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# *Disa albomagentea* (Orchidaceae), a new species from the Hottentots Holland Mountains in the Cape Floristic Region, South Africa

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## Abstract

A new orchid, *Disa albomagentea*, is described from the Hottentots Holland Mountains in the Western Cape Province of South Africa. It is an obligately fire-dependent species closely related to *Disa obtusa* (sect. *Disella*), from which it can be easily distinguished by the larger flowers, i.e. galea 7–9 mm long versus 4–7 mm long, which are patent and bicoloured, i.e. magenta, white and not spotted versus purple brown, white to cream to greenish, and variously purple spotted. It appears to be endemic to seeps and marshes on the high peaks.

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**Keywords:** Cape Flora; *Disa*; New species; Orchidaceae; Section *Disella*; Western Cape Province

## 1. Introduction

The Cape Floristic Region (CFR) of southern Africa, with 9000 species in an area of 90,000 km<sup>2</sup> (Goldblatt and Manning, 2000; Goldblatt et al., 2005), is the most important continental centre of plant endemism and richness in the world (Kier et al., 2009). Despite centuries of intensive botanising (Gunn and Codd, 1981), new species are still being discovered, even in such well studied groups as the Orchidaceae (Bolus, 1896, 1911, 1913; Linder and Kurzweil, 1999; Stewart et al., 1982). Over the last five years, for instance, four new orchid species have been described, namely *Disa remota* H.P.Linder (Linder and Hitchcock, 2006), *Disa linderiana* Bytebier & E.G.H.Oliv. (Bytebier et al., 2007b), *Pterygodium vermiferum* E.G.H.Oliv. & Liltved (Oliver et al., 2008) and *Satyrium situsanguinum* Van der Niet & Liltved (Van der Niet et al., 2009). At least two more *Disa* (Bytebier, pers. comm.; Liltved, pers. comm.) and one *Satyrium* species (Van der Niet, pers. comm.) await formal description. This continued discovery of new species is perhaps a result of a renewed interest in taxonomy as the unraveling of phylogenetic relationships (e.g. Bytebier et al., 2007a, 2008; Van der Niet et al.,

2005; Waterman et al., 2009) requires access to recently collected tissue, which usually necessitates intensive fieldwork. Nevertheless, due to the rugged and remote nature of the Cape Fold Mountains, and the fact that some orchid species flower only the first year after a fire, we can be almost sure that more exciting discoveries will be made in years to come.

Here we describe a new species of *Disa* belonging to section *Disella*, which is obligately fire-dependent. Although the existence of this particular taxon has been known for about half a century it has until now escaped formal description.

## 2. Species treatment

*Disa albomagentea* E.G.H.Oliv. & Liltved, sp. nov. in sectio *Disella*, *Disae obtusae* Lindl. similis sed floribus distincte bicoloribus, i. e. albis magenteisque, galea erecta profunde angustaeque canaliculata, rostellum brachiis erectis, calcar brevis emarginato, lobo posteriori petalorum incurvo, stigma galea externa facile distinguitur.

TYPUS — Western Cape Province, 3419AA, Stellenbosch area, Hottentots Holland Mtns, Dwarsberg plateau NNW of Dwarsberg and NW of Victoria Peak, 1269 m, 5 December 2009, Oliver EGH & Liltved WR 12567 (BOL, holo; BR, K, MO, NBG, NU, PRE, iso.).

