mm diam. at ground level but subterranean portion tapering strongly and white; bracts lanceolate-aristate, lowermost up to 20 × 3 mm and uppermost ± 7 × 2 mm, apex often slightly coiled, whitish and submembranous when young but becoming papery; pedicels ± spreading, (5–)8–10(–15) mm long. *Flowers* held horizontally, rotate, 14–20 mm diam., faintly scented of lemon-cocunut; tepals biseriate with outer series overlapping inner, free, suberect in basal 1.5–2.0 mm then spreading, white with green keels adaxially, outer tepals oblong-elliptical, 7–10 × 2.5–3.0 mm, slightly keeled apically and penicillate, with 3 centrally congested veins, inner tepals elliptical, 7–10 × 3.0–3.5 mm, concave apically and penicillate, with 3 centrally congested veins. *Stamens* free, erect; filaments 4–5 mm long, two thirds as long as tepals, verruculose, both series with quadrate expansion in basal 1.5 mm, outer expansion ± 1 mm wide, inner 1.5 mm wide; anthers versatile, ± 2 mm long at anthesis, pale creamy yellow. *Ovary* ovoid and shortly stipitate, ± 3 mm long, strongly 3-angled, green; style erect, tapering, 3-angled, ± 3 mm long, acute with trigonous, papillate stigma, green in lower half and white distally. *Capsule* depressed-cordate in outline, deeply 3-lobed, 10–12 × 15–20 mm. *Seeds* discoid, 5–8 mm diam., colliculate, glossy black. *Flowering time*: January to early April. Figures 20; 21.

Distribution and ecology: *Albuca gariensis* seems to be restricted to the central portion of the Orange River drainage basin in northeastern Bushmanland, where it has been collected in a region bounded by the towns of Kakamas, Upington and Kenhardt (Figure 22). The species has been recorded from calcrete plains and sandy flats, often in slight washes or drainage lines where seasonal soil moisture levels are higher. *A. gariensis* appears to be endemic to the Bushmanland Bioregion of the Nama-Karoo Biome, primarily in Bushmanland Arid Grassland (Mucina & Rutherford 2006). Flowering occurs in late summer, the exact timing evidently depending on the seasonal rains. The collection *Snijman 244* includes a plant bearing both mature fruiting and flowering stems, indicating two growth flushes some time apart, presumably in response to two distinct rainfall events.

Diagnosis and relationships: the species of *Albuca* with ± monomorphic tepal whorls are segregated among four subgenera that are defined by a combination of vegetative, floral, and fruiting characters (Manning *et al.* 2009). The several, canaliculate leaves and the pyramidal raceme of white flowers with shortly stipitate, 3-lobed ovary developing into a depressed, apically retuse capsule containing large, discoid seeds place *A. gariensis* in subgen. *Namibiogalum* (U.Müll.-Doblies & D.Müll.-Doblies) J.C.Manning & Goldblatt (Manning *et al.* 2009). Here, it is characterized by its several, linear-caliculate leaves that are loosely coiled or twisted apically and much longer (three to six times) than the short inflorescence; its moderate-sized flowers, 14–20 mm in diameter, borne on pedicels mostly 8–10 mm long; and relatively large, deeply 3-lobed capsules. The

