The CAPE ORCHIDS

A regional monograph of the orchids of the Cape Floristic Region



SANDSTONE *Editions*

Addendum, version no. 3
(August 2013)

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Addendum, version no. 3 (August 2013)

This printable addendum to *The Cape Orchids* is supplied to help address information shortfalls, provide new photographs, introduce new publications, record nomenclatural changes, and make general corrections to the book. The PDF will be updated periodically and is available for download from the website **www.capeorchids.co.za**

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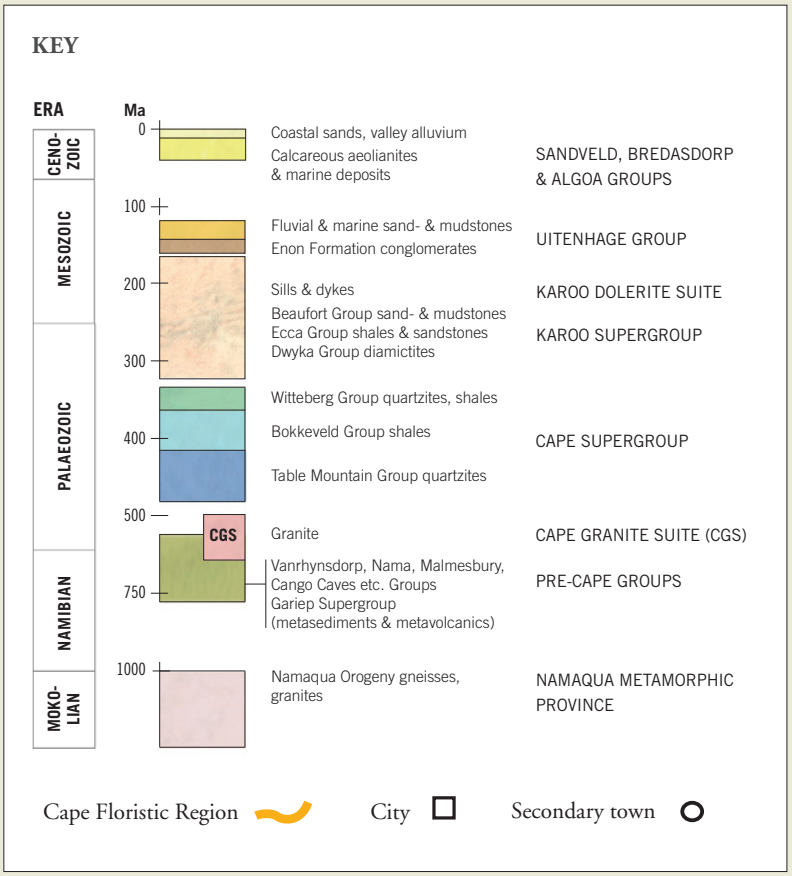
VOLUME ONE

p. x, line 14
Alan's surname should be spelt 'Sonnenberg'

p. 8 (Caption revised.)
RIGHT The local name 'Cape Doctor' refers to the persistent and forceful southeasterly gales that regularly buffet the southwestern Cape from spring to late summer. Here, the flat-topped Table Mountain and adjoining Devil's Peak are draped in a misty, condensing 'tablecloth' formed through the action of this high-velocity wind. On Table Mountain, the scant, highly acid, sandstone-derived soil supports fynbos vegetation. Alternately, the shale-derived soil of Signal Hill (foreground), supports renosterveld vegetation. Lion's Head is seen to the right (22 February 2008).

p. 11 (Revised Bedrock Lithostratigraphy map key.)
The geologist, Dr Michael Johnson, has offered suggestions for improvement of the Bedrock Lithostratigraphy map key. Opposite is the revised version.



p. 27 (Note on caption.)
'*Reigersdaal*' also often spelt '*Reijgersdaal*'

p. 37 (Note on A. V. Duthie.)
After the book was published it became apparent that more information on Dr Augusta Vera Duthie (1881–1963) should have been included owing to her pioneering studies on reproductive biology in *Pterygodium* and natural hybridisation in *Satyrium* (see pp. 107–109, 316, 317). A portrait of her placed in the oval at the centre of page 37 would have better complemented the text. These portraits of Miss A. V. Duthie taken before 1909 are here reproduced by permission of the Stellenbosch University Archives, Watson-Lockley Collection. Mimi Seyffert (Head: Special Collections, J. S. Gericke Library) is thanked for making available these images.





pp. 94, 97, 111, 216, 226
(Note on *Disperis* ×*duckittiae*.)
Disperis ×*duckittiae*, the putative natural hybrid between *D. cucullata* and *D. villosa*, was first proposed rather informally by E. A. Schelpe in Stewart *et al.* (1982), but as no formal description was provided, this name must be considered a *nomen nudum*, and thus presently invalid. It is known from a few sites mainly near Darling. Research is ongoing as to whether it is, in fact, a hybrid, and thus its true taxonomic status. A population of about 30 well-pollinated flowering plants was surveyed at Darling on 6 September 2012 and the accompanying photographs taken (flower diameter *c*. 20 mm).









