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Dyschoriste Nees (Acanthaceae: Ruellieae) — Clarification of species previously recognised in *Chaetacanthus* Nees and two threatened new species from South Africa

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ABSTRACT

Chaetacanthus was described to accommodate species of *Dyschoriste* that had two stamens and two staminodes rather than four stamens. Four species had names in *Chaetacanthus*, but those names have been widely misapplied and very many herbarium specimens and iNaturalist observations have been wrongly identified. The identity and circumscription of the previously named taxa are clarified to lay a foundation on which a revision of species previously regarded as *Chaetacanthus* can be based. Habit, leaf size and shape, corolla morphology and types and distribution of hairs are important characters for recognising species in the group. Two of the several undescribed species are described to facilitate their protection, as a threat status of Critically Endangered is recommended for both.

1. Introduction

Chaetacanthus Nees was described in 1836 to accommodate species where the ovules were situated near the middle (rather than nearer the base) of the capsule, where the calyx lobes were longer (rather than much shorter) than the tube and where there were two rather than four stamens but were otherwise similar to *Dyschoriste* Nees (Nees, 1836). With this circumscription, *Chaetacanthus* was endemic to South Africa, although some material subsequently was collected in adjoining Zimbabwe and Mozambique. Clarke, in *Flora capensis* (Clarke, 1901), used only the difference in the number of stamens to differentiate between the genera and introduced that *Chaetacanthus* may also have two staminodes with or without rudimentary anthers. In addition, common species of *Chaetacanthus* were usually herbaceous and had white flowers, whereas common species of *Dyschoriste* were suffrutescent or shrubs with more colourful flowers (pers. obs.). However, there are suffrutescent species of *Dyschoriste* in tropical Africa and America and *D. radicans* Nees and *D. hildebrandii* (S.Moore) S.Moore are recorded to have flowers with two stamens, two stamens and two staminodes, and four stamens on the same specimen (Vollesen, 2013) and thus *Chaetacanthus* was formally subsumed into *Dyschoriste* by Manning and Goldblatt (2012).

The first key to distinguish between the species of *Chaetacanthus* was that of Clarke (1901), where he used leaf size and shape of the leaf tip as

the first character and then indumentum on the calyx lobes to distinguish the species. Of the species that are included in *Flora capensis*, those that occur in Western Cape through to Eastern Cape are sprawling herbs or shrublets with small leaves that flower without fire, whereas those that occur from Eastern Cape northwards are herbaceous, have larger leaves, occur in grassland and flower prolifically after fire but only sporadically in summers that are not preceded by fire. These characters are not obvious from herbarium specimens and Clarke (1901) has cited specimens from the two regions that have similar calyx indumentum under the same species, which has caused considerable confusion.

As a prelude to determining the species limits of many undescribed entities within the species of *Dyschoriste* with two stamens and to preparing a revision of the genus, this paper aims to clarify and characterise the species that were previously recognised in *Chaetacanthus*. As many taxa have been confused with *D. setigera* and *D. glandulifera*, it is prudent to deal with those species first, followed by the other known species. In addition, two new species that are threatened by urban expansion and development are described as a step in their protection.

2. Material and methods

Specimens: Herbarium specimens were consulted at J (abbreviations follow Thiers 2025 [continually updated]) and material was borrowed

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from BM, HSMC, JRAU, MO, NH, NU, PRE, PRU, PUC and UFH. More recent specimens at PRE were photographed. Other herbaria (e.g. E, K, MO and RSA) are those to which J distributes duplicates. Some types were on loan to J, some were seen in the herbaria where they are housed and some were viewed on JSTOR Global Plants (<https://plants.jstor.org/>).

Measurements: All measurements are based on dried material and mature organs were measured to avoid confusion from developmental plasticity. Flowers were softened in Windowlene and dissected to observe internal morphology and for measurements. Features less than 2 mm were measured under a Wild Heerbrugg dissecting light microscope. Ranges are the smallest and the largest measurements made — specimens were spread out and a few that looked smallest or largest for particular features were measured to obtain the range.

Micromorphology: Hair types and distributions were studied using a Wild Heerbrugg dissecting light microscope at magnification 50×.

Terminology: Descriptive terms follow the definitions of Jackson (1953) and Radford et al. (1974).

Arrangement of species: The six species are arranged beginning with the two most widely misapplied names, followed by the other two

described taxa (in alphabetical order), concluding with the two new species (in alphabetical order).

Conservation Status: Conservation status (extinction risk) was appraised using the Categories and Criteria of the IUCN Red List (IUCN 2012) and the guidelines for their use (IUCN Standards and Petitions Subcommittee, 2024). Extent of occurrence (EOO) was calculated using area polygons inserted on Google Earth and GeoCAT (<https://geocat.iucnredlist.org/>) with cell width set to 25 km, as the data are centroids of quarter degree squares. Criteria for the South African National Categories were found at <http://redlist.sanbi.org/redcat.php> (SANBI, 2025) and accessed on 29 August 2025.

3. Results

Morphology: The species that occur in the southwest of the distribution of the genus (i.e. restricted to Western and Eastern Cape) grow as sprawling herbs or micro-shrubs that flower regardless of whether or not there has been fire in the previous season whereas the currently known species that have two stamens that occur to the north and east are herbaceous and resprout after fire and flower prolifically. *Dyschoriste*

Table 1
Comparison of characters of South African species of *Dyschoriste* with two stamens. Species with four stamens and many as yet undescribed species are excluded.

Character	<i>D. setigera</i>	<i>D. glandulifera</i>	<i>D. burchellii</i>	<i>D. costata</i>	<i>D. stolonifera</i>	<i>D. tshwanensis</i>
Indumentum on young stems	short retrorse soft-walled eglandular hairs	very dense short retrorse thick-walled ornamented eglandular hairs and occasional taller gland-tipped hairs	dense with retrorse ornamented eglandular hairs	dense with retrorse soft-walled eglandular hairs	many multicellular retrorse eglandular hairs	dense patent straight ornamented eglandular hairs to 0.4 mm long and some gland-tipped hairs to 0.5 mm long
Indumentum on leaves	usually glabrous, sometimes with a fringe of hairs	stalked gland-tipped hairs up to 0.5 mm long and shorter fine eglandular hairs	collapsing eglandular trichomes up to 1.5 mm long forming dense fringe and occasional on veins and surface	sparse eglandular trichomes on margins and veins	pin-headed glandular trichomes on the lower surface	dense non-collapsing eglandular hairs up to 0.2 mm long interspersed with gland-headed hairs up to 0.4 mm long
Leaf shape	elliptic to almost round	broadly elliptic to almost round	elliptic	lanceolate to narrowly elliptic	elliptic to obovate with long-tapering base	elliptic
Leaf size	5–11 × 4–9 mm	4–13 × 4–8.5 mm	12–25 × 4.5–18 mm	10–18 × 3–8 mm	15–24 × 6–9 mm	6–13 × 3–8 mm
Petiole length	0.5–1.3 mm	1–1.5 mm	1–4 mm	1–2.5 mm	3–7 mm	0.5–2.5 mm
Bracteole shape	subulate	leaflike	narrowly elliptic	narrowly lanceolate	linear	narrowly elliptic
Bracteole size	about 2 × 0.2 mm	about 5.5 × 1.5–2 mm	3–6 × 0.4–2 mm	9–14 mm long	7 × 0.7 mm	5.5–7 × 2–2.2 mm
Calyx length	9.5–10.5 mm	about 11.5 mm	12–15 mm	8–12 mm	10.5–13 mm	8–9 mm
Indumentum on calyx tube	very sparse eglandular hairs	dense gland-headed hairs	small, retrorse ornamented hairs	glabrous	mainly eglandular appressed hairs	dense slightly retrorse or patent collapsing eglandular hairs
Indumentum on calyx lobes	glabrous or with eglandular hairs distally	many gland-headed hairs	common patent white hairs to 1.2 mm long	glabrous	mainly long stalked gland-tipped hairs	patent collapsing eglandular hairs and patent gland-tipped hairs
Corolla colour	white or cream, occasionally pale lilac	white, tinged with pale mauve	white, occasionally pale lilac	usually white, occasionally pale lilac	white flushed lilac or lilac with mauve stripes or speckles	white or cream
Corolla length	about 13 mm	about 17 mm	about 17.5 mm	about 14 mm	19–23 mm	about 14.5 mm
Corolla upper lobes size	about 3.2 × 1.6 mm	about 2.5–3 × 2 mm	about 2.5 × 1.6 mm	about 2 × 1.5 mm	7–8 × about 2.5 mm	about 3 × 2 mm
Corolla lower lobes size	about 4 × 1.8 mm	about 3.5–4 × 2–2.2 mm	about 3 × 2.5 mm	about 2 × 1.5 mm	7–8.5 × 3–3.5 mm	about 4 × 2.5 mm
Filament indumentum	sparse, short slightly retrorse broad-based hairs	sparse, short slightly retrorse broad-based hairs	glabrous	sparse, short retrorse hairs	glabrous	glabrous
Base of anther	with minute spur	with minute hooked spur	with minute peg	with minute, blunt tail	shortly spurred	with minute peg
Staminode size	0.1–0.5 mm long	about 0.2 mm long	about 0.4 mm long	to 1.5 mm long	1.4 mm long	minimal
Capsule size	about 8 × 1.8 × 1.7 mm	about 10 × 2.4 × 2.3 mm	about 11 × 2.6 × 2.1 mm	about 9 × 2.5 × 2 mm	about 11 × 2.5 × 2 mm	about 10 × 2.5 × 2 mm
Seed size	about 1.9 × 1.5 mm	about 2.3 × 2.1 × 0.3 mm	about 2.5 × 2 × 0.4 mm	about 2.2 × 2 × 0.9 mm	about 2.2 × 1.8 mm	Not seen
Distribution	Eastern and Western Cape	Eastern and Western Cape	Zimbabwe, Mozambique, South Africa and Eswatini	Limpopo, North West, Gauteng and Mpumalanga	KwaZulu-Natal	Gauteng
Phenology - Flowering	Sep to Mar	Sep to Mar	Sep to Jan (July)	Sep to Feb	Sep to Dec	Sep to Mar
Suggested Threat Status	Least Concern	Near Threatened	Least Concern	Least Concern	Critically Endangered	Critically Endangered

