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Disa cochlearis, a new orchid species from the Karoo region of South Africa

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Disa cochlearis Johnson and Liltved, a new orchid species from the Elandsberg mountains in the semi-arid Karoo region is described. The plants occur in a dry habitat which supports few orchid species. The new taxon is not closely allied to any other known species of *Disa*, but is tentatively placed within *Disa* Section *Amphigena* on the grounds of its having similar vegetative morphology.

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Introduction

The genus *Disa* Berg. has radiated extensively in southern Africa, where about 100 species are known to occur (Linder 1981). Most species of *Disa* species occur in moist fynbos and grassland habitats, and only a few species occur in semi-arid habitats (Vlok 1985; Johnson & Linder 1995). Here we describe a new *Disa* species from the semi-arid Karoo.

This new species was discovered below the summit of an unnamed peak in the Elandsberg mountains (an inland ridge situated between the Groot Swartberg and Witteberg mountains) on 24 January 1997 by Mr Dave Osborne, officer in charge of the Towerkop Nature Reserve. The Elandsberg has not been well explored botanically as these remote mountains are very inaccessible. A single poorly preserved specimen of the new species was sent to Mr Jan Vlok, a local authority on the Karoo flora, who immediately recognised it as a new orchid species. Ten days later, on 3 February 1997, the two authors accompanied Mr Osborne on a search for more specimens. Two further plants were collected about three kilometres east of the original locality. One of these was cultivated in order to study the leaves which appear only during the winter months.

Description

Disa cochlearis Johnson and Liltved sp. nov. Affinis *D. tenui* et *D. esterhuyseniae* sed labelli apice inflato et petalis cum tuberculis differt.

Typus:—South Africa, Western Cape, Elandsberg Mountains, in rocky soil on steep south facing slopes. *Liltved 9707* (BOL, holotypus), *Liltved 9708* (BOL, alcohol preserved paratypus).

Plants slender, up to 450 mm tall, stem wiry with basal section sheathed in old leaf fibres. *Tubers* transculent beige, elongate, irregular, 32–50 mm long, 11–18 mm in diameter. *Basal leaves* 4–9, hysteranthous, slender, sickle-shaped towards the apex, 70–100 mm long, 2–4 mm in diameter, petiolate, folded lengthwise around the midrib, dark green with purple tinges at the base and apex, margins purple and prominently undulated along proximal third to half of the leaf. *Cauline leaves* reduced to inconspicuous papery sheaths around stem. *Inflorescence* lax raceme with 3–11 flowers. *Bracts* brown and papery, *c.* 7 mm long. *Ovaries* 11–14 mm long. *Flowers* resupinate, white with pale mauve tinge in some specimens, unscented. *Dorsal sepal* galeate with small apiculum, entrance narrowly elliptic, *c.* 11 mm high and 3.5 mm wide, dorsal part flattened with scattered purple markings, spur *c.* 19 mm, arising from a conical base, usually slightly ascending, tapering, purple on inner surface. *Lateral sepals* lanceolate, slightly concave, spreading, *c.* 10 mm long, *c.* 4 mm wide with prominent apicula *c.* 2 mm in length, ventral and dorsal surface with a maroon streak between central vein and front margin and prominent maroon patch on basal portion. *Petals* cuneate, erect next to the rostellum, extensively fused to the rostellum, *c.* 7 mm tall and *c.* 2 mm wide, included within the dorsal sepal but not overlapping, curled lengthwise to form a channel, prominent tubercule near inner margin, outer margin dark purple. *Lip* spoon-like, linear, *c.* 8 mm long, 2 mm wide, channelled ventrally, ascending from entrance to the galea, swollen near apex where it forms a concave maroon-coloured warty tubercule *c.* 3 mm in diameter with an undulate margin. *Anther* dark purple, *c.* 4 mm long. *Pollinaria* straight, *c.* 4 mm in length with 2 mm caudicle. *Rostellum* truncate with two closely adjacent viscidia. *Stigma c.* 1.5 mm in diameter, horizontal on 1 mm tall pedicel.

