

AMARYLLIDACEAE: CYRTANTHEAE

NEW SPECIES AND NOTES ON *CYRTANTHUS* IN THE SOUTHERN CAPE, SOUTH AFRICA

INTRODUCTION

Cyrtanthus Aiton, a genus that extends from South Africa to East Africa, has some of the most highly ornamental representatives of Amaryllidaceae. About 55 *Cyrtanthus* species are currently recognised, some 53 of which are endemic to southern Africa (Nordal 1979; Reid & Dyer 1984; Hilliard & Burt 1986; Snijman & Van Jaarsveld 1995). Until recently *Cyrtanthus* was regarded as a member of the tribe Haemantheae (Pax) Hutch. (Dahlgren *et al.* 1985) but following a cladistic analysis of molecular data in Amaryllidaceae (Meerow *et al.* in press), *Cyrtanthus* was re-allocated to its own tribe Cyrtantheae Salisb. (Meerow & Snijman 1998).

Cyrtanthus shows considerable variation in floral form and species differ greatly in the colour, size, shape, and position of their flowers. In addition, a few representatives have actinomorphic flowers and a straight perigone tube but mostly the flowers are zygomorphic. Zygomorphy in *Cyrtanthus* is expressed in the simplest state by the curvature of the perigone tube but this is further enhanced by the upward or downward curvature of the stamens and the style, and sometimes by the bilabiate arrangement of the tepals. In the Cape Region, *Cyrtanthus* species are known to attract a variety of animal visitors. Species with wide,

funnel-shaped, red flowers are pollinated by the Mountain pride butterfly, *Aerpetes tulbaghia* (L.) (Johnson & Bond 1994); those with tubular red flowers are visited by both the Lesser double-collared sunbird *Nectarinia chalybea* (L.) (pers. obs.) and the Mountain pride butterfly (Le Maitre & Brown 1992); while species with tubular, cream-coloured, scented flowers are considered to be attractive to moths (J.C. Manning pers. comm.). Although phylogenetic studies are yet to reveal the sequence in which the flower evolved in *Cyrtanthus*, it is probable that the slender, curved perigone tube has been a key feature that allowed the flower to undergo selection in response to a wide variety of specialised pollinators during the lineage's history.

The recent discovery of two rare, new species from the southern Cape extends the known diversity of floral form in *Cyrtanthus* still further. In *C. leptosiphon*, a species discovered near Swellendam in 1981, the cream-coloured to pinkish flowers are long-tubed, and the tepals are weakly bilabiate. The second new discovery, *C. wellandii*, found near Hankey in 1996, has small, widely flared, vermilion to scarlet flowers. As yet, this is the only known *Cyrtanthus* species in which the style remains included in the lower half of the perigone tube, below the stamen insertion.

In her taxonomic treatment of *Cyrtanthus* in East Africa, Nordal (1979) chose subspecific rank for putative sister taxa that differ by small quantitative characters of the leaves and flowers. In contrast, Reid & Dyer (1984) recognised the smallest diagnosable units as species, even those defined by small—but apparently constant—quantitative morphological differences. In accordance with the methods of Reid & Dyer (1984), the phylogenetic species concept has been applied when describing the species below.

***Cyrtanthus leptosiphon* Snijman, sp. nov.**, quoad folia angusta et hysterantha, flores tubulares et cremeos, et segmentis superantibus 7.5 mm ad *C. ochroleucum* (Herb.) Burch. ex Steud. et *C. leucanthum* Schltr. accedit, sed ab eis differt pedicellis brevibus (3–5 mm), tepalis bilabiatis inferme, costa incrassata tepali, et stigmate trilobo minute. Figura 7.

TYPE.—Western Cape, 3420 (Bredasdorp): near Buffeljagsrivier, (–BA), along road to Suurbraak, 15-3-1997, Goldblatt 10621 (NBG, holo.; K, PRE).