ABOVE LEFT *Disa ×vogelpoelii*. The inflorescence as photographed on 7 March 2013 by Wayne Barnes.
ABOVE *Disa ×vogelpoelii*. On 11 March 2013, the viscidia were found to be missing from the uppermost flower and seed capsules seemingly developing lower on the inflorescence.

pp. 109, 111, 495, 780, 817
(Note on *Disa ×vogelpoelii*.)
Disa ×vogelpoelii (H.P.Linder) Bytebier is a natural hybrid resulting from the chance crossing of *D. ferruginea* and *D. graminifolia*. Until recently, it has been known only from a single four-flowered plant observed on Table Mountain by Dr Louis Vogelpoel on 13 March 1985.

On 7 March 2013, while walking near the top of Table Mountain at *c.* 1070 metres, Wayne and Sandy Barnes found an almost identical plant bearing five flowers. The parent species have distinctly different pollination strategies, *D. ferruginea* utilising the Mountain Pride butterfly and *D. graminifolia*, carpenter bees (see pp. 88, 90, 103–105). As bees are generally not attracted to red flowers and butterflies have a broader spectrum of colour vision, one can postulate that the latter insect is more likely to have been involved in the transfer of pollen, in a remote chance event. Further speculations may be reached after DNA studies determine which species is the maternal parent.

Growing amongst low fynbos vegetation, the plant stood 430 mm tall (flower diameter *c.* 20 mm; median sepal length 22–24 mm, height 13–15 mm; lateral sepal length 10–12 mm; lip length 10–12 mm; and total flower length 31–33 mm).

p. 118 (Caption revised.)
In vitro micropropagation of *Disa* plants by tissue culture from either young flower buds or shoots.
Flask left: Plantlet formation induced with a growth hormone in a sterile agar culture medium.
Flask centre: Raising of the plantlets on nutrient-enriched sterile agar.
Flask right: Plantlets ready for deflasking.





p. 171 (*Holothrix secunda* caption revised below and photographs of *H. filicornis*, mentioned on page 171, provided left.)
Figs c, d. *Holothrix secunda*. Nardouwsberg near Clanwilliam.
c. Inflorescences—flower diameter 13–15 mm (23 September 1991).
d. Plants in habitat with *Euphorbia loricata* (23 September 1991).

On 19 May 2012, shortly before the book went to press, William Liltved accompanied Herbert Stärker to Fyftienmylseberg just inland of Port Nolloth on the Namaqualand coast. The goal was to photograph *Holothrix filicornis* in its semi-arid, stony habitat on the lower eastern slopes of this mountain. This species (figured above and mentioned on p. 171, col. 3) is distributed from this area of the Northern Cape Province to southern Namibia. Flowering occurs from May to August, with one record in October (see Linder & Kurzweil 1999).







pp. 208, 210 (*Disperis micrantha* recorded from the CFR.)
Since publication of the book, *Disperis micrantha* Lindl. has been recorded occurring in the Cape Floristic Region. In Afrotemperate forest (*c.* 100 m) near Wilderness in the southern Cape, colonies of several dozen plants flowering in March were first observed by Members of the Custodians of Rare and Endangered Wildflowers (CREW). The above photographs were taken by Herbert Stärker on 19 March 2013.

The species is widespread in the summer-rainfall region extending from the Eastern Cape Province of South Africa to Zimbabwe. It occurs in the shade (occasionally on mossy boulders) of woodland thicket forest patches or montane forest, sometimes growing together with *Disperis anthoceros* and *D. lindleyana*. Unlike other *Disperis* species, *D. micrantha* has so far not been found in plantation forests of gums and pines (H. Stärker pers. comm). It appears closely related to *D. disiformis* which has a very similar lip appendage. The plant measures 60–180 mm in height and a detailed description is available on pages 304–305 of Linder and Kurzweil (1999).

p. 215, col. 2, line 9
'propogated' to read 'propagated'

pp. 230–233 (Note on *Disperis bodkinii*.)
This two-flowered plant of *D. bodkinii* was photographed on 20 August 2012 during a yearly visit to a small population of the rare species on Table Mountain. The spindly plant measured 155 mm tall; the flower 4 mm in diameter; and the ovary 12 mm in height.