Etymology

The specific epithet refers to the spoon-like shape of the lip.

Habitat and ecology

The plants were found on the south slope of a peak (33°18'S, 21°14'E) in the western part of the Elandsberg Mountains. They were growing amongst grass tussocks in rocky soil at the interface between shales of the Swartruggens Formation and quartzites of the Witteberg Formation. The surrounding vegetation was dominated by grasses, restiods and ericoid shrubs. No rainfall data are available for the site, but annual rainfall at the nearby Besemfontein station is *c.* 260 mm per annum. Most of the rain falls in the winter months.

Flowering occurs during January–February. The leaves are hysteranthous and die back before flowering commences in summer; new leaves emerge with the winter rains. The long spurs, absence of scent and nectar guide patterns on the flowers of the new species indicates that it is adapted to pollination by long-tongued flies (cf. Johnson & Steiner 1997), but further observations are needed to verify this hypothesis.

Taxonomic affinities

The new species is highly distinctive on account of its unusual lip structure (modified to form a hollow wart-like protrubence at its tip) and the smooth hornlike protrubences on the petals (Figure 1). The species appears to belong to *Disa* Subgenus *Stenocarpa* (Lindl.) Linder, on account of the erect petals and square rostellum lobes, but it is difficult to place the species in any of the sections recognised by Linder (1981).

The vegetative morphology of the new taxon is similar to a number of species in *Disa* Section *Amphigena* H. Bolus, such as