Deciduous bulbous herb, 200–300 mm tall when flowering. *Bulbs* clumped, hypogeal, ovate, up to 30–50 mm long, 30–35 mm diam., without a prominent neck; outer tunics brown and papery; inner tunics cream-coloured and fleshy. *Leaves* 1–5, absent or sometimes present at flowering, linear, 165–220 × 2.0–2.8 mm, suberect, twisted 1 or 2 times, glabrous, shallowly channelled adaxially, with 3 distinct median veins but not keeled abaxially. *Inflorescence* (1)2(3 or 4)-flowered; scape erect, up to 250 mm long, 3–5 mm diam., tapering distally, pink to green with a grey bloom, hollow throughout or sometimes solid towards base; spathe valves 2, equitant, narrowly lanceolate, up to 30 × 6 mm, membranous, soon becoming papery and reflexed; bracteoles up to 4, filiform, up to 15 mm long; pedicels erect, 3–5 mm long at anthesis, pinkish green, finally up to 9 mm, 2 mm diam., green. *Flowers* erect, 60–93 mm long, tubular, weakly bilabiate, pale salmon to cream-coloured, often with shell pink or peach on perigone tube and median keels of tepals, unscented; tube straight in proximal half, slightly curved distally, 45–65 mm long, 1.5–2.5 mm diam. at base, widening gradually to 6–8 mm at throat; tepals oblong to subacute, 15–25 × 6–10 mm wide, with a prominent 3–5-veined midrib; outer whorl as wide or wider than inner whorl, shortly mucronate; upper 3 tepals connivent for more than half their length, spreading distally; lower 3 tepals overlapping proximally, spreading widely for more than half their length. *Stamens* biseriate; filaments ± 5 mm long, slightly incurved distally, peach-coloured; outer whorl inserted in throat; inner whorl inserted near proximal third of inner tepals; anthers dorsifixed, oblong, 2 mm long, yellow. *Ovary* ellipsoidal, 5–6 × 2–3 mm, green; ovules axile, ± 12 per locule. *Style* arched against uppermost tepal, reaching as far as outer anthers, incurved distally, pale pink to cream-coloured; stigma minutely 3-lobed, papillate. *Capsule* unknown.

Phenology

Flowering in the population extends from late February to early April. The plants flower most profli-