stolonifera is unique in that it has above-ground stolons. The south-western species (*D. setigera* and *D. glandulifera*) have smaller leaves (i. e. 4–13 × 4–9 mm, whereas the leaves of *D. burchellii*, *D. costatus* and *D. stolonifera* are larger (10–25 × 3–18 mm) and those of *D. stolonifera* are tapered at the base (Table 1). The shape and size as well as the presence or absence of a lamina of bracteoles is also characteristic of some species (e.g. the bracteole of *D. stolonifera* is subulate; Table 1).

Corolla size and the ratio of lip length to tube length distinguishes species (e.g. *D. stolonifera*, which has larger corollas (Table 1) and proportionately longer lips). Stamines may be absent in some species, but are usually present as very small (up to 1.5 mm long) structures on the upper edge of the filament curtain between the stamen and the corolla — they may be variable within flowers and within species.

Indumentum: The types of hairs and their distribution are characteristic (Table 1). Hairs may be eglandular or may have glandular heads. Some hairs are straight, while others may be curved. Some collapse when specimens are dried, suggesting they are thin-walled, whereas others do not collapse, suggesting they have thicker walls. Some have what appear to be transparent walls, whereas others are ornamented (i. e. have walls with rough outer surfaces that are opaque). The types of hairs that occur on stems, leaf margins and veins, leaf surfaces, bracts, bracteoles, calyx tube, calyx lobes and filaments may be different and, in combination, may be diagnostic of species.

Conservation status: Of the species treated in this paper, three are of Least Concern, one is Near Threatened and the two newly described species are Critically Endangered (Table 1), largely due to the effects of urban expansion and concomitant habitat fragmentation and degradation.

Using morphology and indumentum, it is possible to circumscribe many more species of *Dyschoriste* with two stamens than are currently recognised. These features can be used to clarify the circumscription of the described species. Once the species are known, their geographical distributions can be determined.

4. Taxonomy

1. *Dyschoriste setigera* (Pers.) J.C.Manning & Goldblatt, *Strelitzia* 29: 789, 125 (2012) [*non* Vollesen in *Fl. Zambes.* 8 (5): 135 (2013)]. *Ruellia aristata* Thunb., *Prodr. Pl. Cap.* 2: 104 (1800), nom. illeg. [*non*. *R. aristata* Vahl (1791)]. *Ruellia setigerus* Pers., *Syn. Pl.* [Persoon] 2(1): 176 (1806) [as replacement name]. *Chaetacanthus setiger* (Pers.) Lindau, *Bot. Jahrb. Syst.* 18(1–2): 38 (1893); in *Engl. et Prantl, Naturl. Pflanzenfam.* iv. 3b (1894) 302; in *Engl. Pflanzenw. Ost-Afr. C.* (1895) 367. *Chaetacanthus persoonii* Nees, *Linnaea* 15: 357 (1841); in *Prodr.* [A.P. de Candolle] 11: 462 (1847); Clarke in *Fl. Cap.* [Harv.] 5,1: 18 (1901), nom. superfl. *Chaetacanthus persoonii* var. *aristata* Nees in *Prodr.* [A.P. de Candolle] 11: 462 (1847). Type: South Africa, without locality, *Thunberg s.n.* (SBT13280—Global Plants!, holo.).

Chaetacanthus persoonii var. *grossus* Nees, *Linnaea* 15: 357 (1841). Type: South Africa, near Grahamstown, Bothasberg, *Ecklon* (GZU000249764—Global Plants!)

Upright to sprawling multi-stemmed herb to micro-shrublet that resprouts after fire, 70 to 300 mm tall, plants flower regardless of fire; stems initially erect and then sprawling, up to 250 mm long and initially 1 mm, but thickening to 4 mm in diam. at the internodes, young stems square in cross-section with angles, dense with short retrorse soft-walled eglandular hairs on two of the four faces and with dense linear cystoliths of about 0.25–0.35 mm long on the other faces; older stems eventually with beige bark. *Leaves* usually glabrous and with cystoliths visible in lower surface when dry, sometimes with a fringe of hairs, these sometimes long, dense and collapsing, sometimes shorter and not collapsing; lamina elliptic to almost round, 5–11 × 4–9 mm, rarely with sparse long gland-tipped hairs; apex rounded, sometimes obtuse; margin entire; base rounded to broadly cuneate; midrib raised below, 2–3 secondary veins

on each side of the midrib slightly raised below; petiole 0.5–1.3 mm long. *Flowers* single or in 3-flowered cymes, produced near the tips of branches; bracts subtending inflorescences leaflike; bracteoles subulate, about 2 mm long, with cystoliths and sometimes with a few wispy hairs on tips. *Calyx* 9.5–10.5 mm long, with very sparse eglandular hairs on tube and proximally on lobes and glabrous distally or with many eglandular hairs distally sometimes with 1 or 2 wisps at the apex; tube about 2.0–2.5 mm long, membranous between lobes at anthesis, with cystoliths as fruit matures, lobes 8–9.5 mm long, splitting to base and persistent once capsules have dehisced, enclosing marked persistent stipe base about 0.5 mm long. *Corolla* tubular below, 2-lipped above, zygomorphic, usually white or cream, occasionally pale lilac, about 13 mm long; tube about 9.5 mm long, about 1 mm in diam. at base and widening to about 2 mm in diam. at throat, straight, with retrorse eglandular hairs, especially near the throat and on the outer surfaces of the lobes; upper lip about 3.5 mm long, with 2 erect lobes, lobes oblong, about 3.2 × 1.6 mm; lower lip about 3.5 mm long with 3 deflexed lobes, lobes oblong, about 4 × 1.8 mm. *Stamens* 2; staminodes 2; filament curtain attached for length of tube and filaments free from about 4 mm below where lips diverge, filaments with sparse, short slightly retrorse broad-based hairs; anthers about 1 × 0.7 mm, with minute spurs; staminodes variable within a flower, 0.1–0.5 mm long, without anthers. *Style* with eglandular, antrorse, hairs; stigma single-lobed, about 0.9 mm long, slightly wider than style. *Capsule* about 8 × 1.8 × 1.7 mm, glabrous, golden brown. *Seeds* about 1.9 × 1.5 mm, densely clothed in white coagulated hairs when dry. *Figs.* 1A–C, 2A & 3A.

Nomenclatural Notes: *Chaetacanthus persoonii* var. *grossus* is based on a specimen with a high level of infection of the calyx. This type of infection (Fig. 3A inset) occurs sporadically through several species and is present on the type of the *D. setigera*. The name *Ruellia aristata* Thunb. appears on the back of the type sheet, which is only visible in the pdf option on Global Plants.

Etymology: The epithets *setigera* and *aristata* refer to the seta-like calyx lobes, especially once the capsule has been shed, and *persoonii* was named for Christiaan Hendrik Persoon (1761–1836) who was a mycologist at the Cape and provided the epithet *setigera*. The swollen and misshapen infected calyces led to the epithet *grossus*. The name has been widely misapplied throughout southern Africa (including Zimbabwe and Mozambique) through misidentification of members of the described species (including *D. glandulifera* and *D. burchellii*) as well as misapplication to widespread species that are as yet undescribed.

Diagnostic characters: *Dyschoriste setigera* is a herb or micro-shrub with perennial stems that is restricted to Western Cape and Eastern Cape. The leaves are elliptic to almost round and smaller than those of most other species (5–11 × 4–9 mm) and the apex is rounded or sometimes obtuse. The calyces are usually longer than the bracts that subtend them and they bear sparse eglandular hairs on the tube and proximally on the margins of the lobes and lobes are glabrous distally.