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Herbaceous geophyte, 30–250 mm tall, with erect, rigid stem; tubers broadly ovoid to spherical,  $13 \times 10$  mm. *Leaves* 7–14, cauline,  $\pm$  rigid, 50–120 mm long, basal leaves longest, with hyaline sheath, linear, becoming lanceolate-attenuate higher up and grading into shorter broader bracts, canaliculate, acute, mostly green but shading into maroon along upper margins and at tips. *Inflorescence* conical becoming ellipsoid to cylindrical,  $40\text{--}130 \times 30\text{--}35$  mm, densely 6–150-flowered; *bracts* narrowly ovate to ovate,  $13 \times 4$  mm, acuminate, naviculate, as long as or shorter than flowers. *Flowers* resupinated, facing outwards (patent) with mouth clearly visible, mildly scented; *dorsal sepal* suberect, galeate,  $7\text{--}9 \times 4\text{--}5$  mm, externally shallowly slightly pouched longitudinally, mouth of galea ovate to elliptic,  $6\text{--}8 \times 3.5\text{--}5.0$  mm, acute, often in same line as ovary, magenta with anterior lateral portions paler and brighter than midzone, pouches verrucose otherwise glabrous and shiny, deeply and narrowly grooved for  $2/3\text{--}3/4$  its length with groove continuing into spur, markedly ridged internally, ridge  $1.5\text{--}2.0$  mm deep, sometimes purple maculate, mostly smooth inside towards base with entrance to spur minutely papillate with white globose bodies extending just into spur, entrance to spur with two lateral greenish ridges running down into spur; *spur*  $1.0\text{--}1.5 \times 1.5\text{--}2.0$  mm, semitriangular in lateral outline with upper edge longer,  $\pm$  parallel sided, emarginate, deeply grooved above and forming 2 cylinders, groove apically with short narrow median ridge sometimes protruding slightly from apex and forming a small knob in emarginate apex, point of attachment to galea below slightly indented and concave, magenta or with basal greenish ring, sometimes totally dull green; *lateral sepals* narrowly ovate to elliptic, sometimes oblique,  $5.5\text{--}8.0 \times 2.5\text{--}4.0$  mm, straight but sometimes slightly curved upwards, spreading outward at an angle of  $60\text{--}80^\circ$  between lip and sepal, pure white adaxially but sometimes variably magenta on upper margin, abaxially white to greenish with 2 mm long dark magenta bar towards upper edge; *petals*  $4 \times 2$  mm, attached to rostellum by narrow erect lateral flange, white, bifid, anterior lobe exerted up to 1 mm beyond galea mouth or reaching mouth of galea but posterior to stigma, mostly square with acute, sometimes greenish apex, posterior lobe narrowing posteriorly, white with yellowish upper margin, rarely purplish spotted, apex curved inwards and forwards, sometimes downwards, green, often clasping galea ridge; *lip* mostly ligulate,  $4.5\text{--}7.0$  mm long, acute, sometimes narrowed medially, white, sometimes tinged green at apex, rarely with slight purple margins. *Rostellum* 2-lobed, lobes 1 mm long, narrow, canaliculate, erect to slightly forward pointing, parallel in a U-shaped arrangement, variously purple-spotted, with white lateral auriculate appendage projecting  $1.0\text{--}1.2$  mm on either side to under anther sacs, subpendant, tuberculate–verrucose. *Anther sacs* ovoid, 1.5 mm long, subpendant to pendant at  $45^\circ$ . *Stigma* shortly columnar,  $1 \times 1$  mm, erect to  $45^\circ$  forward, placed outside galea, with purple anterior ridge. *Ovary* cylindrical–ellipsoid,  $8\text{--}9$  mm long (Figs. 1, 2).

### 3. History

Plants of this taxon were first noted by E.G.H. Oliver in 1964 after a fire over the Landdroskop/Somerset Sneekop area in the