p. 231, col. 2, line 12
'de spite' to read 'despite'

pp. 252–259 (Note on *Pachites appressa*.)
Whether *Pachites appressa* and *P. bodkinii* are truly congeneric, and further still whether the genus *Pachites* is related to either the subtribe Satyriinae or, even as some suggest, Coryciinae, has been uncertain. Research into the matter has been reliant on procuring a fresh leaf sample for DNA sequencing (see Bytebier *et al.* 2008b). In 2011 the Langeberg Mountains near Swellendam were burnt. This offered a new opportunity to search for the fire-dependent and extremely rare *P. appressa*, a local endemic in these mountains (see pp. 256–259). Intensive searching by three separate hiking groups in December 2012 yielded only three *P. appressa* plants (*Figs* a–d)—one in bud on 12 December 2012 (Hildegard Crous); and on 27 and 29 December one flowering and another in fruit (Timo van der Niet).

Continued overleaf

The recent findings show that *P. appressa* is capable of self-pollination. After some observed flowers had been open for less than 24 hours, the pollinaria flipped onto the large horseshoe-shaped stigma and the flower then closed to ultimately wilt. In observations of a solitary plant on an exposed south-facing slope of Hermitage Peak (1308 m) by Timo van der Niet, the lowermost open flower was found to be without pollinaria (*Fig*. d). As one viscidium was still in place, the pollinaria were assumed to have been eaten by an insect. This flower had remained unpollinated and thus stayed open, while all the self-pollinated flowers above it had closed. As shown by Bolus (1896) in plate 76, the pollinarium is rather loosely enclosed by its anther sac, and its lateral slit soon reflexes to release the pollinarium onto the stigma (*Fig*. c, bottom right). Although we now know that the species can be autogamous (self-pollinating), the architecture of presentation of the non-resupinate flower for potential insect pollination, remains confusing. Furthermore, the function of the long horn-like processes (staminodes?) behind the triangular rostellum is a mystery. The lip of the flower is uppermost and is the only markedly-coloured tepal. It is so well-coloured that this must bear some significance, as it is assumed that anthocyanin pigments would not be produced without good reason, this being energetically costly. A post-pollination response involving the purpling of the horns and the at first red-coloured, rugose surface of the top of the rostellum, is a further indication that some visually-stimulated pollinator may play a role in the breeding system of this orchid. Contrastingly, the anteriorly situated and downwardly directed anthers are concealed under the elongate, protruding rostellum. Whatever the pollinator may be, there does not seem to be a specific orientation cue to direct it to a position where it would be able to receive the pollinaria from this lower side of the flower. Additionally, no pollinator reward was obvious and the application of Sudan IV to test for oil in the flower of *P. appressa* yielded negative results (*P. bodkinii* is, however, known to be oil-secreting). A delicate perfume was, however, noted in the heat of the day. An analysis of this scent's chemistry, together with a forthcoming molecular study of *Pachites*, now including *P. appressa*, by Timo van der Niet (Naturalis Biodiversity Center, Leiden University) should make for interesting reading in the near future.



a b

Figs a, b. *Pachites appressa*. Langeberg Mountains near Swellendam (30 December 2012).



c

Fig. c. *Pachites appressa* flower structure. Langeberg Mountains near Swellendam (29 December 2012–3 January 2013).
TOP Views of same flower showing the large horseshoe-shaped stigma and the progressively opening anther sacs designed to release the pollinaria onto the stigma—in this specimen the viscidia have prematurely dried.
FAR LEFT Newly opened flower before self-pollination.
LEFT Self-pollinated flower, with pollinia flipped onto stigma—the domed viscidia are situated on the underside of the triangular rostellum (29 December 2012).
T. van der Niet.

BELOW *Fig.* d. *Pachites appressa*. Langeberg Mountains near Swellendam (3 January 2013).
T. van der Niet.



d

pp. 260–365 (Reclassification of the Coryciinae.)
A reclassification of the Coryciinae was recently proposed by Manning and Goldblatt (2013). By kind permission of the first author it is here reproduced verbatim, from the publication:
Manning, J. & Goldblatt, P. 2013. *Plants of the Greater Cape Floristic Region. 1: The Core Cape Flora*. *Strelitzia* 29 (pp. 810–813). South African National Biodiversity Institute, Pretoria.