Distribution and Ecology: Occurs from Gqutyini in the northeast, southwards to Gxarha [Morgans Bay] in Eastern Cape and westwards to Mossel Bay in Western Cape (Fig. 4). Habitats noted on herbarium sheets include dry grass / fynbos savanna, coastal rhenosterveld, grassy slopes near the sea, grassveld on Witteberg quartzites and rocky ridges.

Phenology: Specimens have been collected in flower and in fruit from September to March.

Conservation Notes: This circumscription of the species means that it is much more restricted in distribution than previously thought and thus the published threat status (Kamundi, 2006a) requires reappraisal. A polygon on Google Earth enclosing the known localities provides an Extent of Occurrence (EOO) of about 34,000 km² in area, whereas GeoCAT provides an EOO of 61, 824 km² and calculates the Area of Occupancy (AOO) as 10,000 km² and suggests the species is Least Concern. Of the 21 specimens with dates that are available, two were collected before 1900, 11 before 1975, seven between 1975 and 1999 and only one since 2000. Although the available data suggest that a threat category of Least Concern is appropriate, a more rigorous

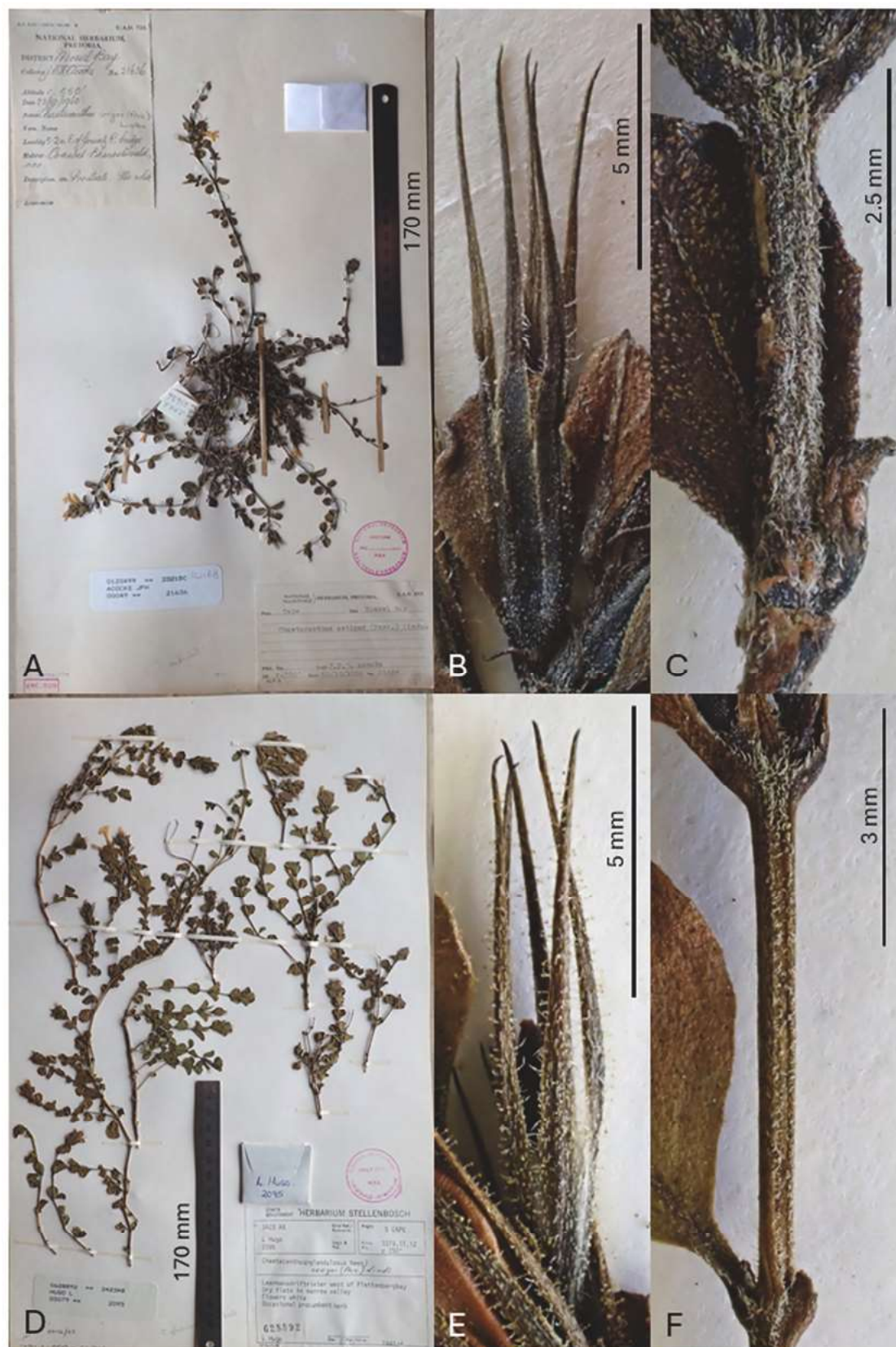


Fig. 1. Habit, calyx morphology and indumentum and stem indumentum. A–C. *Dyschoriste setigera*; D–F. *D. glandulifera*. Vouchers: A–C. Acocks 21,636 (PRE); D–F. Hugo 2095 (PRE).

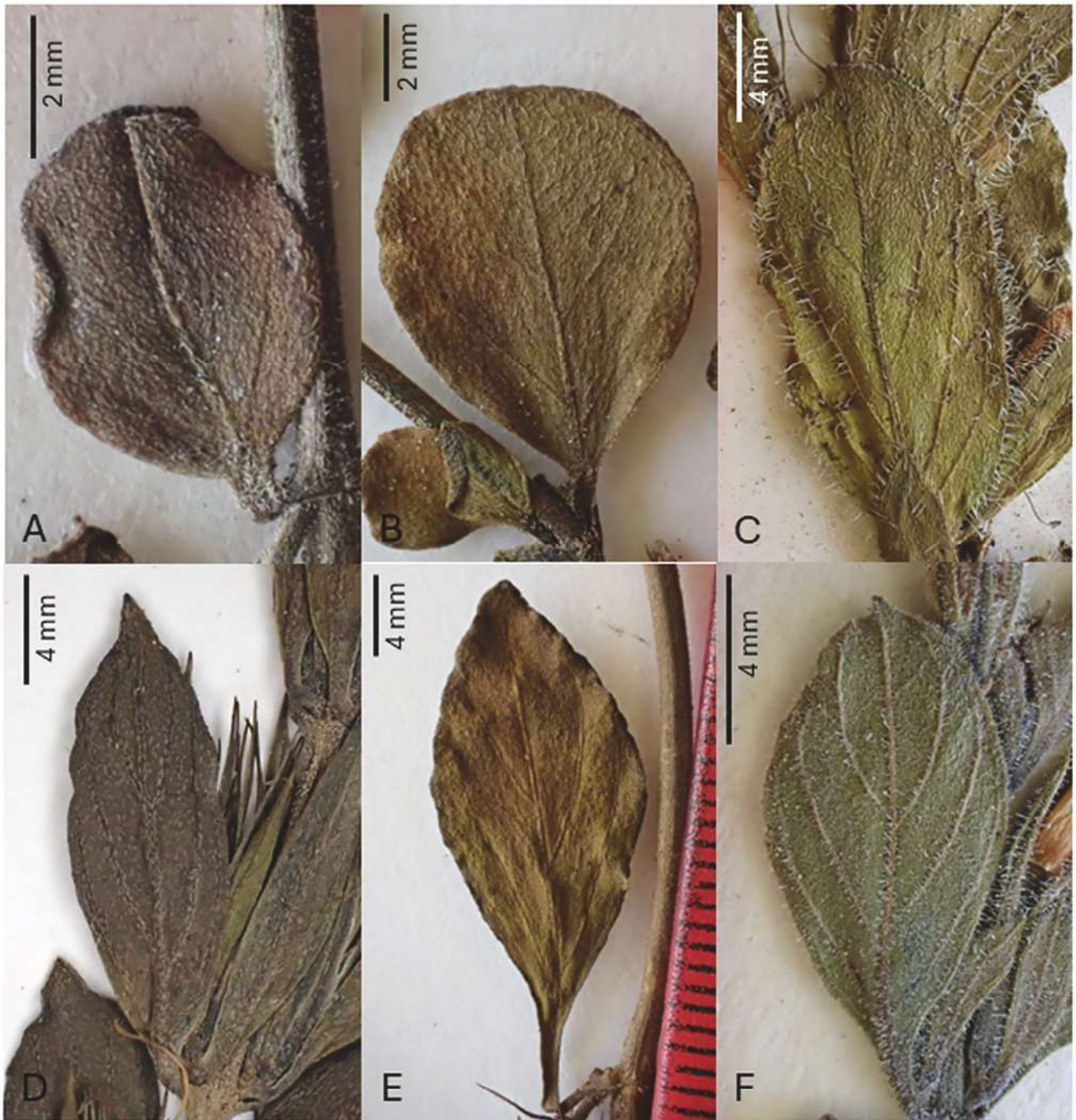


Fig. 2. Leaves of *Dyschoriste*. A. *D. setigera*; B. *D. glandulifera*; C. *D. burchellii*; D. *D. costata*; E. *D. stolonifera*; F. *D. tshwanensis*. Vouchers: A. Acocks 21,636 (PRE); B. Hugo 2095 (PRE); C. McMurtry 10,861 (HSMC); D. Merxmüller 209 (MO); E. Edwards 421 (NU); F. van Wyk 2458 (PRE).

assessment is required.