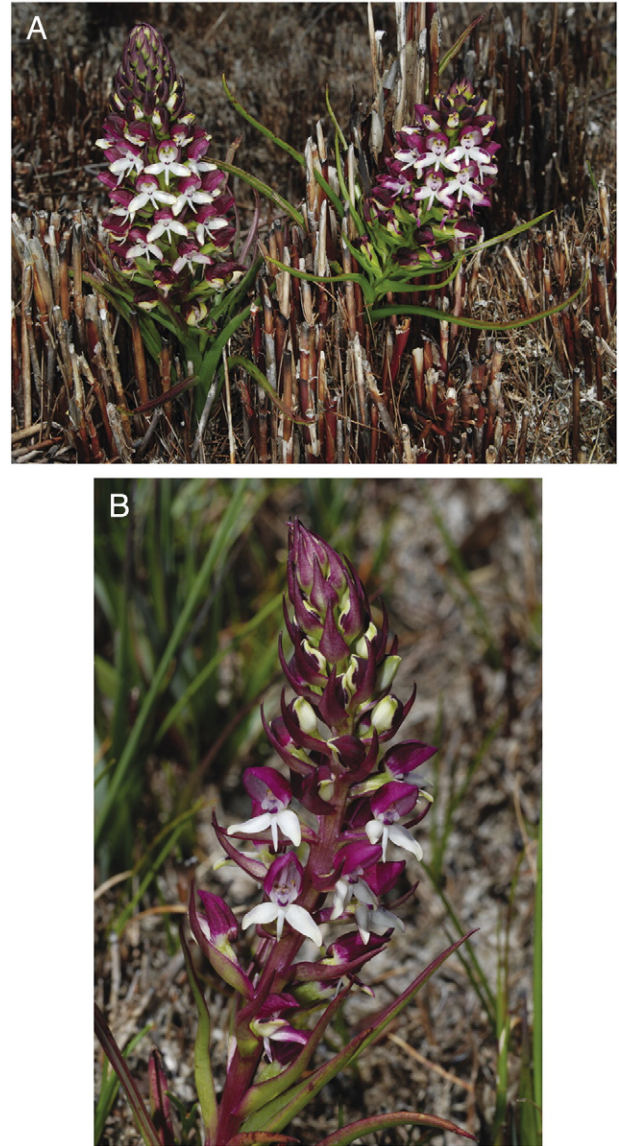


Fig. 1. *Disa albomagentea*: (A) two plants on Dwarsberg plateau; (B) close-up of inflorescence on Somerset Sneekop (photographs W.R. Liltved).

Hottentots Holland Mountains between Somerset West and Stellenbosch. A colour transparency was taken of one of the few plants seen in the marshy area near where the hiking trail hut now stands. At the time it was thought that these possibly represented *Disa pappei* Rolfe, which is now included in *D. obtusa* subsp. *picta* (Sond.) H.P.Linder (Linder, 1981).

The species was next seen by E.G.H. Oliver and I.M. Oliver while hiking on the Panorama Trail at the head of the Jonkershoek valley to record all the orchids that appeared after the 1989 fire. Two large separate sub-populations were encountered on the Dwarsberg plateau and also near Pic-sans-Nom. The plants were in full flower and in both areas were growing with *D. obtusa* subsp. *hottentotica* and apparently, subsp. *picta*. It was immediately apparent that the plants represented a distinct, undescribed species, ample collections of both pressed and spirit material were taken. Photographs and detailed drawings were also prepared. In 1999, fire again swept across the mountain range and abundant populations of



Fig. 2. *Disa albomagentea*: close-ups of flowers (A) front view; (B) rear view; (C) side view; and (D) half side view, with dorsal sepal removed. Type collection from Dwarsberg plateau. (Photographs E.G.H. Oliver).

the new species were studied by E.G.H. Oliver and Liltved. Unfortunately, all the material and drawings, and notes of these two subsequent collections have disappeared.

When another fire swept through the mountains from Stellenbosch to Sir Lowry's Pass in February 2009 a new opportunity arose for finding flowering material at the various sites.

#### 4. Diagnostic characters and relationships

Within section *Disella*, *D. albomagentea* is morphologically most closely related to the very variable and taxonomically problematic *D. obtusa* Lindl., which comprises three subspecies: subsp. *obtusa*, subsp. *picta* (Sond.) H.P.Linder and subsp. *hottentotica* H.P.Linder (Linder, 1981), the latter two occurring

sympatrically in the Hottentots Holland Mountains, and the type subspecies endemic to the Cape Peninsula. The new species may be distinguished on a number of characters:—

1. Flowers white and magenta, not spotted *versus* purple brown in the rear half and white to cream to green in the front half and variously purple spotted
2. Flowers noticeably larger than those of *D. obtusa* subsp. *hottentotica* and subsp. *picta*, the galea 7–9 mm long *versus* 4–7 mm long
3. Spur 1–1.5 mm long and as long as to broader than long, parallel sided, emarginate, always 2-tubed *versus* spur variable in shape and length, 0.2–2.2 mm long but distinctly longer than broad, when short then V-shaped, obtuse, straight to strongly decurved, 1-tubed or only slightly 2-tubed

4. Lower point of attachment of spur to galea indented *versus* rounded and convex
5. Rostellum arms prominent, erect, parallel in a U-shaped arrangement, 1 mm long *versus* divaricate in a V-shaped arrangement and shorter, 0.5–0.6 mm long
6. Dorsal sepal deeply and narrowly canaliculate forming almost a partition on the inside of the galea *versus* dorsal sepal shallowly and broadly canaliculate
7. Lateral sepals more spreading at an angle of 60–80° between lip and sepal *versus* 45° or less
8. Galea opening suberect and patent *versus* galea mostly facing downwards
9. Stigma positioned in front of the galea *versus* stigma included in the galea
10. Raised front margin of stigma purple *versus* colourless/white
11. Flowers mildly scented *versus* pungently scented
12. Plants at first compact and conical with densely packed flowers, the lower whorls just opening, elongating later on with the flowers becoming more spaced *versus* tightly packed and elongated inflorescences.