Disperis and **Corycium.** A phylogenetic analysis of plastid and nuclear markers (Waterman *et al.* 2009) has confirmed that subtribe Coryciinae is paraphyletic with the inclusion of *Disperis*, a possibility that was first suggested by a morphological cladistic analysis of the group (Kurzweil & Linder 1994). The subtribe in this narrower circumscription is morphologically defined by several synapomorphic anther characters, notably the widened connective separating the anther thecae, and the fasciculate massulae of elongated pollen tedrads with striate-tectate sculpturing (Kurzweil & Linder 1994). Generic circumscriptions within Coryciinae *s.str.* have been much disputed and were recently significantly revised by Kurzweil *et al.* (1991) following a detailed morphological cladistic analysis of the group, focussing especially on the detailed structure of the gynostemium. This resulted in the recognition of four genera. *Ceratandra* (6 spp.) and *Evotella* (1 sp.) were closely allied on the basis of their distinctive, anchor-shaped lip and
± equally long cauline leaves: *Evotella* was retained as a separate genus on the basis of its ± entire lip appendage and stigmas placed terminally on the rostellar arms, and *Ceratandra* was diagnosed by its thickened roots and pendent anther. The remaining two genera, *Corycium* (14 spp.) and *Pterygodium* (18 spp.), were less convincingly diagnosable, their distinction relying essentially on the depth of the hood formed by the petals and median sepal: deep in *Corycium* and shallow in *Pterygodium*.

Waterman *et al.* (2009) conclude that both *Corycium* and *Pterygodium* are polyphyletic as currently circumscribed, evidently because of significant convergence in the floral characters used to define the genera. The analysis confirmed the close relationship between *Ceratandra* and *Evotella* suggested by their similar vegetative and floral morphology, and also largely corroborated the species relationships within *Disperis* that emerged from an earlier morphological cladistic analysis of that genus (Manning & Linder 1992).

Although *Corycium* may be readily rendered monophyletic by the exclusion of *Co. carnosum* and *Co. flanaganii*, the genus in this narrower circumscription is still deeply embedded within *Pterygodium*, in which relationships are complex and not fully resolved. Significantly, the genus *Ceratandra* is retrieved as monophyletic and sister to *Evotella* + *Co. carnosum*. The latter alliance receives independent morphological support from the unusual, unequal pollinium sections found in these two species (Waterman *et al.* 2009). Both *E. rubiginosa* and *Co. carnosum* are also unusual in their pink petals. We have re-examined the lip in *Co. carnosum* and discover that it is shortly clawed with a distinctly semi-lunate or anchor-shaped blade, characters that define this clade. There are thus no morphological barriers to transferring *Co. carnosum* to the genus *Evotella*. In the current taxonomy of the genus, *Co. carnosum* is treated in the monotypic sect. *Carnosum* Kurzweil & H.P.Linder on the basis of its entire, hooded lip appendage and the position of the stigmas, which are terminal on the rostellum arms. Both of these characters are anomalous in *Corycium* but are diagnostic of *Evotella*.

A less explicable relationship is shown by *Pterygodium alatum*, which is placed sister to the *Ceratandra* + *Evotella* + *Co. carnosum* clade. This alliance has no evident morphological support, making it impossible to provide a morphological basis for recognizing the two primary clades retrieved in the molecular analysis. Unfortunately, just a single sample of *P. alatum* was included in the analysis, and although this placement receives the maximum posterior probability value in the Bayesian analysis, it is only moderately supported (BS 81%) in the parsimony analysis (Waterman *et al.* 2009 [Supplementary figure]). This leaves the possibility of some doubt as to its reliability. The minimum number of morphologically definable, monophyletic clades that Waterman *et al.* (2009) were able to recognize was ten, the largest of which was the *Corycium* clade (12 spp.), followed by their '*Eupterygodium*' clade (7 spp.), and the *Ceratandra* clade (6 spp.).

It is clear that some generic re-circumscription is necessary in Coryciinae in order to render the genera monophyletic. Although a formal re-classification of Coryciinae is postponed to a separate paper, Waterman *et al.* (2009) favour treating all or most of their ten informal clades at generic level on the basis that the 'morphological and molecular variation within the two primary clades that are retrieved [in the] analysis is extremely high in comparison with other genera in the Diseae'. No formal evidence for this claim is offered and it can be readily argued that both *Disa* and *Disperis* display comparable levels of variation in morphological and molecular characters (as judged from their Supplementary Figure). Significantly, Bytebier *et al.* (2008) identified the enormous morphological diversity present in the Disineae as the primary obstacle to a morphological classification system in the group. As a result, the circumscription of *Disa* was expanded to include the segregate genera *Monadenia*, *Herschelia*, and *Schizodium* (Bytebier *et al.* 2008), and now includes ± 180 spp. In contrast, *Disperis* (176 spp.) has been consistently treated as a single genus despite significant variation in vegetative and floral features, especially the form of the gynostemium, lip, and lip appendage. It is just these characters that have been traditionally emphasized in the generic classification of members of Coryciinae *s.str.*

The molecular and morphological data presented by Waterman *et al.* (2009) suggest two main options for recognizing monophyletic, morphologically definable genera. Option 1 requires the recognition of ten genera, as discussed above, the largest of which contains just