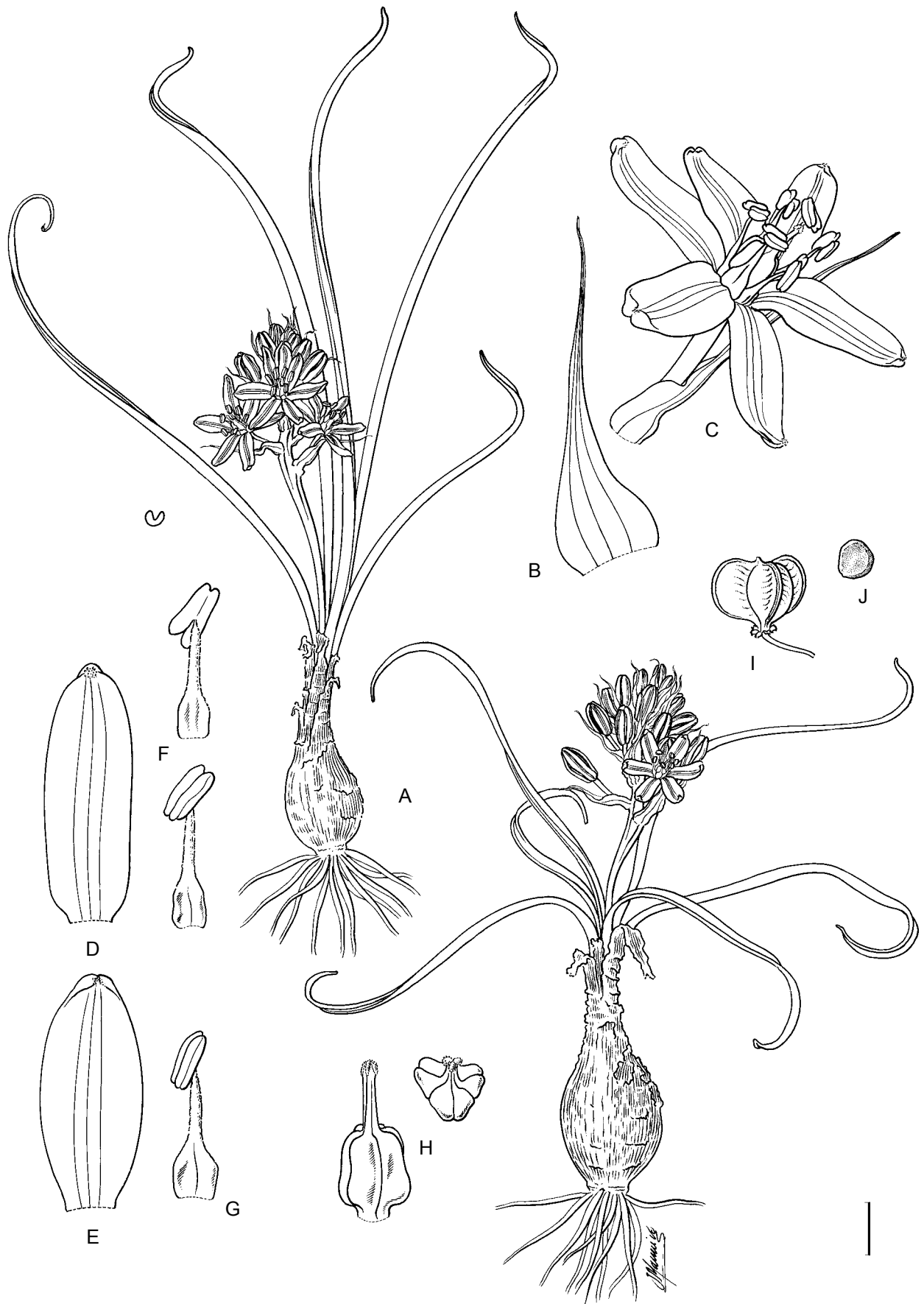


FIGURE 20.—*Albuca gariensis*, Manning 3294. A, flowering plants; B, bract; C, flower; D, outer tepal; E, inner tepal; F, outer stamen, adaxial (upper) and abaxial (lower) views; G, inner stamen; H, ovary, lateral and dorsal views; I, capsule; J, seed. Scale bar: A–C, I, J, 10 mm; B, C, 3 mm; D–H, 2 mm. Artist: John Manning.

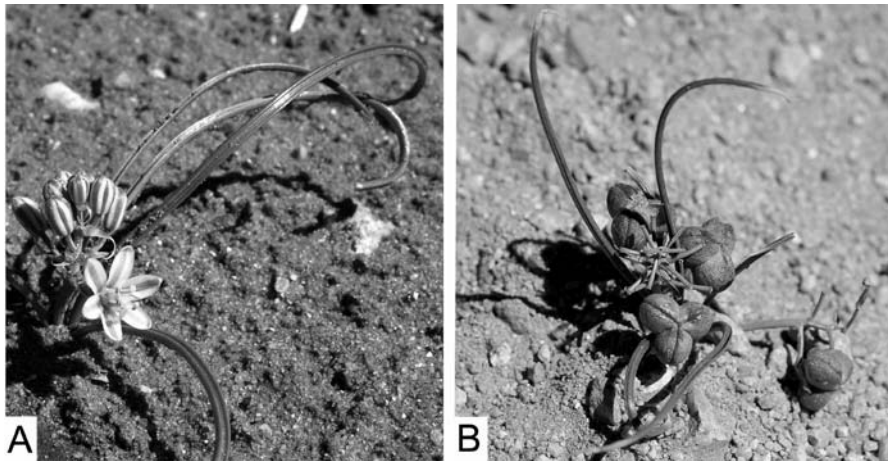


FIGURE 21.—*Albuca gariensis*. A, flowering plant, Manning 3294. Photograph by John Manning. B, fruiting plant, Magee & Boatwright 229. Photograph by Anthony Magee.

