A NEW SPECIES OF *DRIMIA* (URGINEOIDEAE) FROM THE KNERSVLAKTE, WESTERN CAPE, SOUTH AFRICA

INTRODUCTION

Drimia Jacq., as broadly circumscribed by Manning *et al.* (2004), comprises ± 100 species, many of which belonged to the 11 genera previously placed in the subfamily Urgineoideae by Speta (1998). Consisting entirely of bulbous, mostly deciduous plants, the genus is known from southern Africa through tropical Africa to the Mediterranean, Asia and Madagascar. Species of *Drimia* have short-lived flowers with the tepals ± united at the base (Manning *et al.* 2004) and, like all representatives of Urgineoideae, the inflorescence has small bracts of which the lower ones at least are spurred. Although this broad treatment is more inclusive than those of Jessop (1977) and Stedje (1987, 1996), all agree on the inclusion of *Urginea* Steinh. in *Drimia*.

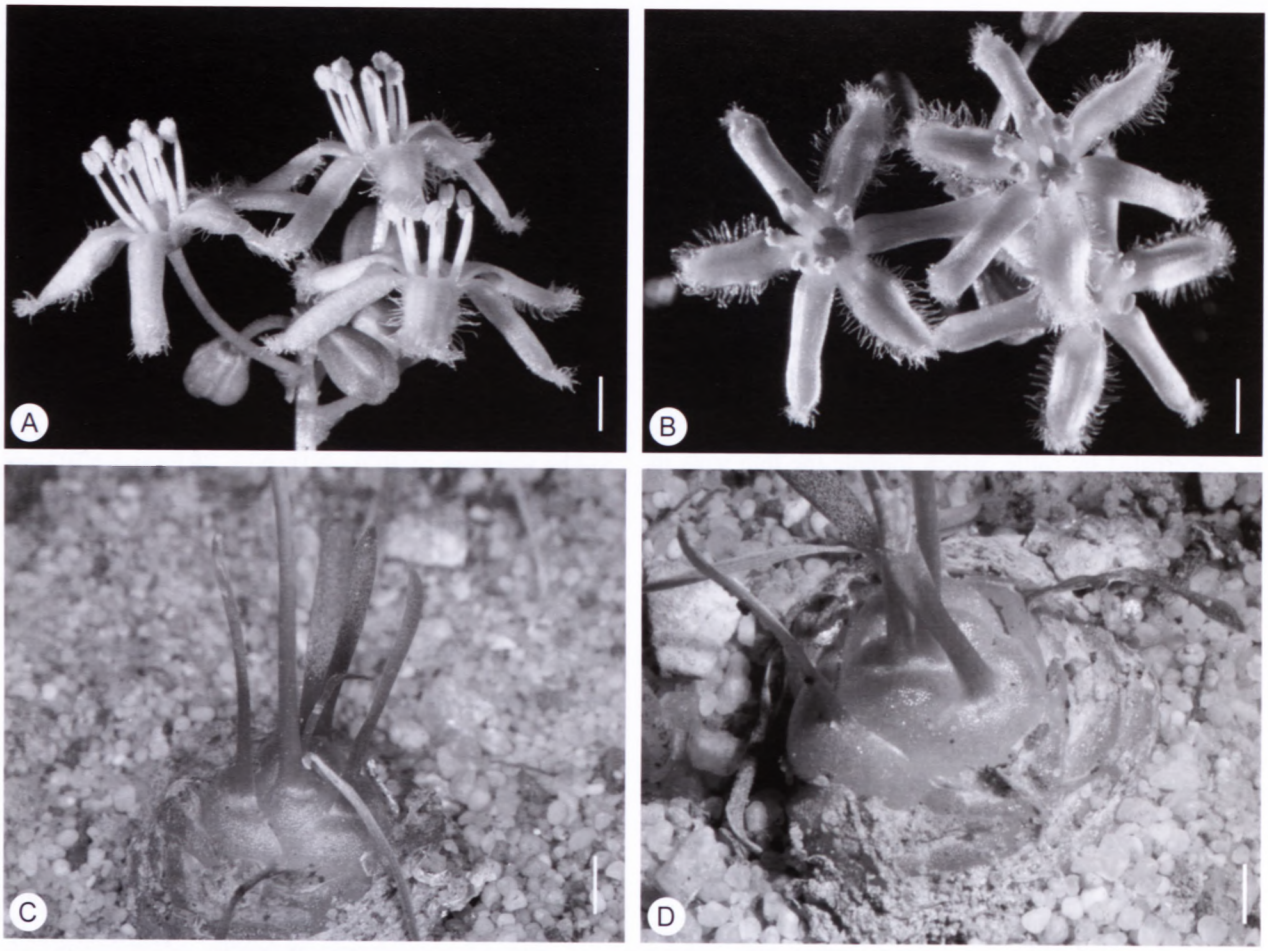

FIGURE 12.—Macromorphology of *Drimia fimbrimarginata, Harrower 2762* (NBG, PRE). A, lateral view of flowers; B, frontal view of flowers; C, epigeal bulb with mature leaves showing the abscission from bulb scales; D, bulb showing imbricate bulb scales. Scale bars: A, B, 3 mm; C, D, 5 mm. Photographs: A.D. Harrower.