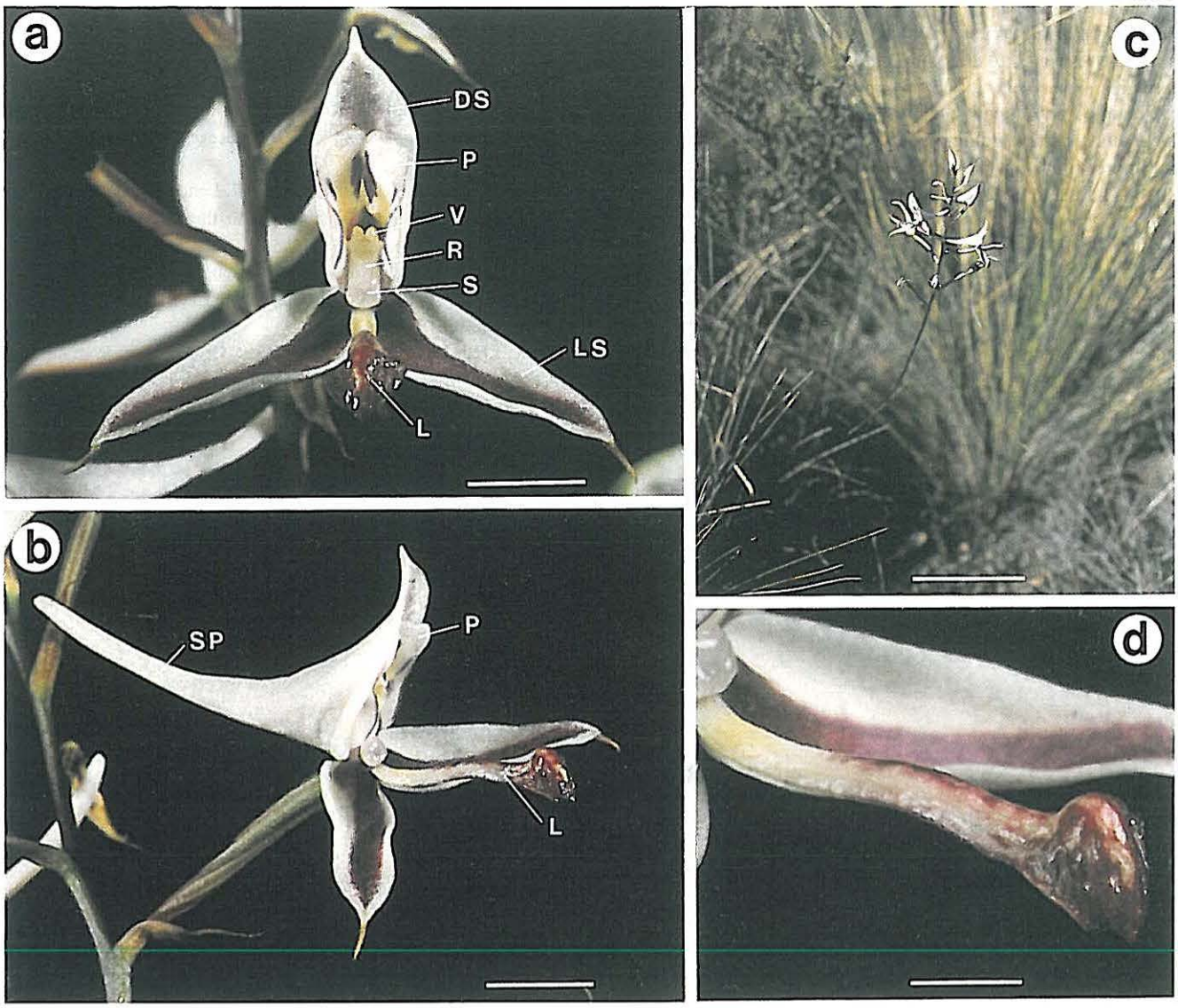

Figure 1 *Disa cochlearis* **a.** Front view of a flower. Scale bar 5 mm. **b.** Lateral view. Scale bar 5 mm. **c.** Plant in habitat. Scale bar 50 mm. **d.** Close up of lip, showing the swollen apex. Scale bar 2 mm. Abbreviations: DS dorsal sepal, P petal, V viscidium, R rostellum, S stigma, LS lateral sepal, L lip, SP spur.

Disa tenuis Lindl. and *Disa esterhuyseniae* Schelpe ex Linder. The leaves in particular are similar to the former two species, being hysteranthous, slender and sickle-shaped and emanating from a petiolate wiry base with a circular cross-section (Figure 2). The leaves of *D. esterhuyseniae* also have undulated margins (cf. Thomas s.n. NBG), but they are not folded along the midrib as in *D. cochlearis* and *D. tenuis*. Non-foliage characteristics of the new species which are also consistent with the concept of *Disa* Section *Amphigena* are the lanceolate lateral sepals with prominent apiculi, oblong erect petals and habitat in dry stony soil.

Figure 2 Whole plant of *Disa cochlearis*, drawn from the holotype (Liltved 9707). Scale bar - 30 mm.

The new species also has features in common with species in *Disa* Section *Coryphaea* Lindl., such as the flattened apex of the dorsal sepal, the channelled petals (very similar to *Disa karooica* Johnson & Linder), the ascending lip and the purple anthers (Figure 1). The hysteranthous basal leaves are also similar to those of the genus *Herschelianthe*, which is now thought to be phylogenetically embedded within *Disa* Subgenus *Stenocarpa* (H.P. Linder, unpublished data). The curious modification of the lip to form a swollen wartlike apex is not found in any other members of Subgenus *Stenocarpa* as currently recognized. It is reminiscent of the lip of some species of *Schizodium*, but this is presumably a result of convergence as the morphology of *Schizodium* differs in many other respects.

At present, the new species is known only from two populations in the Elandsberg mountains. Hybrid origin seems highly unlikely as no other orchid species were found on the mountain. Differentiation of the new taxon was probably facilitated by

geographical isolation, as suitable habitats for orchids in the Karoo are restricted to a few mountain summits separated by hot dry plains.

A detailed phylogenetic analysis of the whole of *Disa* Subgenus *Stenocarpa,* including *Herschelianthe*, is needed in order to shed more light on the taxonomic affinities of the new species, which is here tentatively placed in *Disa* Section *Amphigena*.

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