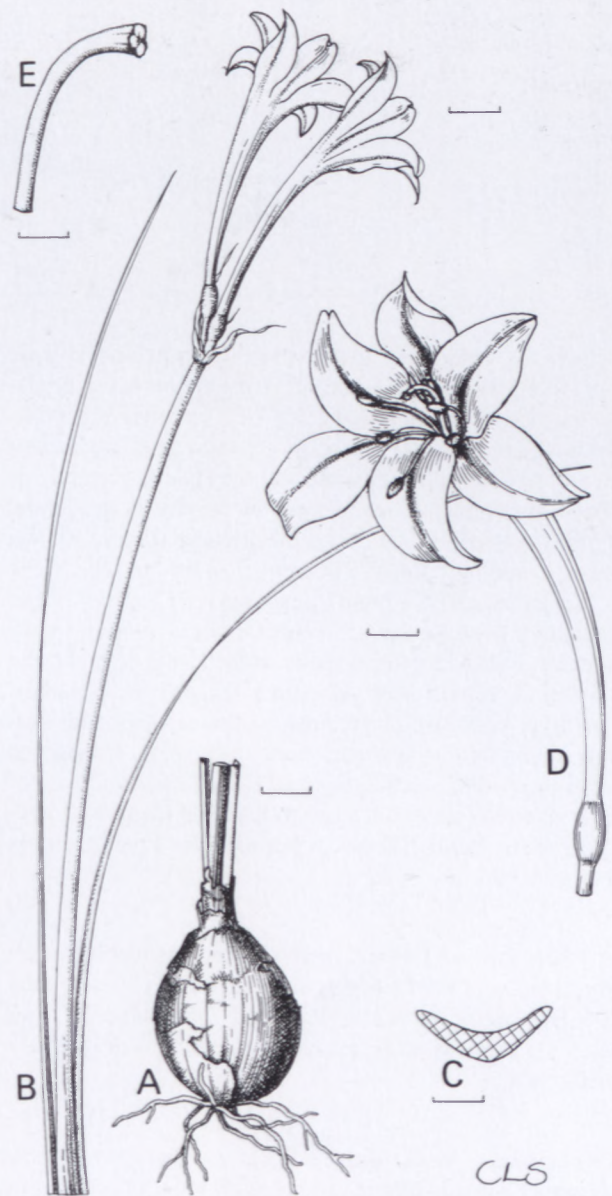


FIGURE 7.—*Cyrtanthus leptosiphon*: A, bulb; B, inflorescence and leaves; C, transverse section through leaf blade; D, flower; E, distal end of style and stigma. Drawn from Goldblatt 10621 by Claire Linder Smith. Scale bars: A–B, 10 mm; C, 1 mm; D, 5 mm; E, 2.5 mm.

cally in recently burnt veld but occasional flowers have been seen in open, partially disturbed, unburned vegetation. The individual flowers of *C. leptosiphon* are short-lived and each lasts up to four days. Mostly the bulbs bloom without their foliage leaves, which emerge at the beginning of summer and rapidly dry off with the onset of autumn.

Diagnostic features

Cyrtanthus leptosiphon is similar to two other Cape species, *C. leucanthus* Schltr. and *C. ochroleucus* (Herb.) Burch. ex Steud. (sensu Dyer 1939 and Reid & Dyer 1984, non Batten & Bokelmann 1966 t. 24:1). All three species have narrow (less than 5 mm wide), hysteranthis leaves and long (50–93 mm), narrow-tubed, cream-coloured or yellowish flowers (sometimes flushed with pink), in

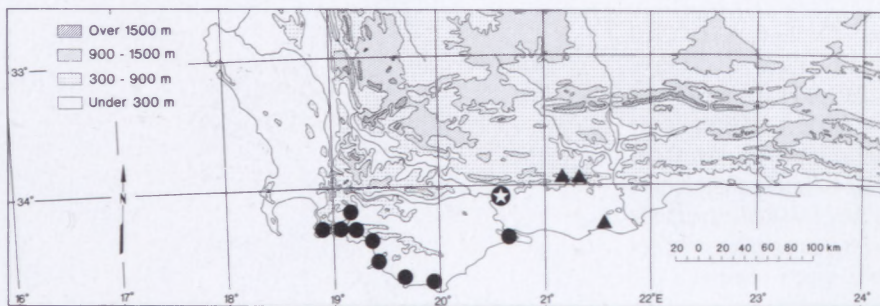


FIGURE 8.—Known distributions of *Cyrtanthus leptosiphon*, \odot , *C. leucanthus*, \bullet , and *C. ochroleucus*, \blacktriangle , based on collections at BOL, NBG, PRE and SAM.

which the tepals are longer than 7.5 mm and slightly spreading. Within this group *C. leptosiphon* is easily distinguished by its short pedicels (3–5 mm long) and weakly bilabiate flowers. Furthermore, the tepals are prominently ribbed with 3–5 veins and the style is minutely 3-lobed. In contrast, *C. leucanthus*, an endemic of the coastal fynbos between Rooiels and the Potberg (Figure 8), has sweet-smelling, cream-coloured flowers in which the tepals are broad (7–13 mm), many-nerved (7 or more), and regularly overlapping. *C. ochroleucus*, a more easterly species, found in neutral sands in the Langeberg and the coastal forelands near Albertinia (Figure 8), has dull-smelling, brownish or greenish yellow flowers with narrow (3–5 mm) tepals, each with 3–5 veins. Unlike the tepal veins of *C. leptosiphon* and *C. ochroleucus*, those of *C. leucanthus* curve outwards to the tepal margins. A synopsis of the floral differences between the three species is given in Table 1.

Other narrow-tubed *Cyrtanthus* species that have bilabiate flowers are *C. fergusoniae* L.Bolus, *C. inaequalis* N.E.Br., and *C. labiatus* R.A.Dyer but unlike *C. leptosiphon* these species are red-flowered and most likely bird-pollinated.