In the last six years, four new *Drimia* species have been described from the winter rainfall region of the Northern and Western Cape Provinces, South Africa (Manning & Goldblatt 2003, 2007), all in the Urginea group as recognized by Goldblatt & Manning (2000). All are hysteranthous-leaved species, characterized by contracted, ± capitate inflorescences and campanulate flowers with spreading tepals. Their late discovery in the relatively well-explored Greater Cape Floristic Region, *sensu* Born *et al.* (2006), is likely due to the growth habit of these species which is marked by a long dormant phase. This is broken only by the appearance in winter of the leaves, which decay at the end of spring, and by the brief flowering of the bulbs in summer.

We report here on the discovery of another member of the Urginea group from the winter rainfall region. This remarkable new species, known only from one collection on the quartz-strewn plains of the Knersvlakte, Western Cape Province, is a dwarf plant with distinctive flowers and leaves and is named *Drimia fimbrimarginata* to describe the flower's conspicuously fringed inner tepals, a character never before known in the genus.

Drimia fimbrimarginata *Snijman*, sp. nov.

Geophytum deciduum, foliis ± 8, fere hysteranthis effusis lanceolatis, 12–26 × ± 1.5 mm, adaxialiter trichomatibus minutis reflexis munitis; scapo flexuoso, 25–55 × 0.7 mm longo, racemo dense 6 vel 7-floro; bracteis 0.5–1.5 mm longis, inferioribus calcari 0.8–1.0 mm longo munitis; floribus campanulatis; pedicellis suberectis, 5–8 mm longis; tepalis ± 7.0 mm longis, basin versus in tubum cupulatum ± 1.5 mm longum connatis, exterioribus 1.5 mm latis, apice ciliatis, interioribus 2 mm latis, apice et in lateribus ciliatis; ciliis albis, 1 mm longis; staminibus erectis, per ± 1 mm ad perianthium adnatis; filamentis erectis, subteretibus, sursum decrescentibus, ± 4 mm longis; antheris dorsifixis, ± 1.2 mm longis; ovario ovoideo, ad ± 2.5 × 2.0 mm; stylo ± 2.5 mm longo.

TYPE.—Western Cape: 3118 (Vanrhynsdorp), Knersvlakte, Farm Moedverloor, ± 17 km NE of Koekenaap, (–AD), on quartzite ridges, 22 July 2005, *A.D. Harrower 2762* (NBG, holo.; PRE, iso.).

Deciduous, bulbous herb, up to ± 60 mm tall at flowering. *Bulb* solitary, half-epigeal during growing season, subglobose, 20–22 mm diam.; scales tightly imbricate, ± spiralled, basally vaginate, fleshy, buff-coloured. *Leaves* mostly dry and shed at flowering, ± 8, spreading at first, becoming suberect later in growing season shortly before dormancy, inserted far apart on apex of inner bulb scales in a sparse tuft, abscising abruptly from apex of scales; blade narrowly lanceolate, 12–26 × ± 1.5 mm, narrowed to ± 1 mm near base, firm, olive-green; adaxial surface plane, with pale sheen from minute, whitish, thick, recurved trichomes arranged in vertical rows, with each trichome inserted on a minute green papilla;