4.1. Additional specimens examined

South Africa. EASTERN CAPE. **3127 (Lady Frere):** Between Indwe & Lady Frere, 1130 m (–CB), 11 Jan 1997, *Germishuizen* 8793A (PRE); Elliot Region, Gqutyini, NW of Engcobo, below Ntsimbini Peak, 1210 m (–DB), 31 Oct 1997, *Victor* 2371 (PRE). **3226 (Fort Beaufort):** Hill-andale road, Faraway Farm (–BC), 16 Jan 1986, *Cadman* et al. 3183 (J, NU); Fort Beaufort, Gaga Valley, 518 m (–DD), 10 Mar 1943, *Giffen* 1935 (PRE); Fort Hare, near bridge over Tyumie River, 525 m (–DD), 10

Nov 1939, *Giffen* 260 (PRE, UFH). **3227 (Stutterheim):** Cathcart, Thomas River, N of Ailsa (–AC), 15 Nov 2001, *Hoare* 3200 (PRE); Stutterheim Division, Dohne Research Station (–CB), 10 Sep 1942, *Acocks* 9054 (PRE); Kingwilliamstown (–CD), Oct, *Sim* 4138 (PRE). **3228 (Butterworth):** Komga district, Morgans Bay, first hill from sea (–CB), 20 Mar 1992, *Moss* 2436 & 2437 (J); Kwenqura River Mouth, 15 m (–CC), 23 Dec 1900, *Galpin* 5802 (PRE). **3325 (Port Elizabeth):** Ouboskloof (–BC), 18 Dec 1986, *van Wyk & van Wyk* 1892 (PRE); Uitenhage district, Groendal Wilderness Area, Nounek, upper Swartkops River Basin, Kwazunga, 525 m (–CA), 17 Dec 1973, *Scharf* 1062 (PRE). **3326 (Grahamstown):** Alexandria district, Bushmans River Poort



Fig. 3. Habit of species of *Dyschoriste*: A. *D. setigera* (inset is of galled flowers); B. *D. glandulifera*; C. *D. burchellii*; D. *D. costata*. Photographers: A. Sally Adam; B. Nicola van Berkel; C. Jacqueline Wetselaar; D. Richard Gill.

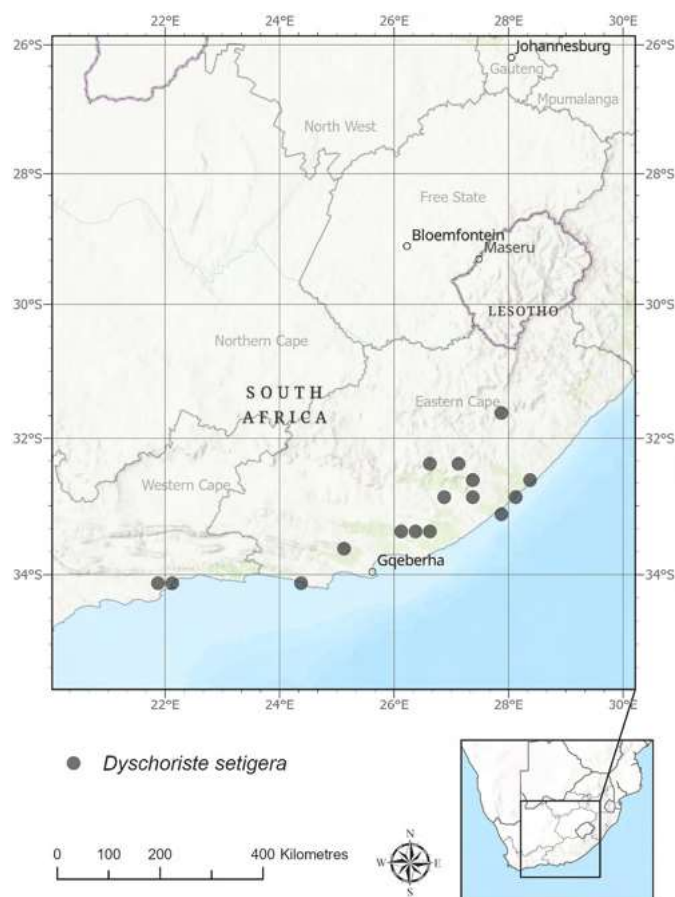


Fig. 4. Distribution of *Dyschoriste setigera* based on herbarium specimens. Cartographer: M. Lötter.

Heights, 155 m (–AC), 26 Dec 1955, *Archibald* 6117 (PRE); Grahamstown district, Faraway, about 2 km from turnoff on main road to Highlands (–AD), 16 Dec 1980, *Germishuizen* 1548 (PRE); Grahamstown, Kowie road, above toll, 615 m (–BC), Oct 1888, *Galpin* 279 (PRE). **3327 (Pieddie):** East London (–BB), Dec 1917, *Breijer sub Transvaal Museum Herbarium* 17,162 (PRE). **3424 (Humansdorp):** Humansdorp division, Rietvlei Flats (–AB), 11 Nov 1941, *Esterhuysen* 6610 (MO, PRE). WESTERN CAPE. **3421 (Riversdale):** Mossel Bay district, 8.3 km [5.2 miles] E of Gouritz River bridge, 165 m (–BB), 23 Oct 1960, *Acocks* 21,636 (PRE). **3422 (Mossel Bay):** Mossel Bay district, Gouritz Valley (–AA), Sep 1960, *Horn sub PRE39903* (PRE); Swellendam, Gouritz River, Jan 1839, *Krauss* 1639 (MO). WITHOUT LOCALITY. *Zeyher* 1403 (PRE).

2. *Dyschoriste glandulifera* K.Balkwill nom. nov. pro *Chaetacanthus glandulosus* Nees in Prodr. [A.P. de Candolle] 11: 462 (1847); Clarke in Fl. Cap. [Harv.] 5,1: 19 (1901) [non *Dyschoriste glandulosa* Kuntze (1891)]. Type: South Africa, Enon, Bergplätze, 1000–2000 Fuss Höhe, Nov, *Drège Eranthemum obovatum b* (GZU000249762—Global Plants!, lecto., here designated; GZU000249761—Global Plants!, MO!, S09–1946 left hand specimen only—Global Plants!, isolecto.).

Upright to sprawling multi-stemmed herb to micro-shrublet that resprouts after fire, 90 to 220 mm tall, plants flower regardless of fire; stems initially erect and then sprawling, up to 240 mm long and initially 1 mm in diam. but thickening to 3 mm in diam. at the internodes, young stems squarish in cross-section with rounded angles and a broad groove on two faces, very dense with short retrorse thick-walled ornamented eglandular hairs and occasional taller gland-tipped hairs on all faces; older stems round in cross-section, with greyish beige bark. *Leaves* with stalked gland-tipped hairs up to 0.5 mm long and shorter fine eglandular

hairs on both surfaces when young and with curved, thick-walled ornamented trichomes and occasional glandular trichomes and with broadish cystoliths about 0.3 mm long when older; lamina broadly elliptic to almost round, 4–13 × 4–8.5 mm; apex rounded, sometimes obtuse; margin entire; base rounded to broadly cuneate, sometimes attenuate; midrib slightly raised below; petiole 1–1.5 mm long. *Flowers* single or in 3-flowered cymes, produced near the tips of branches; bracts subtending inflorescences leaflike with stalked gland-tipped hairs up to 0.5 mm long and shorter fine eglandular hairs on both surfaces; bracteoles leaflike, about 5.5 × 1.5–2 mm, with dense long-stalked gland-headed hairs. *Calyx* about 11.5 mm long at anthesis and up to 15 mm long in fruit, with dense gland-headed hairs on the tube and many gland-headed hairs on the lobes; tube about 2.5 mm long, membranous between lobes; lobes about 9.5 mm long, splitting to base and persistent once capsules have dehisced. *Corolla* tubular below, 2-lipped above, zygomorphic, usually white, tinged with pale mauve, about 17 mm long; tube about 13 mm long, about 1.5 mm in diam. at base and widening to about 2 mm in diam. at throat, slightly arcuate, with slightly retrorse soft-walled eglandular and gland-tipped hairs in the upper third of the tube and around the throat and soft-walled eglandular hairs on the outer surfaces of the lobes; upper lip about 5 mm long, with 2 erect lobes, lobes oblong, about 2.5–3 × 2 mm; lower lip about 5–6 mm long with 3 deflexed lobes, lobes oblong, about 3.5–4 × 2–2.2 mm. *Stamens* 2; staminodes 2; filament curtain attached for length of tube and filaments free from where lips diverge for about 2 mm, filaments with sparse, short slightly retrorse broad-based hairs; anthers about 1.2 × 0.8 mm, with minute hooked spur; staminodes about 0.2 mm long. *Style* with eglandular, antrorse hairs; stigma single-lobed, about 1.3 mm long, slightly wider than style. *Capsule* about 10 × 2.4 × 2.3 mm, glabrous, golden brown. *Seeds* about 2.3 × 2.1 × 0.3 mm, densely clothed in white coagulated hairs when dry. Figs. 1D–F, 2B & 3B.