Continued overleaf

a dozen species and three of which are monotypic. Option 2 requires that all 39 species be treated in a single, readily diagnosable genus, within which various subgenera and sections may be recognized. Option 1 highlights morphological diversity in the group but reduces information on phylogenetic relationships, and its advantages are difficult to justify. Although it retains all current genera, the circumscriptions of most need to be substantially altered, thereby largely negating this benefit. Option 2 maximizes nomenclatural stability and taxonomic utility at the cost of phylogenetic information, although the latter is readily supplied through provision of an appropriate infrageneric classification. A more inclusive generic circumscription is consistent with generic treatments elsewhere in the tribe and also highlights the evident close phylogenetic relationship among the species, as well as their specialized pollination ecology (Pauw 2006). Either of these two solutions is a radical departure from current taxonomic treatment of the subtribe and we therefore propose a compromise solution based on the possibility that *Pterygodium alatum* may be misplaced in the molecular analysis. This option recognizes three genera: 1. *Ceratandra* is retained as currently circumscribed; 2. *Co. carnosum* is transferred to the genus *Evotella*, with which it accords in flower colour, lip shape, stigma position, and unusual pollinium structure; 3. *Corycium* is subsumed within *Pterygodium*, reflecting the weak morphological distinction between the two and the uncertain relationships among the species. This treatment is consistent with the topology of the molecular analysis in all respects except the position of *P. alatum* but support for the placement of this species outside the *Pterygodium–Corycium* clade is only moderate and requires additional investigation pending a final conclusion.

Most species of *Corycium* were treated in the genus *Pterygodium* by Schlechter (1898) in his monograph of the tribe and very few new combinations are necessary. These are provided below. An appropriate infrageneric classification is still required but we transfer most of the existing sections recognized in *Corycium* by Kurzweil *et al.* (1991) to *Pterygodium* and provide a preliminary system for further study and for herbarium curation.

Evotella *Kurzweil & H.P.Linder* in Kurzweil *et. al.*, Plant Systematics and Evolution 175: 215 (1991). Type species: *Evotella rubiginosa* (Sond. ex Bolus) *Kurzweil & H.P.Linder*.
Corycium sect. *Carnosum* Kurzweil & Linder: 218 (1991), syn. nov. Type species: *Corycium carnosum* (Lindl.) Rolfe = *Evotella carnosa* (Lindl.) J.C.Manning & Goldblatt.

Evotella carnosa *(Lindl.) J.C.Manning & Goldblatt*, comb. nov. *Pterygodium carnosum* Lindl., The genera and species of orchidaceous plants: 367 (1839). *Corycium carnosum* (Lindl.) Rolfe: 284 (1913).

Pterygodium *Sw.* in *Kongliga Swenska Wetenskaps Academiens handlingar*, ser. 2, 21: 217 (1800). Type species: *P. alatum* (L.f.) Sw.

Pterygodium sect. **Corycium** *(Sw.) J.C.Manning & Goldblatt*, comb. *et stat*. nov. *Corycium* Sw. in *Kongliga Swenska Wetenskaps Academiens handlingar*, ser. 2, 21: 220 (1800). Type species: *Corycium orobanchoides* (L.f.) Sw. = *P. orobanchoides* (L.f.) Schltr.
Corycium sect. *Microglossum* Kurzweil & H.P.Linder: 218 (1991), syn. nov. Type species: *Corycium microglossum* = *P. microglossum* (Lindl.) Schltr.

Pterygodium alticola *(Parkman & Schelpe) J.C.Manning & Goldblatt*, comb. nov. *Corycium alticola* Parkman & Schelpe in N.C. Anthony & E.A.C.L. Schelpe, Contributions of the Bolus Herbarium 10: 157 (1982).

Pterygodium dracomontanum *(Parkman & Schelpe) J.C.Manning & Goldblatt*, comb. nov. *Corycium dracomontanum* Parkman & Schelpe in N.C. Anthony & E.A.C.L. Schelpe, Contributions of the Bolus Herbarium 10: 158 (1982).

Pterygodium ingeanum *(E.G.H.Oliv.) J.C.Manning & Goldblatt*, comb. nov. *Corycium ingeanum* E.G.H.Oliv. in South African Journal of Botany 52: 256 (1986).

Classification of *Pterygodium*

Provisional classification of *Pterygodium* (Species arranged following Kurzweil *et al.* (1991) and Waterman *et al.* (2009)).