species is most similar to *A. seineri* (Engl. & K.Krause) J.C.Manning & Goldblatt in foliage and inflorescence but the latter is an altogether larger species, with \pm straight or arching leaves up to 400×30 mm (vs $70\text{--}200 \times 1\text{--}4$ mm), and larger flowers $24\text{--}40$ mm in diameter borne on longer pedicels, up to 50 mm long. Its area of occurrence is north of that of *A. gariensis*, ranging from northern Namibia through Botswana and the northern parts of Northern Cape (Prieska and Hopetown Districts) into the western Free State, northern Mpumalanga and Limpopo (Obermeyer 1978).

Smaller plants of *Albuca gariensis* may be confused with *A. toxicaria* (C.Archer & R.H.Archer) J.C.Manning & Goldblatt from southern Namibia and central South Africa, which has with similar, almost filiform leaves but which has smaller flowers, ± 10 mm in diameter, very short pedicels $1.5\text{--}2.2$ mm long, minute, deltoid bracts ± 1.2 mm long, and much smaller, ovoid capsules up to 10×5 mm containing elliptical, peripherally winged seeds $8 \times 5\text{--}6$ mm (Archer & Archer 1999).

The filaments in *Albuca gariensis* are abruptly expanded at the base into quadrate wings, unlike the smoothly tapering filaments in *A. seineri* and *A. toxicaria*. Similar, basally expanded filaments are characteristic of some other species in the subgenus, notably *A. rautanenii* (Schinz) J.C.Manning & Goldblatt and *A. stapfii* (Schinz) J.C.Manning & Goldblatt, but the ovary in both these species is abruptly expanded above the stipe into a 6-lobed disc. Although the ovary in *A. gariensis* is slightly widened above the stipe, it does not develop the characteristic lobes that are present in these two species.

Additional specimens seen

NORTHERN CAPE.—2820 (Kakamas): 31 km W of Kakamas along road to Pofadder and Onseepkans, 800 m, (–CC), 31 Jan. 1974, *Davidse 6169* (PRE); 20 km S of Kakamas on road to Loeriesfontein, 789 m, (–DC), 14 Mar. 2010, *Magee & Boatwright 229* (MO, NBG). 2821 (Upington): Upington, industrial commonage, 2700 ft [1 680 m], 1 Apr. 1980, *Snijman 244* (NBG). 2921(Kenhardt): near Steenkop, SE of Kenhardt, 900 m, (–AD), 7 Jan. 1989, *Bruyns 3461* (NBG).

Ornithogalum prasinum

Ornithogalum prasinum Ker Gawl. is relatively widespread through the drier parts of central South Africa, extending into Namibia and Botswana (Obermeyer

1978). The species was misattributed to John Lindley by Baker (1897) and subsequent authors, but John Belenden Ker[–Gawler] provided the text of the first 14 volumes of *The botanical register*, whereas Lindley was responsible for volumes 15–33 (Stafleau & Cowan 1976: 724). Placed by Baker (1897) in *O.* subgen. *Osmyne* (Salisb.) Baker, *O. prasinum* was subsequently transferred to subgen. *Urophyllon* (Salisb.) Baker by Obermeyer (1978), who considered it to be closely related to *O. seineri*. This treatment was followed by Müller-Doblies & Müller-Doblies (1996), who included both species in *O.* series *Prasinocorymbosa* Müll.-Doblies & Müll.-Doblies, and later by us when we transferred the members of *O.* subgen. *Urophyllon* to *Albuca* (Manning *et al.* 2009). At this time we had DNA sequence data for *O. seineri* but not for *O. prasinum* and our association of the two species was determined by the opinions of Obermeyer (1978) and Müller-Doblies & Müller-Doblies (1996).