Nomenclatural notes: *Chaetacanthus glandulosus* has been treated as a synonym of *Dyschoriste setigera* (previously *Chaetacanthus setiger*), but differs by the glandular hairs present on the calyx and young leaves. *Dyschoriste glandulosa* Kuntze (now a synonym of *Dyschoriste serpyllifolia* (Nees) Benoist from Madagascar) means that a new name must be provided for this taxon. The Drège specimens designated *Eranthemum obovatum b* by Drège were from two localities, i.e. V, a, 17 and V, a, 22 and one has more gland-tipped hairs than the other. Thus, the specimens distributed under this designation are of two gatherings. I have chosen GZU000249762 as lectotype as it fits Nees's description "dense glanduloso-pubescent" better. The TUB-004,288 and the right hand specimen of S09–1946 are from the second locality and are thus syntypes.

Etymology: *Glandulifera* means glandular and refers to the gland-tipped hairs on the calyx lobes (Figs. 1E & 3B upper inset) and young leaves. Although this epithet is similar to *glandulosa*, the latter is a synonym of a Madagascan species and thus is unlikely to cause any confusion.

Diagnostic characters: The small leaves (4–13 × 4–8.5 mm) separate this species from those currently described other than *D. setigera*. The glands on the young leaves and calyx distinguish it from the latter.

Distribution and Ecology: The species occurs from Komani [Queens-town] in the northeast, southwards to Qonce [King Williams Town] and the Fish River Mouth and then westwards to Slang River and then westwards along the coast to Mossel Bay (Fig. 5). Habitats recorded on herbarium labels include plains at base of mountains, dry flats, hills, open dune veld, rocky open veld near seashore, grassland and recently burnt fynbos. There is one mention of black sandy soil.

Phenology: Plants have been collected in flower from September to March and in fruit from October to March. The peak for both is November.

Conservation Notes: A generous polygon drawn around the collection points provides an EOO of 1240 km². GeoCAT provides an EOO of 55,847 km² and an AOO of 10,000 km² and suggests a category of Least Concern. Many herbarium labels mention that the species is common at the locality. Out of 22 specimens, two were collected before 1900, five

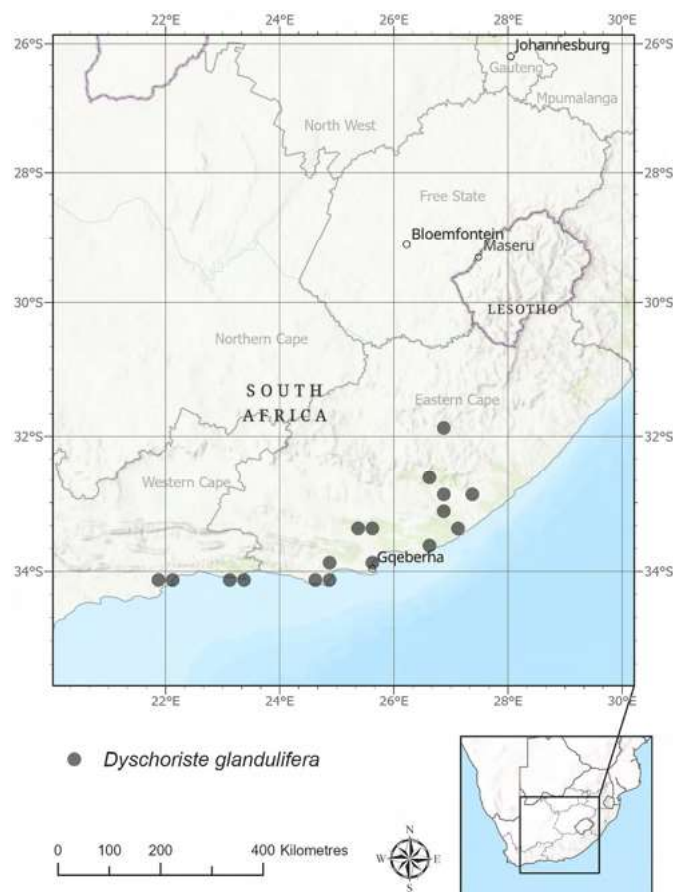


Fig. 5. Distribution of *Dyschoriste glandulifera* based on herbarium specimens. Cartographer: M. Lötter.

between 1975 and 2000 and none since 2000. The small EOO (by my calculation) and the lack of recent specimens suggests that the threat status of this species requires investigation.

4.2. Additional specimens examined

South Africa. EASTERN CAPE. **3126 (Queenstown)**: Queenstown, Dry plains behind mountains, 1170 m (–DD), Jan 1896, *Galpin* 1957 (PRE); Queenstown district, 2030 m (–DD), 31 Dec 1962, *Roberts* 2033 (PRE). **3226 (Fort Beaufort)**: Fort Beaufort, hills above Balfour (–DA), 25 Nov 1928, *Hutchinson* 1607 (PRE); Near Alice (–DD), 20 Dec 1926, *Adele Lewis Grant* 2704 (MO); Fort Hare Estate, 525 m (–DD), 2 Dec 1935, *Giffen* 426 (UFH). **3227 (Stutterheim)**: Kingwilliamstown (–CD), Oct, *Sim* 4141 (NU). **3324 (Steytlerville)**: Zuurbron (–DD), Oct 1927, *Fourcade* 334 (PRE). **3325 (Port Elizabeth)**: Uitenhage district, Winterhoek Mountains, Zuurberg, Woodfield's Krantz (–AD), 7 Sep 1930, *Fries et al.* 621 (MO, PRE); Enon (–BC), Nov 1926, *Thode* A1116 (NH, PRE); 1.6 km [1 mile] north of Zuurberg Inn, 650 m (–BC), 22 Sep 1953, *Archibald* 5220 (PRE); Zuurberg National Park (–BC), *van Wyk & van Wyk* 1400 (JRAU, PRE); Uitenhage division, Aloes, 15 m (–DC), *Drège* 3123 (PRE); Port Elizabeth, St George's Strand, near seashore (–DC), 20 Nov 1932, *Long* 844 (PRE). **3326 (Grahamstown)**: Bushmans River Mouth, west bank, Beacon Hill, 30 m (–DA), 6 Dec 1951, *Archibald* 3903 (PRE). **3327 (Peddie)**: Bathurst district, 1 km west of Fish River Mouth, 280 m (–AC), 20 Mar 1992, *Moss* 2444 (E, J). **3424 (Steytlerville)**: Humansdorp district, Slang River, 15 m (–BA), 11 Dec 1921, *Spearman* 23 (PRE); Slang River, near Forest Station (–BA), Nov 1921, *Fourcade* 1883 (PRE); Jeffreys Bay (–BB), Jan 1995, *Edwards* 1267 (J). WESTERN CAPE. **3421 (Riversdale)**: Between Mossel Bay and Robinson Pass, on national road 15 km north of Brandwag, 190 m (–BB), 30 Oct 1987, *Vlok*

1867 (PRE). **3422 (Mossel Bay)**: Little Brak River, 10 m (–AA), *Burchell* 6173 (PRE). **3423 (Willowmore)**: west of Plettenberg Bay, Leermansdrifrivier, 75 m (–AB), 12 Nov 1979, *Hugo* 2095 (PRE). WITHOUT PRECISE LOCALITY. Cape of Good Hope, 1774, *Masson* (MO); Transkei, *Baur sub Marloth* 8691 (PRE); Transkei, 1860, *Cooper* 235 (NH).

3. *Dyschoriste burchellii* (Nees) Kuntze, Revis. Gen. Pl. 2: 485 (1891). *Chaetacanthus burchellii* Nees in Prodr. [A.P. de Candolle] 11: 462 (1847); Clarke in Fl. cap. [Harv.] 5(1): 19 (1901). *Calophanes burkei* T. Anderson, J. Proc. Linn. Soc., Bot. 7: 24 (1863), nom. superfl. Type: South Africa. Thaba Nchu [Thaba Unca], *Burke [not Burchell]* (K!, GZU0249760—Global Plants!, iso.).