## 5. Distribution

*Disa albomagentea* is known only from the Hottentots Holland Mountains between the head of Jonkershoek Valley, Stellenbosch, and the highest peaks towards Sir Lowry's Pass (Fig. 4). The type locality is the plateau north–northwest of Dwarsberg Peak, with disjunct populations previously sighted near Pic-sans-Nom to the west, and to the south on the Somerset Sneekop shaleband, on the plateau east of Landdroskop, and on the summit of Moordenaarskop. The altitude over this range varies from 1100 m to 1350 m with the lowest being at Pic-sans-Nom and the highest on Somerset Sneekop.

## 6. Habitat and ecology

The Hottentots Holland range receives a considerable amount of rain during the winter. The rain gauge is near the type locality on the Dwarsberg plateau and has recorded up to 4222 mm p.a. with an average of 3000–3500 mm, which is the highest rainfall in South Africa. During the summer it also receives a fair amount of rain and deposition of moisture from cloud banks formed by the frequent southeasterly gales. All the high altitude areas are especially moistened by these condensing mists. In winter the highest peaks of the range are subject to periodic snowfalls lasting only several days, hence the name of one of them as Somerset Sneekop.

*Disa albomagentea*, like most members of section *Disella*, appears only the first year after fire. Fire records in the database of CapeNature, the conservation body that now manages the Hottentots Holland Mountains, only date back to 1978. Two small fires were recorded in separate areas on Dwarsberg plateau in 1983 and 1985 and a small controlled blockburn near Landdroskop was carried out in 1978. From our field observations we know that fires occurred in 1964, and then again in 1989 and 1999. This shows that tubers can remain dormant for at least ten years.

Our observations indicate that *D. albomagentea* is confined to seeps and marshes (Fig. 3A, B). At most recorded sites, it appears that *D. albomagentea* occupied wetter areas, whereas *D. obtusa* was more abundant on the drier margins of marshes. In some drier seepages, however, both species were intermixed, sometimes growing only a few centimetres apart. At the type locality on the north and west portions of the Dwarsberg plateau there are numerous marshes and seepages along drainage lines. In 90% of these *D. albomagentea* occurred together with *D. obtusa* in varying proportions; in some cases there were many more plants of *D. albomagentea* and, in others, a few more *D. obtusa*. One marsh was slightly drier and resembled a mowed lawn. It contained over 100 plants of *D. albomagentea*, of which several were albinistic and yellow-flowered, near several scattered individuals of *D. obtusa*. Plants of *D. albomagentea* are usually single stemmed, but may form clusters of two to three flowering stems from a common base.

In 2009 we were surprised by the absence of *D. albomagentea* in the marsh near Pic-sans-Nom as, in 1989, many flowering plants of both *D. albomagentea* and *D. obtusa* were seen. Only a few *D. obtusa* plants occurred around the marsh edges and, because of the visible damage to the restio and grass clumps at the site, we postulate that the fire had been overly hot in this area. The plants of *D. albomagentea* were also no longer present in the lower area around the Landdroskop Hut.

The habitat in one marsh on the Dwarsberg plateau was unique, and very similar to the damaged Pic-sans-Nom marsh as seen in 1989, in that *D. albomagentea* occupied elevated spongy mounds up to 500 mm tall of densely entwined, coir-like fibres and burnt grass culms interconnected by boggy channels of standing water (Fig. 3B). Burnt remains of the reed, *Elegia mucronata* (Nees) Kunth (Restionaceae), were often present. *D. obtusa* was absent from these mounds.

Although we did not carry out dedicated pollinator observations we noticed various dungflies and carrionflies visiting the inflorescences. One individual of iridescent blue-green blowfly had a pollinarium attached to its head. Several plants were noted with crab spiders on them (see also Bytebier et al., 2007b), these no doubt preying upon insects visiting the flowers.