1. sect. **Pterygodium**: *P. cruciferum* Sond., *P. connivens* Schelpe, *P. acutifolium* Lindl., *P. catholicum* (L.) Sw., *P. newdigateae* Bolus, *P. cleistogamum* (Bolus) Schltr., *P. platypetalum* Lindl., *P. hastatum* Bolus, *P. leucanthum* Bolus, *P. caffrum* (L.) Sw., *P. pentherianum* Schltr., *P. alatum* (Thunb.) Sw.

2. sect. **Magnum** *Kurzweil & Linder*: *P. magnum* Reichb.f.

3. sect. **Ommatodium** *(Lindl.) Kurzweil & Linder*: *P. cooperi* Rolfe, *P. volucris* (L.f.) Sw., *P. vermiferum* E.G.H.Oliv. & Liltved, *P. schelpei* H.P.Linder.

4. sect. **Anochilus** *Schltr.*: *P. flanaganii* Bolus, *P. inversum* (Thunb.) Sw., *P. hallii* (Schelpe) Kurzweil & H.P.Linder.

5. sect. **Corycium** *(Sw.) J.C.Manning & Goldblatt*: *P. microglossum* (Lindl.) Schltr., *P. bifidum* Sond., *P. tricuspidatum* (Bolus) Schltr., *P. nigrescens* (Sond.) Schltr., *P. dracomontanum* (Parkman & Schelpe) J.C.Manning & Goldblatt, *P. alticola* (Parkman & Schelpe) J.C.Manning & Goldblatt, *P. bicolorum* (Thunb.) Schltr., *P. excisum* (Lindl.) Schltr., *P. orobanchoides* (L.f.) Schltr., *P. ingeanum* (E.G.H.Oliv.) J.C.Manning & Goldblatt, *P. deflexum* Bolus, *P. crispum* (Thunb.) Schltr.

p. 289, col. 3, line 23
'*P. physodes*' to read '*Disa physodes*'

p. 378 (Caption error.)
'*Figs* d. *Satyrium emarcidum*' to read '*Fig.* d. *Satyrium emarcidum*'

p. 396, col. 2, line 35 (Distribution for *Satyrium outeniquense* extended.)
Satyrium outeniquense is uncommon to locally abundant in the mountains and adjacent forelands of the southern and eastern CFR, from Swellendam to Humansdorp. It occurs at altitudes of 160 m to somewhat over 1000 m (Hall 1982).

VOLUME TWO

pp. 515, 516 (Habitat note on *Disa aurata*.)
In late December 2012 after fire, *Disa aurata* flowered abundantly in the Langeberg Mountains near Barrydale and Swellendam. It was found that the habitat is not restricted only to streamsides as previously thought, as colonies are also common in the burnt peaty banks along mountain crests. The especially high precipitation in such areas obviates the usual need for the strictly streamside habitat seen at lower altitudes in these mountains.





pp. 526–528 (Note on *Disa richardiana*.)
This exceptional photograph of *Disa richardiana* was taken by Ted Oliver on the southern ridge of Somerset Sneeukop in the Hottentots Holland Mountains near Grabouw, on 14 December 2012. The flowers are seldom seen in this fully opened state and, owing to their delicate pink tints and unusual horizontally barred petals, these are especially attractive. Pollen massulae were adherent to almost every stigma.



p. 602, col. 1, top (*Disa sagitallis*, heading omitted.)
The heading '*Disa sagitallis*' has been omitted from this page. Should you not have the printed sticker supplied to make the correction, please email William Liltved at the address above.

p. 621, col 2, line 26
'Pilarkop' to read 'Pilaarkop'

pp. 741–745, 1003 (Note on distinctive forms of *Disa tenuis* according to our recent article available for download as www.capeorchids.co.za/plus/Disa%20tenuis.pdf:
Liltved, W. & Russell, G. 2012. An intriguing Cape orchid—The distinctive forms of *Disa tenuis* Lindl. *Veld & Flora* **98**: 108–111).

Disa tenuis is an inconspicuous reed-like species measuring up to 500 mm tall in exceptionally long plants. It was first discovered by Drège at 'Wynberg under 100ft' (*Drège 8274*; Kew; *Fig*. c) on the Cape Peninsula and later described by Lindley in 1838. A second similar plant, an isotype (*Drège 8274*; Herb. Mus. Paris), was found at nearby 'Dieprivier'.

The tiny flowers of *D. tenuis* are characterised by the typically prominent apiculi of the sepals (particularly in Cape Peninsula plants), a very short spur and a single viscidium. As noted by Linder (1981c), the species is variable in the overall size and coloration of the flowers, the length of the apiculi and degree of serration in the petal margins, lip and median sepal. Among forms, there are also significant differences in spur orientation and structure.