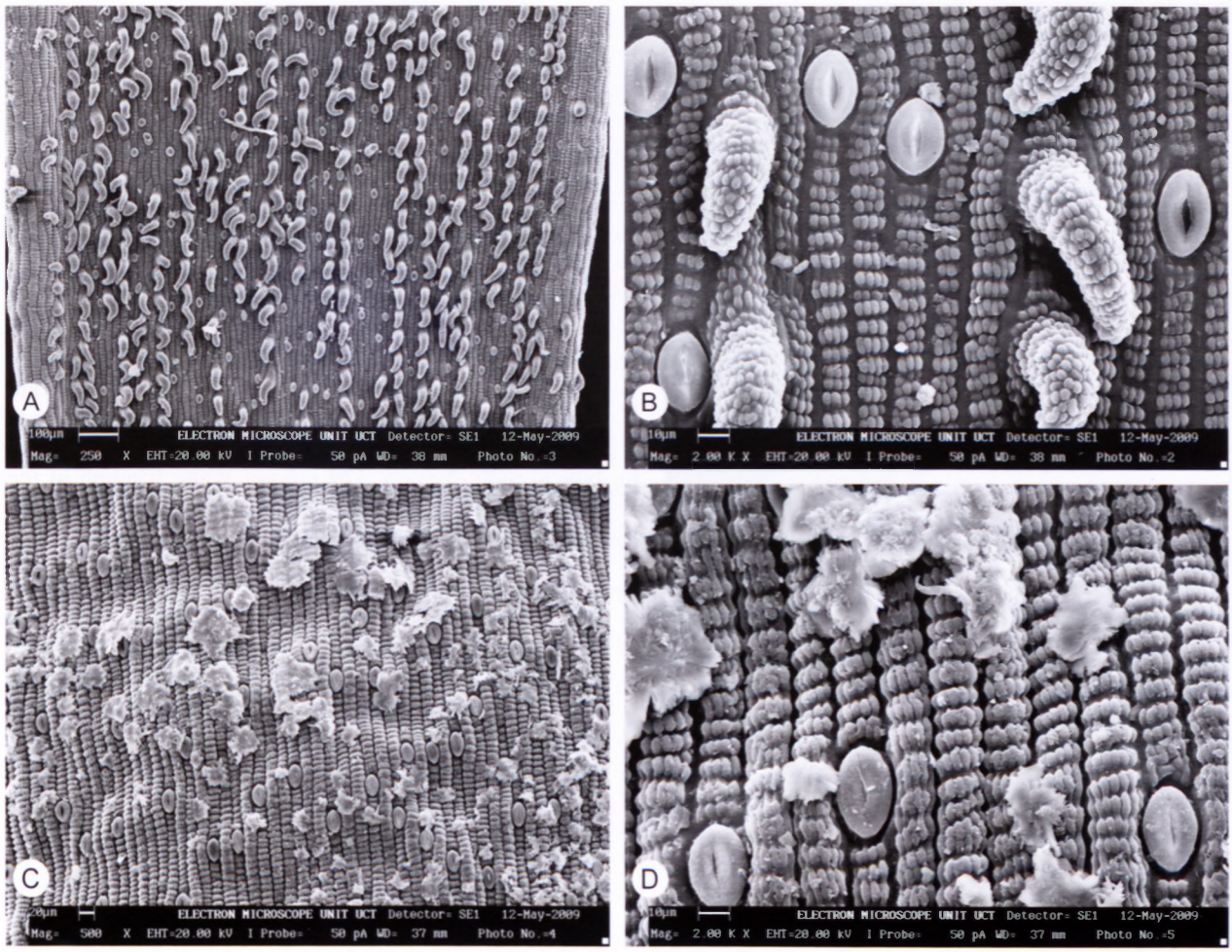

FIGURE 13.—Scanning electron micrographs of leaves of *Drimia fimbrimarginata, Harrower 2762* (NBG, PRE). A, adaxial leaf surface showing difference between leaf margin and inner part of blade; B, adaxial leaf surface showing recurved trichomes, sunken stomata with thick-walled guard cells, and axially elongated epidermal cells bearing parallel clusters of micropapillae; C, D, abaxial leaf surface showing sunken stomata and ± striate epidermal cells with parallel clusters of micropapillae. Scale bars: A, 100 µm; B, D, 10 µm; C, 20 µm.