A review of the cytology of subfamily Ornithogaloideae (Goldblatt & Manning 2011) shows *A. prasina* to have a diploid number of $2n = 16$ (Pienaar 1963), thus $x = 8$. This makes the species cytologically anomalous in *Albuca*, in which the most common base number is $x = 9$, and led us to re-examine its floral morphology, particularly the tepal venation, in relation to that of *A. seineri*. We confirm that *A. seineri* (Figure 23A, B), with $2n = 24$ ($x = 6$) (Vosa 1980), has the medially aggregated, mostly simple veins diagnostic of *Albuca* but that *A.*

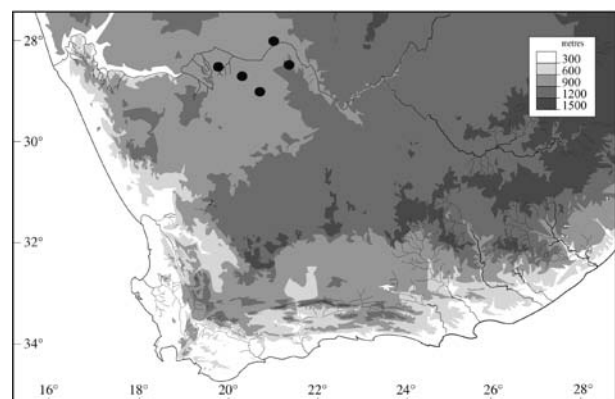


FIGURE 22.—Known distribution of *Albuca gariensis*.

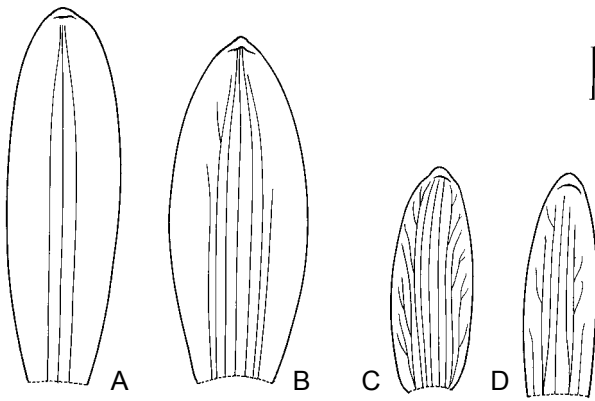


FIGURE 23.—*Albuca seineri*, D'Ewes s.n. (NBG). A, outer tepal; B, inner tepal. *Ornithogalum prasinum*, Barker 7116 (NBG). C, outer tepal; D, inner tepal. Scale bar: 2 mm. Artist: John Manning.

prasina (Figure 23C, D) has a quite different, more diffuse, branched venation which is characteristic of *Ornithogalum*. Colour notes on specimens confirm that the tepals lack the distinct green median band that is characteristic of *Albuca*. This is confirmed by the illustration of cultivated plants from Burchell's type collection (Ker Gawler 1816), which shows the perianth to be uniformly pale greenish white. Floral morphology thus supports our cytological observations that *O. prasinum* is incorrectly placed in *Albuca*, and the species should accordingly be transferred back to *Ornithogalum*.

Within *Ornithogalum*, the relationships of *O. prasinum* evidently lie with *O. haalenbergense* U.Müll.-Doblies & D.Müll.-Doblies and *O. xanthochlorum* Baker in *O.* subgen. *Galtonia* sect. *Xanthochlorum* (U.Müll.-Doblies & D.Müll.-Doblies) J.C.Manning & Goldblatt, based on its leathery outer bulb tunics, several lanceolate leaves, and especially the diagnostic, depressed-globose, apically retuse capsules containing large, discoid seeds 6–8 mm in diameter (Manning *et al.* 2009). All three species also have distinctive pale jade-green, rather obtuse tepals. The basic and most common chromosome number in subgen. *Galtonia* is $x = 8$ (Forrest & Jong 2004 [as *Galtonia*]), providing cytological support for the morphological evidence that *A. prasina* is allied to this subgenus of *Ornithogalum*.

Although Ker Gawler (1816) claimed that Burchell collected *Ornithogalum prasinum* near Graaff-Reinet in Eastern Cape, Burchell's own labels on his collections indicate that he found the plants at Horse's Grave near the Hondeblats (sic.) River in the Colesberg Division. The latter is a reference to one of his collecting localities near De Aar (Leistner & Morris 1976), which accords with the location of Hondeblafrivier that flows through Philipstown. The type locality of the species is thus in Northern Cape, between De Aar and Philipstown. The species has, however, subsequently been collected around Aberdeen in Eastern Cape (Obermeyer 1978), from where it ranges westwards across the interior of the country as far as Aus in southern Namibia (Obermeyer 1978).

***Ornithogalum prasinum* Ker Gawl.** in The botanical register 2: sub. t. 158 (1816). Type: [Northern

Cape], Colesberg Div., Hondeblafs River [Hondeblafrivier], fl. ex hort. 1816/18, *Burchell bulb 49* (K, holo.!, iso.!). *Albuca prasina* (Ker Gawl.) J.C.Manning & Goldblatt: 92 (2009).

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