Elsewhere in the genus, floral zygomorphy is also shown to some extent in species with more or less flared flowers. Although the tepals are regularly arranged, the stamens and style arch against the upper tepal in the slightly flared flowers of *C. ventricosus* (Jacq.) Willd., whereas in the group of wide-tubed species comprising *C. clavatus* (L'Hér.) R.A.Dyer, *C. speciosus* R.A.Dyer, *C. loddigesianus* (Herb.) R.A.Dyer, *C. helictus* Lehm., *C. smithiae* Watt ex Harv., *C. thorncroftii* C.H.Wright, *C. galpinii* Baker, *C. sanguineus* (Lindl.) Walp., and *C. eu-callus* R.A.Dyer, the stamens and style curve downwards from within the throat.

Distribution and biology

Records show that *C. leptosiphon* is known from a few isolated populations in marginal fynbos and renosterveld, close to the Buffeljagsrivier, in the foothills of the Langeberg, east of Swellendam (Figure 8). The populations favour pebble-strewn loamy soils along the interface of shale and sandstone of the Table Mountain Group. Other plants in the community are species of Poaceae, *Leucadendron*, *Cliffortia*, *Restio*, *Erica*, and *Rhus*.

In the Langeberg region, several other autumn-flowering species have pale, long-tubed flowers, similar to those of *C. leptosiphon*: notably *Gladiolus bilineatus*, *G. engysiphon*, and several *Pelargonium* species. Goldblatt & Manning (1998) have recorded a species of long-tongued fly, *Prosoeca longipennis* (Loew) (Nemestrinidae), which is active in autumn, foraging for nectar on these species. Although *C. leptosiphon* is probably another member of this guild, a careful search for the pollinator of *C. leptosiphon* and *G. bilineatus* at the Buffeljagsrivier site was unsuccessful. Correspondingly, it has not yet been possible to document the capsule and seeds of *C. leptosiphon*.

When Mr Jan Vlok first collected the species in 1981 he noted that the habitat faced possible demise through man-induced disturbances. In 1999 these conditions were still evident. Accordingly, *C. leptosiphon* is regarded as Vulnerable: C2a in terms of the IUCN Red List Categories and Criteria of 1994.

Unfortunately, like many other deciduous species, *C. leptosiphon* has proved difficult to maintain in cultivation (G.D. Duncan, Kirstenbosch Botanic Garden, pers.comm.).

WESTERN CAPE.—3420 (Bredasdorp): near Buffeljagsrivier, along the road to Suurbraak, (–BA), Goldblatt 10489 (NBG); Goldblatt 10621 (K, NBG, PRE); Viviers 187 (NBG); Buffeljagsrivier, Farm Middenplaas, Vlok 172, 173 (NBG).

TABLE 1.—Comparison of the floral characters that distinguish *Cyrtanthus leptosiphon* Snijman, *C. leucanthus* Schltr., and *C. ochroleucus* (Herb.) Burch. ex Steud.

Characters	<i>C. leptosiphon</i>	<i>C. leucanthus</i>	<i>C. ochroleucus</i>
Pedicel length at anthesis	3–5 mm	7–20 mm	5–15 mm
Floral fragrance	absent	sweet	dull
Tepal arrangement	± bilabiate	regular	regular
Tepal length	15–25 mm	13–24 mm	8–10 mm
Tepal width	6–10 mm	7–13 mm	3–5 mm
Tepal veins	3–5, median only	7 or more, median & lateral	3–5, mostly median
Stigma	minutely 3-lobed	3-branched	shortly 3-branched

Cyrtanthus wellandii Snijman, sp. nov., forma et coloris floris *C. collini* Ker Gawl. similis, praecipue differt floribus parvis (36–42 mm longis), tubo expanso distincte, et stylo brevi (usque ad 9 mm longum). Figura 9.

TYPE.—Eastern Cape, 3324 (Steytlerville): W bank of Kabeljouws River, Farm Misgund, (–DD), 20-2-1997, Snijman 1575 (NBG, holo.; K, PRE).