Putative hybrids were clearly recognised in most populations of *D. albomagentea* and *D. obtusa* which grew intermixed. With the close proximity of both parent species it is easy to postulate the chance cross-visitation of any pollinator despite the clear difference in the scent between the two species.

## 7. Flowering time

Observations over a few months in the known localities indicate that the new species flowers from November to January, with the best period being early December. Plants on Moordenaarskop were still in later stages of flowering in mid January.

## 8. Etymology

The species is named after the very distinctive and striking, bicoloured flowers, *magenteus* = magenta for the galea and *albo* = white for the lateral sepals and lip.

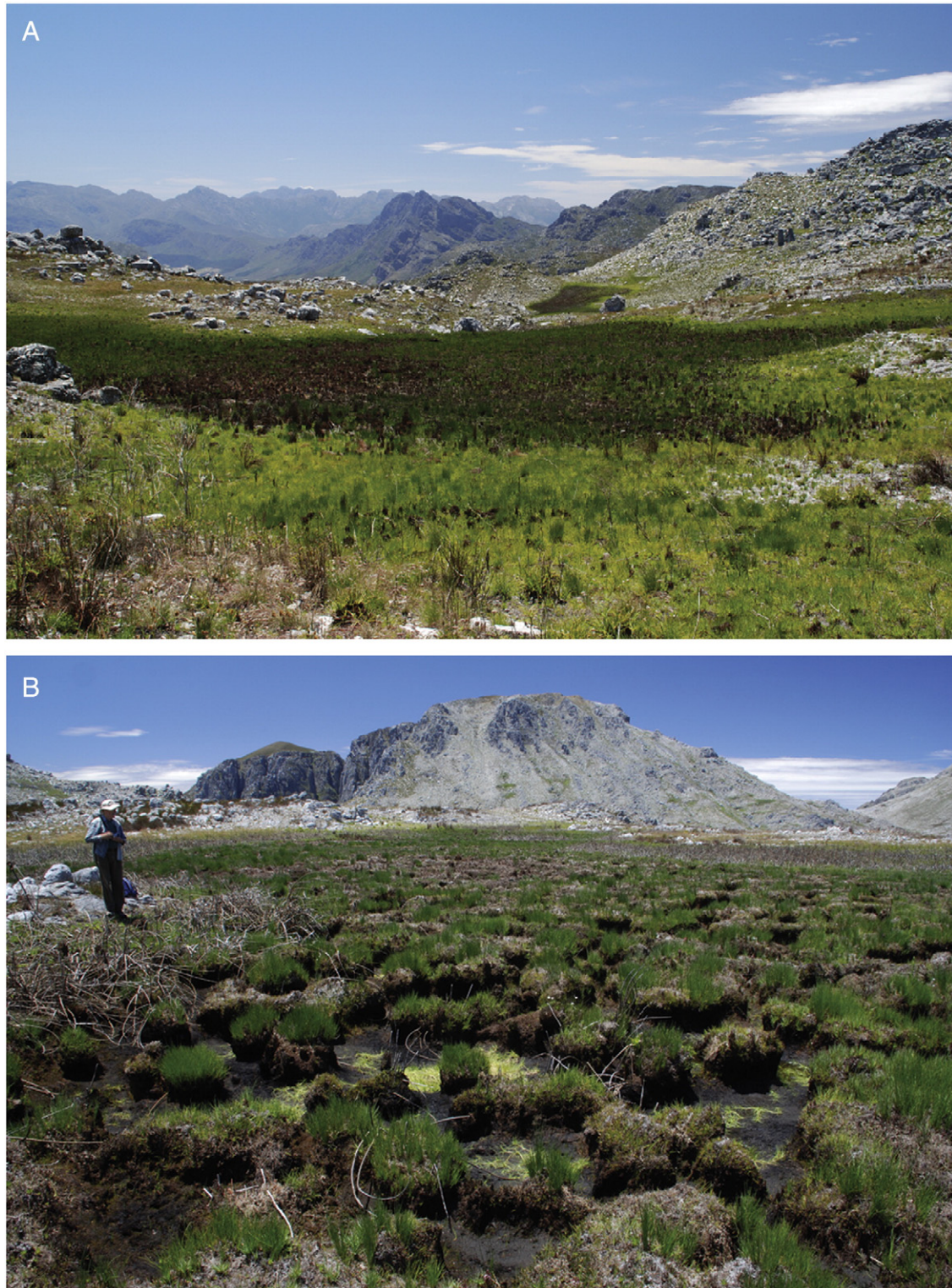


Fig. 3. Dwarsberg plateau: (A) a burnt marsh; (B) close-up of a marsh showing tussock habitat in December 2009 (photographs W.R. Liltved).