Chaetacanthus hispidus S. Moore in J. Bot. 40: 384 (1902). Type: South Africa, Free State [Orange River Colony], near Vrededorst road [Leeuw Spruit & Vrededorst on label], 1901–1902, *Barrett-Hamilton sub BM* 40,801 (BM, holo.!).

Upright to sprawling multi-stemmed herb resprouting from a woody perennial underground rootstock after fire, flowering when as short as 20 mm tall and attaining 280 mm; plants flower only sporadically and are less vigorous if there is no fire in the preceding winter; stems initially erect and then sprawling, up to 270 mm long and 2 mm in diam. at the internodes, young stems square in cross-section with rounded angles, dense with retrorse ornamented eglandular hairs; older stems with similar hairs, but less dense, and with linear cystoliths to about 0.5–0.6 mm long. *Leaves* with a dense fringe of collapsing eglandular trichomes up to 1.5 mm long on margins and similar hairs on veins and rare on surface, linear cystoliths about 0.5 mm long visible on both surfaces when dry; lamina elliptic, 12–25 × 4.5–18 mm; apex acute; margin entire, sometimes weakly undulate; base cuneate; midrib and 1–2 secondary veins on each side of the midrib slightly raised below; petiole 1–4 mm long. *Flowers* single or in 3-flowered cymes, produced near the tips of branches; bracts subtending inflorescences leaflike; bracteoles narrowly elliptic, 3–6 × 0.4–2 mm, with similar hairs and cystoliths as leaves. *Calyx* 12–15 mm long, with small, retrorse ornamented hairs on the tube and patent white hairs to 1.2 mm long common on the lobes; tube about 3 mm long, membranous between lobes, lobes 9–11 mm long, splitting to base and persistent once capsules have dehisced. *Corolla* tubular below, 2-lipped above, zygomorphic, usually white, occasionally pale lilac, about 17.5 mm long; tube about 12.5–13 mm long, about 1.5 mm in diam. at base and widening to about 2 mm in diam. at throat, slightly arcuate, with retrorse eglandular hairs on the upper half of the tube, throat and outer surfaces of the lobes; upper lip about 4 mm long, with 2 erect lobes, lobes oblong, about 2.5 × 1.6 mm; lower lip about 4 mm long with 3 deflexed lobes, lobes oblong, about 3 × 2.5 mm. *Stamens* 2; staminodes 2; filament curtain attached for length of tube; filaments free for about 2 mm from where lips diverge, glabrous; anthers about 1.2 × 0.5 mm, with minute peg at base; staminodes about 0.4 mm long, without anthers. *Style* with eglandular, appressed, upward-pointing hairs; stigma single-lobed, about 1 mm long, very slightly wider than style. *Capsule* about 11 × 2.6 × 2.1 mm, glabrous, golden brown. *Seeds* about 2.5 × 2 × 0.4 mm, densely clothed in white coagulated hairs when dry. *Figs.* 6A–C, 2C & 3C.

Nomenclatural notes: *Nees* (1847) thought that the type specimen had been collected by W.J. Burchell (1781–1863) and named the species after him. However, as pointed out by *Anderson* (1863), “This, however, was an error, as the plant has been found only by the collector Burke, whose name therefore it ought to bear.” As Burchell’s route did not include Thaba Nchu and that of J. Burke (1812–1873) did (*Gunn and Codd*, 1981), *Anderson* (1863) is correct, but Article 60 of the International Code of Nomenclature for algae, fungi, and plants (*Turland et al.*, 2025) does not allow for a correction of this nature and thus the epithet *burchellii* must be retained and *Calophanes burkei* is a superfluous name. Although the type of *Chaetacanthus hispidus* has a slightly different locality on the label from that in the protologue, it does bear the name of the species with an exclamation mark at the bottom of the sheet,



Fig. 6. Habit, calyx morphology and indumentum and stem indumentum. A–C. *Dyschoriste burchellii*; D–F. *D. costata*. Vouchers: A & C. Strey 9948 (NU); B. Hofmeyr 161 (PRE); D & F. Munday 585 (J); E. Hanekom 1901 (MO).

suggesting this was the specimen regarded as the type by the author.

Etymology: The name commemorates W.J. Burchell who was erroneously thought to have collected the type specimen.

Diagnostic characters: The leaves of *D. burchellii* are larger (12–25 × 4.5–18 mm) than those of *D. setigera* (5–11 × 4–9 mm) and *D. glandulifera* (4–13 × 4–8.5 mm) and they are fringed with collapsing (on drying) hairs that are up to 1.5 mm long and similar hairs are prevalent on the calyx lobes. Non-collapsing eglandular hairs are not present between the veins of the leaves, as is the case in a similar undescribed species. There are no gland-tipped hairs on the calyx or the leaves.

Distribution and Ecology: *Dyschoriste burchellii* occurs in southern Zimbabwe, southern Mozambique, Eswatini and South Africa. In South Africa, it occurs between Louis Trichardt in the north, Ventersdorp in the west, Mkuzi Game Reserve in the east and Clydesdale in the south (Fig. 7). It occurs in grasslands and flowers prolifically in response to fire.

Phenology: Flowering is from September through to January, with outliers in April, May and July, possibly due to unseasonal fires. Plants may flower from as soon as they resprout and when they are only 20 mm tall. Fruiting is between November and February, with outliers in April and May.

Conservation Notes: *Dyschoriste burchellii* is widespread, occurring in four southern African countries and seven provinces in South Africa. GeoCAT calculates an EOO of 461,358 km² and an AOO of 36,875 km² and indicates a status of Least Concern. The species is common in the areas where it occurs. I thus endorse the threat category of Least Concern assigned by Kamundi (2006b).

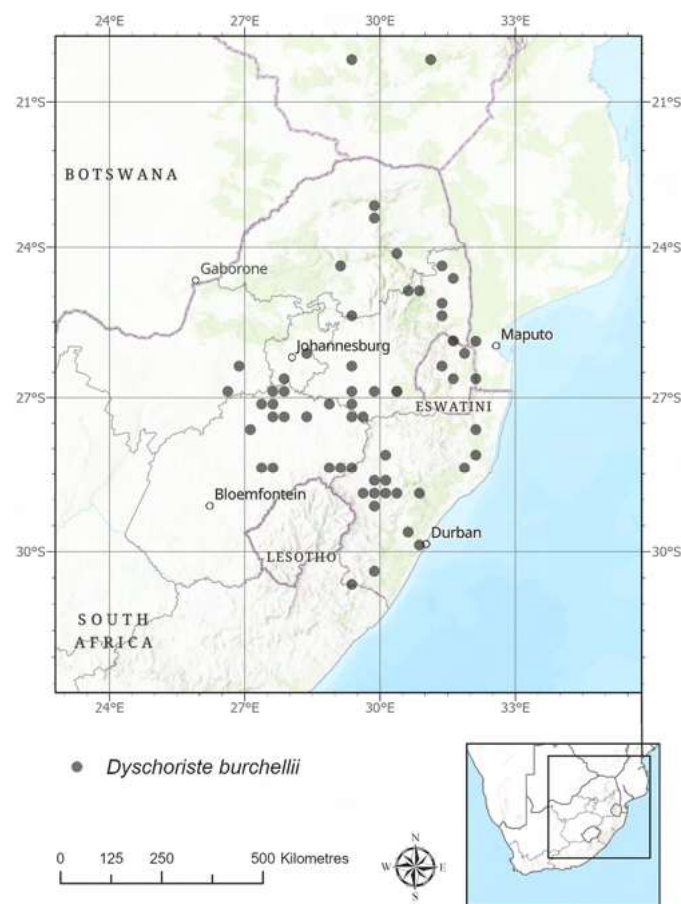


Fig. 7. Distribution of *Dyschoriste burchellii* based on herbarium specimens. Cartographer: M. Lötter.