Deciduous bulbous herb, 200–400 mm tall when flowering. *Bulb* solitary, hypogeal, narrowly ovate, 40–50 mm long, up to 30 mm diam., sometimes extended into a narrow neck up to 10 mm long; outer tunics brown and papery; inner tunics cream-coloured and fleshy. *Leaves* 2 or 3, appearing at or shortly after flowering, linear, up to 190 × 3 mm, suberect to recurved distally, red proximally otherwise light green, deeply channelled adaxially, keeled abaxially; keel mostly three-nerved becoming

one-nerved distally, sometimes minutely papillate. *Inflorescence* 4–7-flowered; scape erect, up to 350 mm long, ± 3–5 mm diam., tapering distally, pale pink to pale green or brownish pink, covered with a grey bloom, hollow from base upwards; spathe valves 2, equitant, narrowly lanceolate, up to 35 × 7 mm, initially pale green, soon becoming brown and reflexed; bracteoles up to 7, narrow, up to 15 mm long; pedicels erect, varying in length, 6–24 mm long at anthesis, 2 mm diam., brownish green. *Flowers* spreading horizontally, 36–42 mm long, funnel-shaped, regular, vermilion to scarlet, ageing to dull red, with 6 faint white streaks leading downwards from tepal sinuses, unscented; tube 23–25 mm long, lower 3–5 mm narrow, up to 2 mm diam., more or less bent at right angles, upper 15–20 mm flaring open to 8–10 mm wide at throat; tepals oblong to oblong-lanceolate, 11–16 × 6–8 mm, outspread at anthesis forming a flat or sometimes slightly recurved rim, 5-veined, soft-textured, without a thickened median rib; outer whorl shortly mucronate, slightly wider than inner. *Stamens* biseriate, regular; filaments ± 1.5 mm long, incurved, white, inserted ± half way up tube, with the inner inserted ± 2.5 mm above outer; anthers dorsifixed, oblong, 1.75 mm long, yellow. *Ovary* ellipsoidal, 5–6 × 3–5 mm, green; ovules axile ± 9 per locule. *Style* straight, up to 9 mm long, remaining in tube, ± 4–5 mm below lowermost stamen insertion, white; stigma 3-lobed, papillate; lobes broad, less than 0.25 mm long. *Capsule* narrowly elliptical, 20 × 7 mm, 3-valved; valves reflexing when dry. *Seeds* black, flattened, wrinkled, 7 × 4 mm.

Phenology

Cyrtanthus wellandii flowers in mid February, often after the foliage leaves, which appear in summer and begin to dry off in autumn. Although its habitat is periodically burned, the flowering of *C. wellandii* is not fire-induced. In cultivation the bulbs flower freely and if kept indoors the individual flowers remain fresh for ± 10 days.

Diagnostic features

Cyrtanthus wellandii is unique in the genus in having a style that remains included in the lower half of the perigone tube, ± 4–5 mm short of the lowermost filament insertion. In floral form and colour, *C. wellandii* is most similar to *C. collinus* Ker Gawl., a species known from scattered collections, in rocky, fynbos communities from the mountains between Genadendal, near Caledon and the Gamka Mountain Nature Reserve, near Oudtshoorn (Figure 10). Both species have equally long tepals (11–16 mm and 9–15 mm respectively) that flare open, although the perigone tube of *C. wellandii* is consistently more flared and usually shorter (23–25 mm) than that of *C. collinus* (23–30 mm). Moreover, several other subtle floral characters separate the species. The tepals of *C. wellandii*, which remain outspread until the entire flower collapses, are 5-veined in both whorls, whereas in *C. collinus* the tepals flare initially but readily become connivent before the flower collapses; the outer tepals are 3–5-veined, while the inner tepals are only 3-veined. Finally, whereas *C. wellandii* has a stigma with three, broad lobes of less than 0.25 mm long, the stigma of *C. collinus* is distinctly tripartite, with narrow branches up to 1 mm long.