abaxial surface slightly convex in t/s, smooth, slightly thicker towards base, minutely glaucous distally; margin ± smooth, minutely thickened and translucent; epidermal cells of both surfaces elongated, with straight anticlinal walls and sunken cell borders, those of adaxial surface bearing parallel clusters of 3 or 4 micropapillae, those of abaxial surface ± longitudinally striate and bearing parallel clusters of 5 or 6 micropapillae; stomata on both surfaces anomacytic, sunken, and with thick-walled guard cells; wax platelets with crenulated margins sparsely covering abaxial surface in distal half. *Inflorescence* a solitary, simple, bracteate raceme; scape flexuose, slender, 25–55 × 0.7 mm, brownish green, sparsely puberulous for most of length, becoming smooth close to flower cluster, hairs ± in vertical rows, minute, spreading to slightly reflexed; raceme corymbose, densely 6 or 7-flowered; bracts 0.5–1.5 mm long, lower spurred, except uppermost ones, with spur 0.8–1.0 mm long. *Flowers* suberect, shallowly campanulate, 1–3 open simultaneously, white to pale beige above, backed with darker beige and slightly tinged with pale green, opening at ± 16:00 and closing at ± 20:30, unscented; pedicels curved upwards, 5–8 mm long at anthesis, brownish green; tepals biseriate, fused basally for ± 1.5 mm into shallow cup, free and spreading to slightly arched above, ± 7.0 mm long, outer tepals oblong, ± 1.5 mm wide, tipped with tuft of ± 1 mm long, fine, white hairs, inner tepals narrowly ovate, ± 2 mm wide, fringed with 1 mm long, fine, white hairs except basally. *Stamens* adnate to base of tepals for ± 1 mm; filaments suberect, subterete, tapering distally, ± 4 mm long, white; anthers erect, dorsifixed, introrse, dehiscing by longitudinal slits, ± 1.2 mm long, yellow, with yellow pollen. *Ovary* ovoid, ± 2.5 × 2.0 mm, green; style columnar, ± 2.5 mm long, white, widening to a truncate, trigonous, minutely papillate, stigmatic apex. *Capsule* and *seeds* unknown. *Flowering time*: late November to early December. Figures 12; 13.

Distribution and ecology: the species is currently known from a single population on the quartz fields of the western Knersvlakte, on the Farm Moedverloor, NE of Koekenaap (Figure 14), in Knersvlakte Quartz Vygieveld (Mucina & Rutherford 2006). The habitat comprises dry, undulating, shale-derived, clay hills covered by a prominent layer of weathered, white quartz pebbles. On N-facing slopes, below a large quartzitic outcrop, the population is confined to a ridge covered with less-eroded, more stable quartz pebbles than those found on the surrounding hills. Winter temperatures in the area are mild, but summer temperatures are high (30°–35° C), moderated only by the reflective properties of the quartz. When first collected in July 2005, the plants were in leaf, but they flowered in late November and early December, after being cultivated in the potted

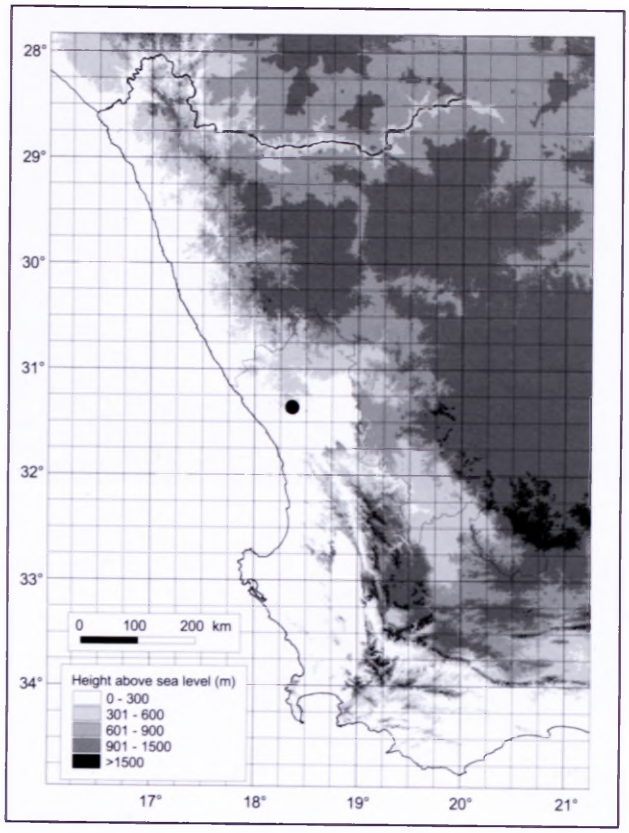

FIGURE 14.—Distribution of *Drimia fimbrimarginata* in Western Cape Province.

collections at the Kirstenbosch National Botanical Garden. Apart from keeping the bulbs dry in summer, they seem not to require any specific growing conditions, as the collection flowered well in the subsequent two years of cultivation. Despite hand pollination, no fruit was produced which suggests that individuals are self-incompatible and require outcrossing. Since the plants are yet to be seen flowering in the wild, their pollination biology remains unknown.

Despite an intensive search in the surrounding areas, only one population of *Drimia fimbrimarginata* is known. The occurrence, however, of a small number of plants in only a few suitable places is a feature of many species endemic to the Knersvlakte. Other quartz-loving, geophytic species endemic to the western Knersvlakte are *Bulbine dactylopsoides* G.Will., *B. haworthioides* B.Nord., *Lachenalia patula* Jacq., *Ornithogalum naviculum* W.F.Barker, and *Othonna hallii* B.Nord.