There has been some uncertainty over Sonder's *Disa leptostachys* of 1846. However, owing to the distinctive single viscidium—a character that had escaped Lindley (due to the absence of pollinaria in the specimen he had to hand)—Bolus (1884) believed

Continued overleaf

that both taxa are 'no doubt' the 'same thing'. Conversely, within his genus *Amphigena*, Rolfe (1913) separated *D. leptostachys* Sond. from *D. tenuis* Lindl., because of the 'crenulate' margin of the median sepal and less prominent apiculi on the sepals. Most modern botanists have considered the two taxa to be conspecific. However since publication of *The Cape Orchids* (Liltved & Johnson 2012), new observations increasingly point to the presence of distinctive, separately recognisable variants perhaps worthy of species status (Liltved & Russell 2012). On the Cape Peninsula, the earlier-flowering (February to early April) form has white flowers with purple-brown to greenish stripes; prominently apiculate sepals; the median sepal enclosing small white petals, both serrate; a broad serrate lip; and an indistinct spur (*Fig*. a). In the later-flowering (April to early June) greenish to dark-brown form, which conforms exactly to Lindley's type, the median sepal and long narrow lip are mostly smooth; petals exserted from the median sepal; and the short spur upcurved (*Figs* b, c). In the rosy-purple, spotted form, which flowers from April to early June, the median sepal, petals and lip are serrate, with short apiculi; the conical spur pointing backwards (*Figs* d, e). Orientation of the lateral sepals differs markedly between the green-brown form, where they are reflexed, and the other forms, where they are concave to forwardly directed and, with the median sepal, present a cup-like appearance.

Although the present understanding of the various entities currently placed under the 'catch-all' name, *Disa tenuis*, is still too inadequate to allow for any last word on the subject, there are enough data to suggest that sufficient co-occurring characters exist (e.g. in phenology, morphology and coloration as it relates to pollinator attraction) to be fairly sure that there are three or four different taxa deserving formal recognition at one or another level.

We presently recognise the following distinctive forms of *D. tenuis*:

The earlier-flowering form (February to early April) has white flowers with purple-brown to greenish stripes; prominent thread-like apiculi of the lateral sepals; the median sepal enclosing small white petals, both serrate; a broad serrate lip; and an indistinct spur (*Fig*. a right. See also *Cape Orchids* p. 745, *Fig*. h).

Its distribution is restricted to the Cape Peninsula from Constantiaberg (760 m) to Table Mountain (240–610 m) and living plants have not yet been seen by us. This is the same form of *D. tenuis* figured in *An Introduction to the South African Orchids* (Schelpe 1966, as '*Amphigena tenuis*') and *Wild Orchids of Southern Africa* (Stewart *et al*. 1982). Well-preserved specimens are housed in the Compton and Bolus herbaria in Cape Town (e.g. *Barker 691*, 8 March 1940; NBG).

The later-flowering (April to early June) 'typical' form has greenish to dark-brown flowers; the median sepal and long narrow lip are usually smooth; petals exserted from the median sepal; and the short spur upcurved. This conforms exactly to Lindley's type specimen (*Figs* b, c overleaf—drawing on Lindley's herbarium sheet. See also *Cape Orchids* pp 741–743, *Figs* a–e).

It has been recorded from scattered sites in the southwestern Cape Floristic Region, but for this study was observed mainly on the Cape Peninsula (30–400 metres). As noted on page 745 of *The Cape Orchids*, plants of this form usually with high fruit-set, were monitored yearly in the southern Cape Peninsula mountains (*Liltved 111*, 22 May 2009; NBG). Close inspection of the flowers revealed that some efficient pollinator had been at work. Most anther sacs were empty, with masses of pollen granules deposited on the broad, circular stigma. The ascending one millimetre-long spur was filled with thick, clear nectar. Droplets of sweetish nectar coalesced around the stigma to copiously ooze onto the lateral sepal bases. The cryptic floral coloration suggests pollination by tiny moths at night. However, moth-pollinated orchids are usually strongly evening-scented and no scent was detected over a 24-hour period.

Continued overleaf



a

Fig. a. *Disa tenuis*: earlier-flowering form with serrate median sepal and petals. Constantia Nek, Cape Peninsula (two views of one plant, March 1965). R. Geary-Cooke. See also Fay Anderson's painting of same plant, *Cape Orchids* p. 745, *Fig*. h).



b



c

Figs b, c. *Disa tenuis*: later-flowering 'typical' form with median sepal and long narrow lip usually smooth, and petals exserted from the median sepal: (b) floral detail showing single white viscidium in front of pollinia-containing anther sacs. Flower diameter 7–11 mm (22 May 2009); (c) astonishingly accurate drawing accompanying Lindley's type specimen from 'Wynberg under 100ft' (*Drège 8274*; Kew) (note, viscidium absent).