## 9. Additional material examined

### 9.1. *Disa albomagentea*

Western Cape Province (all in the Hottentots Holland Mountains): 3418BB, 'Landdroskop' small outcrop SE of

Somerset Sneekop, 1100 m, 12–1964, *Oliver EGH s.n.* (NBG photo only); Pic-sans-Nom, marsh NNW of, 1130 m, 2–12–1989, *Oliver EGH & Oliver IM 9342* (NBG photo only); Somerset Sneekop, shaleband on E. side, 1350 m, 28–11–2009, *Oliver EGH, Liltved WR & Stärker W 12560* (BOL, NBG); Moordenaarskop, summit, 1330 m,

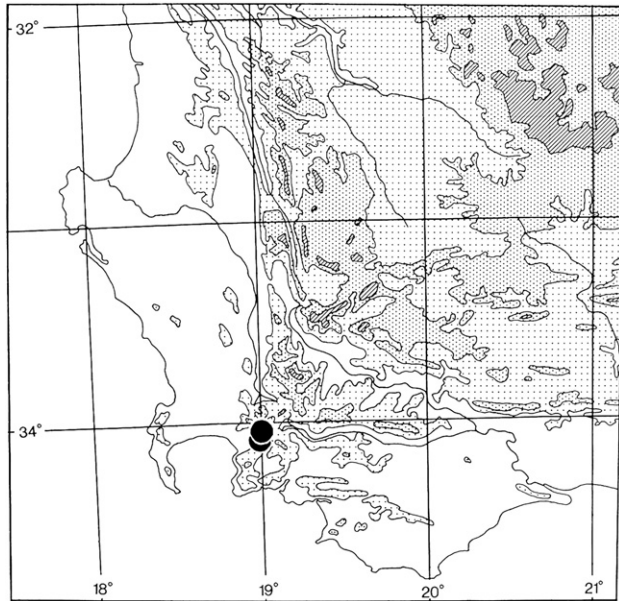


Fig. 4. Known distribution of *Disa albomagentea*.

10–12–2009, *Bytebier B, Oliver EGH & Stärker H 3165* (BR, NBG, NU). 3419AA, Dwarsberg plateau, 28–12–1989, *Oliver EGH & Oliver IM 9416* (NBG photo only); *ibid.*, 3–01–2000, *Liltved WR s.n.* (NBG photo only); *ibid.*, albino variant, 10–12–2009, *Oliver EGH & Liltved WR 12568* (NBG).

### 9.2. *Disa obtusa*

Western Cape Province (Herbarium collections and numerous living plants in the many wild populations). 3418BB, Moordenaarskop summit, 1330 m, 10–12–2009, *Bytebier B, Oliver EGH & Stärker H 3162* (BR, NBG, NU); *ibid.*, *Oliver EGH, Bytebier B & Stärker H 12573 & 12574* (NBG). Somerset Sneekop, shaleband on E. side, 1350 m, 28–11–2009, *Oliver EGH, Liltved WR & Stärker W 12559* (BOL, NBG). Rockview/Steenbras area, 720 m, 19–11–2009, *Oliver EGH 12550*, (BOL, K, NBG), *12551* (NBG) & *12552* (NBG). 3419AA, Dwarsberg plateau, 1260 m, 5–12–2009, *Oliver EGH & Liltved WR 12569* (NBG) & *12570* (BOL, NBG).

### 9.3. Putative hybrids: *Disa albomagentea* × *D. obtusa*

Western Cape Province: 3418BB, Somerset Sneekop, shaleband on E. side, 1350 m, 28–11–2009, *Oliver EGH, Liltved WR & Stärker W 12561* (BOL, NBG); *ibid.*, *Oliver EGH, Liltved WR & Stärker W 12561* (NBG). 3419AA, Dwarsberg plateau, 1260 m, 5–12–2009, *Oliver EGH & Liltved 12571* (NBG).

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