Diagnosis and relationships: *Drimia fimbrimarginata* is allied to a group of species, mainly from the Greater Cape Floristic Region (Born *et al.* 2006), which share ± capitate inflorescences and shallowly campanulate, brownish to brownish white flowers with ± spreading tepals. Originally Jessop (1977) recognized just two species as having these features: *D. depressa* (Baker) Jessop and *D. marginata* (Thunb.) Jessop. But recently, Brink & Dold (2003) and Manning & Goldblatt (2003, 2007) have added six more species to the group, namely *D. acarophylla* E.Brink & A.P.Dold, *D. barkerae* J.C.Manning & Goldblatt, *D. ligulata* J.C.Manning & Goldblatt, *D. pulchromarginata* J.C.Manning & Goldblatt, *D. vermiformis* J.C.Manning & Goldblatt, and *D. virens* Schltr. All have remarkably uniform flowers and are distinguished from each other by the form, number, position and vestiture of their leaves.

Drimia fimbrimarginata is unusual in the Urginea group in having both distinctive foliage and flowers. The leaves bear minute, pale, recurved trichomes in vertical rows on the adaxial surface, giving the olive-green blades a whitish sheen. Uniquely in the genus, the flowers have markedly different outer and inner tepals. The outer ones are oblong and tipped with a prominent tuft of soft, white hairs (± 1 mm long), whereas the inner tepals are narrowly ovate and fringed with ± 1 mm long, fine, white hairs, except near the base. The flowers are small and remain open for about four hours from the late afternoon to early evening. Being unscented they are not typical moth-flowers. The unique, white fringing of the inner tepals may, however, play a role in attracting pollinators that are active at dusk.

From morphological data alone, it is difficult to know which species in the Urginea group is most closely allied to *Drimia fimbrimarginata*. It is noteworthy, nevertheless, that *D. barkerae* which occurs on the flats surrounding the Piketberg, Western Cape, occupies the fringe of quartzite pebble fields that support Piketberg Quartz Succulent Shrubland, a vegetation unit that forms part of the Knersvlakte Bioregion, as classified by Mucina & Rutherford (2006). Since *D. fimbrimarginata* occupies similar quartz-strewn patches further north in the Knersvlakte Bioregion, it is conceivable that these two species share a recent common ancestor that diversified when new quartz-field habitats developed during the geomorphic evolution and aridification of the forelands along the Cape's West Coast. *Drimia barkerae* differs from *D. fimbrimarginata* by having a tuft of obovate leaves that are ± conspicuously hairy beneath and an inflorescence of brownish, smooth-tepalled flowers that open in the late morning and fade in the evening.

ACKNOWLEDGEMENTS

The Western Cape Nature Conservation Board kindly granted a permit to collect specimens on the Knersvlakte. We thank Miranda Waldron of the Electron Microscope Unit, University of Cape Town, for the electron micrographs and Michelle Smith for helping to prepare the figures.

REFERENCES

BORN, J., LINDER, H.P. & DESMET, P. 2006. The Greater Cape Floristic Region. *Journal of Biogeography* 34: 147–162.

BRINK, E. & DOLD, A.P. 2003. *Drimia acarophylla* (Hyacinthaceae), a new species from Eastern Cape, South Africa. *South African Journal of Botany* 69: 396–400.

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.

GOLDBLATT, P. & MANNING, J.C. 2000. Cape plants. A conspectus of the Cape flora of South Africa. *Strelitzia* 9. National Botanical Institute, Cape Town & Missouri Botanical Garden, Missouri.

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 Pseudoprospereae. *Edinburgh Journal of Botany* 60: 533–568.

MANNING, J.C., & GOLDBLATT, P. 2003. Hyacinthaceae: a new species and new combinations in *Drimia*. *Bothalia* 33: 109–111.

MANNING, J.C. & GOLDBLATT, P. 2007. New species of *Drimia* (Hyacinthaceae): Urgineoideae) allied to *Drimia marginata* from Western and Northern Cape, South Africa. *Bothalia* 37: 183–187.

MUCINA, L. & RUTHERFORD, M.C. (eds). 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

SPETA, F. 1998. Hyacinthaceae. In K. Kubitzki, *The families and genera of vascular plants III. Flowering plants. Monocotyledons: Lilianae (except Orchidaceae)*: 261–285. Springer-Verlag, Berlin.

STEDJE, B. 1987. A revision of the genus *Drimia* (Hyacinthaceae) in East Africa. *Nordic Journal of Botany* 7: 655–666.

STEDJE, B. 1996. Hyacinthaceae. In R.M. Polhill, *Flora of tropical East Africa*: 1–32.

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MS. received: 2009-06-01.