In the rosy-purple, spotted form (flowering April to early June), with serrate median sepal, petals and lip, the apiculi are short; the conical spur pointing backwards (*Figs*. d, e overleaf. See also *Cape Orchids* p. 744, *Fig*. h and photographs on p. 1003).

This especially rare form is known from a few sites in the southwestern Cape Floristic Region near Franschhoek, Houwhoek and Kleinmond (reaching 590 metres). It is consistent with the concept of '*Disa leptostachys* Sond.' The original sheet of Sonder's *D. leptostachys*, housed in the herbarium of the Riksmuseet, Stockholm, is the holotype, but is confusing in that it contains two separate collections and apparently two separate forms. Which individual specimens relate to which label has unfortunately not been recorded on the sheet. Six of the seven specimens (one of them including the twining slender stem of a creeper) showing short apiculi, are apparently the rosy-purple, spotted form, and were probably all collected from the 'Grietjesgat' locality of Ecklon & Zeyher and April to June-flowering ('56.6'). Grietjesgat is near the top of Sir Lowry's Pass. The seventh specimen on the herbarium sheet is slightly more lax, with flowers that are more spreading and exhibit long apiculi. Could this represent the second collection, that of Zeyher from 'Heidevalley'? This latter specimen apparently represents the 'typical' form discussed above.

The apiculi in plants of the '*D. leptostachys*' form tend to be shorter, but not entirely absent, and the flowers may be more densely clustered, as opposed to distantly spaced on the inflorescence (cf. Bolus 1913: t. 72 'B'). This tendency is observable in a series of five fine specimens from near Palmiet River mouth just west of Kleinmond and housed in the Bolus Herbarium (*Stokoe s.n.,* May 1922; BOL 17225).

It seems adapted for daytime pollination and releases a strong, pleasant, yet hard to define, scent in warm weather. The spur is nectar-filled. The tiny flowers (*c.* 6 mm diameter) are long-lived and the inflorescence remains in bloom for over a month as seed capsules gradually replace pollinated flowers from base to tip.

Continued overleaf



d



e

Figs d, e. *Disa tenuis* rosy-purple, spotted form with serrate median sepal, petals and lip; diameter 5–7 mm. Palmiet River Mountains, Kleinmond (10 April 2012). ((e) H. Stärker.)

The Compton, Bolus and Paris Museum herbaria house specimens of a fourth distinctive form of which there are no recent records. These plants were found by Guthrie, Bodkin and Schlechter at Houwhoek ('2 000 ft.') in April 1862–1896 (e.g. *Guthrie 2314*, 6 April 1892; NBG). *Schlechter 7550*, 12 April 1896; Herb. Mus. Paris). They are very long with 30 to over 50 distantly spaced flowers (cf. Bolus 1913: t. 72 'A'; see also *Cape Orchids* p. 744, *Fig.* f). The flowers are described as greenish by Bolus. According to his plate, the median sepal, petals, and broadish lip have edges that are serrate. The lateral sepal apiculi are not at all prominent.

p. 954 (Caption revised.)
a–c. *Acrolophia cochlearis*: an apparent peloric anomaly where the lip somewhat resembles the rest of the perianth segments. A number of such individuals grew in an apple orchard sprayed twice annually with the herbicide, Gramoxone (Paraquat). Normal plants of *A. cochlearis* were seen near the border of the orchard. The chemistry in these unusual plants is assumed to be altered sufficiently by the Gramoxone to cause teratological changes in the floral features and presentation, giving rise to flowers exhibiting a condition approaching peloria. It seems likely that the herbicide also alters the normal floral initiation mechanism so that inflorescences that bear unusually small flowers are readily produced on undersized plants. Langkloof near Krakeel (30 November 2011). (See pp. 872–875.)

pp. 816, 817 (Photographic study of *Disa ferruginea* on the Cape Peninsula.)
The unusually tall *Disa ferruginea* plants figured on page 816 (*Fig.* f) were photographed on the Steenberg Mountains on 16 March 2006, using 35 mm slide film. Shown below and overleaf is the same group (probably comprising two double-flowered plants, measuring *c.* 440 mm in height) photographed digitally, exactly seven years later, on 16 March 2013.





p. 984, col. 1, line 28
'Dr Pascal Chesselet' to read 'Dr Pascale Chesselet'

p. 2003 (Caption error.)
'See p. 774' to read 'See p. 744'

Sandstone Editions logo

The logo contains three stone-age implements called 'bored stones'. Such perforated stones may have been of religious significance, used as digging stick weights, pestles, mace heads and hunting trap drop weights. These artefacts are common in southern Africa and were made by the Khoisan and other peoples (see p. 1 of *The Cape Orchids*).

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