4.3. Selected additional specimens examined

Zimbabwe. 2029: Insiza district, Fort Rixon (AB), 8 Feb 1974, Mavi 1500 (SRGH). 2031: Ndanga district, Close to Masvingo [Fort Victoria] to Birchenough Bridge road, near Ndanga turnoff (–AA), 19 Jan 1960, Goodier 836 (SRGH). South Africa. LIMPOPO. 2329 (Polokwane [Pietersburg]): Louis Trichardt (–BB), Jan 1920, Breyer sub TvlMus20938 (PRE); beside road between Soekmekaar and Louis Trichardt, 1.5 km north of turning to Mannamead, 900 m (–BD), 6 May 1984, Balkwill 1599 (NU). 2429 (Zebediela): Sunningdale Private Nature Reserve, 1075 m (–AC/AD), 3 Jan 1970, Hofmeyr 161 (PRE). 2430 (Pilgrim's Rest): Letaba district, near Metz Hospital (–AB), 18 Nov 1976, Venter 1254 (PRE). NORTH WEST. 2626 (Klerksdorp): 5 km from Ventersdorp on road to Koster, Schoonspruit by die Oog (–BD), 27 Nov 1986, Germishuizen 3958 (PRE); Klerksdorp (–DC), 15 Nov 1927, de Victoria 35 (PRE). MPUMALANGA. 2430 (Pilgrim's Rest): Pilgrim's Rest district, Farm Vaalhoek 474 KT (–DB), 17 Oct 2015, McMurtry 1266 (HSMC); Ohrigstad Dam Nature Reserve, 1540 m (–DC), 18 Nov 1970, Jacobsen 1180 (LYD, PRE); between Pilgrim's Rest and Sabie, 1075 m (–DD), Dec 1919, Rogers 25,059 (J). 2431 (Acornhoek): Klaserie Private Nature Reserve, Morgenzon 199 KU, 450 m (–AD), Zambatis 1248 (LYD, PRE); Manyeleti Game Reserve, Sarabank, 385 m (–DA), 8 Jan 1976, Brendenkamp 1402 (PRE, PRU). 2529 (eMalahleni [Witbank]): Loskop Dam Nature Reserve, Weltevreden (–AD), 25 Mar 1969, Theron 2653 (PRU). 2531 (Komatipoort): Kruger National Park, 3.2 km N of Pretoriuskop, 615 m (–AB), 4 Feb 1949, Codd & de Winter 4953 (PRE); Kruger National Park, Malelane, Khandzalive, E of radio tower, 833 m (–AD), 30 Dec 2015, Zambatis et al. 1214 (PRE); Kamlushwas district, Nsulase Koppie, 550 m (–DC), 19 Nov 1993, Balkwill & Balkwill 8626 (J). 2629 (Bethal): Bethal (–AD), 14 Dec 1910, Leendertz 9787 (PRE); Standerton (–CD), Feb 1912, Leendertz sub TvlMus11084 (PRE); Ermelo district, Roodepoort (–CD), 7 Oct 1927, Henrici 1689 (PRE); Amersfoort area, Farm Brakfontein, 1675 m (–DD), 27 Feb 1986, Turner 899 (PRE). 2630 (Carolina): Ermelo district, Farm Nooitgedacht (–CD), 2 Nov 1926, Henrici 1122 & 1144 (PRE). 2729 (Volksrust): Perdekop [Paardekop], 1385 m (–AB), 13 Oct 1893, Schlechter 3455 (PRE); Volksrust district, Farm Waterval, Tierkloof 4 × 4 route, 1939 m (–BC), 2 Dec 2015, Steyn 2169 (PRE). GAUTENG. 2627 (Potchefstroom): Vereeniging (–DB), Nov 1911, Leendertz 10,917 (PRE). 2628 (Johannesburg): Dersley (–AB), 17 Nov 1929, Moss 1777 (J); Geduld (–AB), 15 Oct 1927, Moss 15,612 (J). FREE STATE. 2627 (Potchefstroom): 5–6 km WNW of Sasolburg, Farm Uitkomst 413, 1430 m (–DC), 18 Dec 1996, Kroon 14,055 (PRE); 7 km WNW of Sasolburg, Rietfontein 123, 1430 m (–DD), 10 Oct 1996, Kroon 12,012 (PRE). 2727 (Kroonstad): 12 km W of Koppies (–BA), 14 Jan 1992, de Lange 411 (PRE); Edenville, Farm Lusthof (–BC), 13 Dec 1966, van Rensburg 19 & 137 (PRE); Heilbron (–BD), 24 Jan 1931, Goossens 583 (PRE); Heilbron district, 24 km SW of Heilbron, Vechtkop Spruit, 1500 m (–BD), 31 Jan 1960, Cocks 21,034 (PRE); Kroonstad (–CA), Jan 1928, Pont 391 (PRE); Sasol Game Park, Wilgefontein boundary, 1440 m (–DD), 6 Nov 1995, Kroon 11,729 (PRE). 2728 (Frankfort): Frankfort, Farm Spitskop (–AD), 23 Jan 1992, de Lange 648 (PRE); Banks of Vaal River, Mandyville, Terblanche's farm (–BB), 28 Jan 1988, Crosby 641 (PRE). 2729 (Volksrust): Vrede, Farm Rome (–AD), 28 Jan 1992, de Lange 788 (PRE). 2827 (Senekal): Willem Pretorius Game Reserve, Farm Rietspruit, 1385 m (–AD), 1 Dec 1971, Muller 794 (PRE); Senekal, Doornkop (–BC), 7 Dec 1931, Goossens 873 (PRE). 2828 (Bethlehem): Harrismith district, Campus of University of Qua-Qua, 1800 m (–BD), 11 Oct 1994, Moffett 4726 (J). 2829 (Harrismith): Harrismith (–AC), Jan 1905, Sankey 205 (MO); Boschetto (–AC), Jan 1932, van Wyk 97 (PRE); Sterkfontein Dam, 1700 m (–AC), 16 Oct 1974, Jacobsz 1850 (PRE); Platberg, Botanical Garden area, 1700 m (–AC), 26 Nov 1979, Jacobsz 2262 (PRE); Harrismith district, Swinburne, Rensburgskop (–AD), 19 Nov 1962, Jacobsz 198 (PRE). KWAZULU-NATAL. 2732 (Ubombo): Mkuzi Game Reserve (–CA), 30 Apr 1958, Lawson 7020 (NH). 2829 (Harrismith): near Colenso, Harts Hill (–DB), 18 Oct 1970, Strey 9948 (NU); Winterton (–DC), Reyburn sub

NH 21,549 (NH); Estcourt district, 10 km SE of Estcourt, Farm Rensburgspruit, 1100 m (–DD), 30 Nov 1988, *Balkwill et al.* 4201a (J). **2830 (Dundee)**: Dannhauser, Farm Fairbreeze (–AA), 26 Dec 1983, *Ngwenya* 58 (NH); Weenen district, Tugela River valley, Farm Kaisha, 850 m (–CA), 15 Nov 1989, *Balkwill & Balkwill* 5045 (B, E, L, MO); Weenen County, Weenen Veld Reserve, 1045 m (–CC), 27 Oct 1944, *Pentz & Acocks* 10,713 (PRE); Umvoti district, near Muden, Farm Roodbokvlakte 1858, 850 m (–CD), 13 Jan 1990, *Balkwill et al.* 5330 (C, J, PRE). **2831 (Nkandla)**: Umfolozi Game Reserve, on way to Wilderness Trails Base Camp (–BD), 22 Nov 1986, *Balkwill & Cadman* 3385 (J). **2832 (Mtubatuba)**: Hluhluwe Game Reserve, Malundweni (–AA), 7 Nov 1971, *Hitchins* 620 (PRE). **2929 (Underberg)**: Weenen County, 1500–1850 m (–BB), Jan 1895, *Evans* 415 (NH); Estcourt district, Willowford Station, 1230 m (–BB), 17 Sep 1944, *Acocks* 10,600 (NH, PRE); Estcourt, Research Station, 1230 m (–BB), 15 Sep 1937, *West* 321 (PRE). **2930 (Pietermaritzburg)**: Camperdown, 615 m (–DA), *Wood* 11,737 (NH); Durban, Reservoir Hills, off Burlington Drive, 170 m (–DD), 21 May 1967, *Baijnath* 444 (PRE). **EASTERN CAPE. 3029 (Kokstad)**: Clydesdale, 770 m (–BD), Nov 1884, *Tyson* 2078 (PRE); Kokstad, 1540 m (–CB), Dec 1883, *Tyson* 1794 (PRE). **Mozambique. 2532 (Maputo [Lourenco Marques])**: Namaacha (–CC), 14 Jan 1975, *Marques* 2547 (MO). **Eswatini. 2631 (Mbabane)**: Manzini district, Red Tiger Ranch, about 300 m (–AD), 31 Oct 1961, *Compton* 30,953 (PRE); Mlawula Nature Reserve, 168 m (–BB), 2 Jan 1987, *Braun* 334 (PRE); Sipopaneni, 310 m (–DA), 13 Jan 1960, *Compton* 29,711 (PRE). **2632 (Bela Vista)**: Lebombos, SE of Siteki, Mtimbhalati River Gorge (–CA), 23 Nov 2002, *McMurry* 10,931 (HSMC).

4. *Dyschoriste costata* (Nees) Kuntze, Revis. Gen. Pl. 2: 486 (1891). *Chaetacanthus costatus* Nees in Prodr. [A.P. Candolle] 11: 462 (1847); Clarke in Fl. Cap. [Harv.] 5:1: 19 (1901). *Calophanes costatus* (Nees) T. Anderson, J. Proc. Linn. Soc., Bot. 7: 23 (1863). Type: South Africa, “Macalisberg in pr. b. sp.”, Nov, *Burke [Burchell on GZU sheet]* (K, hol.; GZU000251139—Global Plants!, PRE!, iso.).