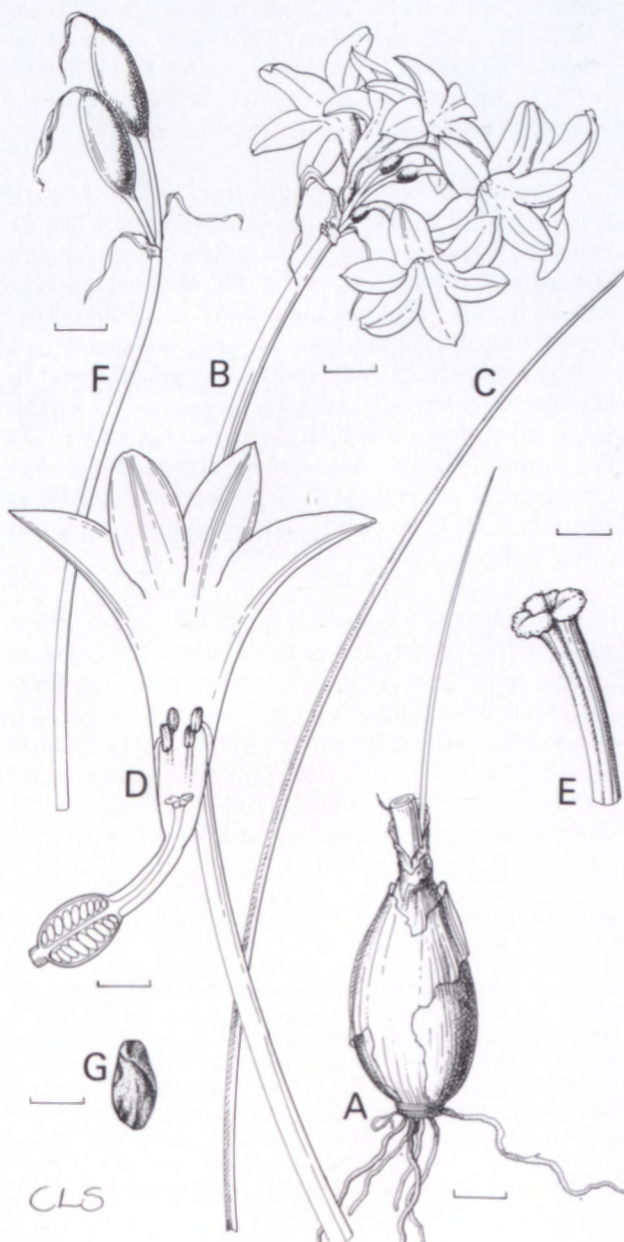


FIGURE 9.—*Cyrtanthus wellandii*: A, bulb and young leaf; B, inflorescence; C, mature leaf; D, flower; E, distal end of style and stigma; F, infructescence; G, seed. Drawn from Snijman 1575 by Claire Linder Smith. Scale bars: A–C, F, 10 mm; D, G, 5 mm; E, 2 mm.

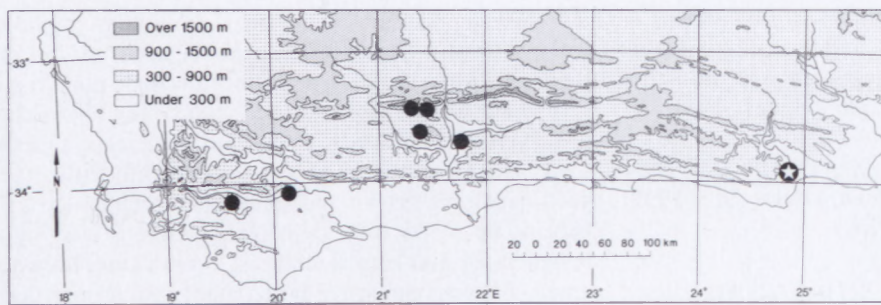


FIGURE 10.—Known distributions of *Cyrtanthus wellandii*, ☆; and *C. collinus*, ●, based on collections at BOL, NBG, PRE and SAM.

Many protandrous flowers are known to have short styles in the early stages of floral development. The style of *C. wellandii*, however, remains short through all its stages. As yet, little is known about the species' breeding biology. However, in the absence of hand-pollination, the few plants that have been grown under cover have not produced seeds. Although these observations are preliminary, they suggest that the short, included style of *C. wellandii* is not associated with selfing.

Distribution and habitat

Cyrtanthus wellandii is known only from a single population on the coastal forelands overlooking the Kabeljous River Valley in the Hankey District (Figure 10). The population, which appears to face no immediate threat, is locally abundant in well-drained loamy soils, amongst occasional quartzite rocks. Due to its small area of occupancy the species has been assessed as belonging to the IUCN category: Vulnerable D2.

As the Kabeljous River cuts across the coastal forelands, it passes through several geological formations, mainly the shales and sandstones of the Table Mountain Group and the Enon Conglomerates of the Uitenhage Group. Thus the Hankey region has diverse soils, each with their own nutrient and moisture status, which support a complex mixture of vegetation types. The area of the Kabeljous River valley where *C. wellandii* is found receives less than 500 mm rain per annum, predominantly in early summer and autumn (J.J. du Plessis pers. comm.). The population occurs in association with *Elytropappus rhinocerotis* (L.f.) Less., and species of *Tetaria*, *Aspalathus*, *Bobartia*, *Argyrolobium*, and Poaceae, in a community which Cowling (1984) describes as Hankey Coast Renosterveld.

Etymology

Cyrtanthus wellandii commemorates Mr Welland Cowley of Port Elizabeth, who first discovered the species in 1996 and subsequently brought this highly ornamental plant into cultivation, mainly from seed.

EASTERN CAPE.—3324 (Steytlerville): W bank of Kabeljous River, Farm Misgund, (–DD), Cowley s.n. (NBG); Snijman 1575 (K, NBG, PRE).

Cyrtanthus collinus Ker Gawl.

Cyrtanthus collinus has been interpreted in a variety of ways since Ker Gawler (1816) first described the species.

Baker (1896) included specimens from both the Western Cape (Baviaanskloof, Genadendal, Burchell 7783) and Eastern Cape (Zuurberg Range, Cooper 3223) within his circumscription, whereas Dyer (1939) included specimens only from the Western Cape in his treatment of *C. collinus*. In the most recent revision of the genus, Reid & Dyer (1984) cited the provenance of the holotype of *C. collinus* (Burchell 7783, K) as 'Uitenhage district', as did Baker (1888). Accordingly, Reid & Dyer (1984) used a photograph of an Eastern Cape plant, collected by G. Skinner (PRE37826) from the Grootrivier, between Armandsvriend and Hedley Road, to illustrate the species.

An examination of Burchell's hand-written label on the holotype of *C. collinus* has since confirmed that the collection comes from the Baviaanskloof Mountain near Genadendal, in the Caledon District. Moreover, several specimens that match the holotype of *C. collinus* have been collected from this area. In particular, Rourke 330 (NBG) and Snijman 1666 (NBG) are accompanied by photographs which show that the flowers of *C. collinus sensu stricto* have a trifid style that arches against the upper tepal. This is in contrast to the deflexed position of the style seen in the flowers of G. Skinner (PRE37826), which Reid & Dyer (1984: fig. 3) used to depict their concept of *C. collinus*.

In conclusion, although field studies on population variation and pollination mechanisms are needed to expand upon these preliminary observations, the floral characters that distinguish *C. collinus sensu stricto* suggest that the Eastern Cape plants, which have been called *C. collinus* in accordance with Reid & Dyer's treatment (1984), may well have other affinities and may yet be shown to belong to *C. staadensis* Schönland *sensu lato*.

Specimens examined

WESTERN CAPE.—3321 (Ladismith): southern slopes of Klein Swartberg, (–AD), Vlok 139 (NBG); Seven Weeks Poort, Wurts 1328 (NBG); Calitzdorp, Rooiberg on Bailey's Peak, (–BC), Vlok 138 (NBG); Gamka Mountain Nature Reserve, (–DB), Erasmus 145 (NBG). 3419 (Caledon): Baviaanskloof near Genadendal, (–BA), Burchell 7783 (K); Gillett 862 (BOL); Genadendal, Kanonkop, Esterhuysen 35618 (BOL); Rourke 330 (NBG); Greyton, below Uitkykkop, Snijman 1665 (NBG); Greyton, Paardekop Peak, Stokoe s.n. (BOL7422, SAM55864); Zinn s.n. (SAM55721). 3420 (Bredasdorp): Riviersonderend, lower south east slopes of Dasberg, (–AA), Taswell Yates sub Manning 1085 (NBG).

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