Upright to sprawling multi-stemmed herb resprouting vigorously from a woody perennial underground rootstock after fire, plants flower only sporadically and are less vigorous if there is no fire in the preceding winter; stems initially erect and then sprawling, up to 250 mm long and 2 mm in diam. at the internodes, young stems square in cross-section with broad grooves between the angles, dense with retrorse soft-walled eglandular hairs; older stems with similar hairs, but less dense, and with linear cystoliths to about 0.3 mm long. *Leaves* with sparse eglandular trichomes on margins and veins, surfaces glabrous and with broad cystoliths about 0.5 mm long on the upper surface, lamina lanceolate to narrowly elliptic, often folded along its length in dried material, 10–18 × 3–8 mm; apex sharply acute to acute, sometimes weakly declinate; margin entire; base cuneate; midrib and 2–3 secondary veins on each side of the midrib markedly raised below; petiole 1–2.5 mm long. *Flowers* single or in 3-flowered cymes, produced near the tips of branches; bracts subtending inflorescences leaflike; bracteoles narrowly lanceolate, sometimes slightly asymmetric and appearing scimitar-shaped, 9–14 mm long, with lamina and cystoliths. *Calyx* 8–12 mm long, glabrous except for 1 or 2 wisps at the apex; tube about 2.5 mm long, membranous between lobes, lobes 6–9 mm long, splitting to base and persistent once capsules have dehisced. *Corolla* tubular below, 2-lipped above, zygomorphic, usually white, occasionally pale lilac, about 14 mm long; tube about 11 mm long, about 1.4 mm in diam. at base and widening to about 2.5 mm in diam. at throat, slightly arcuate, with retrorse eglandular hairs, especially on the upper and lower sides; upper lip about 3.5 mm long, with 2 erect lobes, lobes oblong, about 2 × 1.5 mm; lower lip about 4.5 mm long with 3 deflexed lobes, lobes oblong, about 2 × 1.5 mm. *Stamens* 2; staminodes 2; filament curtain attached for length of tube and filaments free from where lips diverge, filaments 2.5 mm long, with sparse, short retrorse hairs; anthers about 1 × 0.5 mm, with minute, blunt tail; staminodes to 1.5 mm long, without

anthers. *Style* with eglandular, appressed, upward-pointing hairs. *Capsule* about 9 × 2.5 × 2 mm, glabrous, golden brown. *Seeds* about 2.2 × 2 × 0.9 mm, densely clothed in white coagulated hairs when dry. **Figs. 6D–F, 2D & 3D.**

Nomenclatural notes: Nees made the same mistake as he did for *D. burchellii*, in thinking that the type specimen had been collected by W. J. Burchell, rather than J. Burke.

Etymology: *Costata* means ribs and refers to the prominent midrib and secondary veins in the leaves.

Diagnostic characters: In the field, the striking white hairs on the stems, the appressed leaves with raised veins and declinate tips combined with the absence of hairs from the calyx distinguish this species from others that co-occur.

Distribution and Ecology: This species occurs between Doorndraai [Sterkrivier] Dam Nature Reserve in the north, Zeerust in the west, Middelburg in the east and Leeuwkuil near Vereeniging (Fig. 8). It occurs in grassland and flowers prolifically after fire.

Phenology: *Dyschoriste costata* mainly flowers from September to February, with a strong peak in October. There are outliers in March, June and August and one outlier has a note that it is in moribund grassland. Specimens have been collected in fruit from September to April, with a peak in November and December.

Conservation Notes: A polygon around the known sites of *D. costata* provides an EOO of 46,245 km², but in the region of 75 % of this area is transformed by urban settlement or agriculture. GeoCAT provides an EOO of 91,180 km² and an AOO of 17,500 km² and indicates a threat status of Least Concern. The species is common where it occurs. Although the current circumscription of the species is narrower than what was accepted when *Kamundi* (2006c) assessed the species, the status of Least Concern is still appropriate.

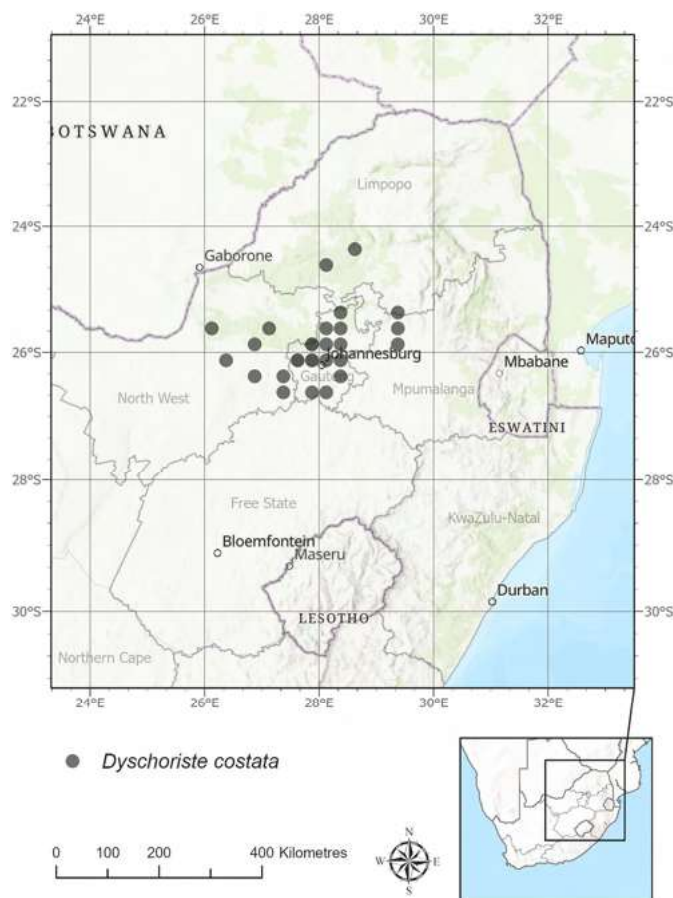


Fig. 8. Distribution of *Dyschoriste costata* based on herbarium specimens. Cartographer: M. Lötter.

4.4. Selected additional specimens examined

4.4.1. South Africa

LIMPOPO. **2428 (Nylstroom)**: Sterkrivierdam Nature Reserve, 1230 m (–BC), 11 Jan 1973, *Jacobsen 2624* (PRE); between Nylstroom and Alma, near Loubadspruit bridge (–CA), 4 Mar 1985, *Welman 499* (PRE). MPUMALANGA. **2529 (Witbank)**: Groblersdal district, Loskop Dam Nature Reserve (–AD), 5 Mar 2017, *Steyn 2295* (PRE); Middelburg, Doornkop 273 JS (–CB), 25 Nov 1968, *du Plessis 1132* (PRE, PRU); Middelburg (–CD), 6 Nov 1933, *Young A50* (PRE). NORTH WEST. **2526 (Zeerust)**: Zeerust (–CA), Jan 1912, *Leendertz sub TvlMus11522* (PRE); Rustenburg district, Groenfontein (–DD), 11 ??? 1962, *Beer 23* (PUC). **2527 (Rustenburg)**: Rustenburg Nature Reserve, 1475 m (–CA), 4 Nov 1970, *Jacobsen 1156* (PRE); No precise locality (–DD), 28 Sep 1969, *Mogg 34,451* (PRE). **2626 (Klerksdorp)**: Lichtenburg district, Witstinkhoutboom (–AB), 28 Jan 1926, *Liebenberg 28* (PRE); Ventersdorp, Somerville (–BD), 21 Jan 1964, *Louw 3280* (PUC); **2627 (Potchefstroom)**: Boskop (–BA), 15 Oct 1939, *Louw 399* (PRE); Taaibosbult (–BB), 6 Mar 1948, *Louw 1699* (PRE, PUC); Dassiesrand (–CA), 4 Dec 1939, *van der Westhuizen 815* (PUC); Sandemans Ridge (–CA), 18 Jan 1977, *Botha & Ubbink 1889* (PRE, PUC); Elandsfontein (–CB), 22 Dec 1934, *Theron 1050* (PUC). GAUTENG. **2527 (Rustenburg)**: near Muldersdrift, Swartkops (–DD), 1984, *Norman s.n.* (J); Uitkomst 499 JQ, 1540 m (–DD), 2 Jan 1970, *Coetzee 51* (PRE). **2528 (Pretoria)**: NW of Hammanskraal (–AD), 28 Dec 1953, *Meeuse 9136* (MO); Meintjies Kop, 1415 m (–CA), 20 Oct 1926, *Smith 3294* (PRE); Groenkloof National Park, koppie, 1475 m (–CA), 5 Mar 1971, *Catto 38* (PRU); Eloffsdal (–CA), 23 Oct 1972, *Hanekom 1901* (MO, PRE); Arcadia (–CB), 13 Oct 1907, *Burt-Davy sub PRE7036* (PRE); Baviaanspoort (–CB), Oct 1930, *Obermeyer 7140* (PRE); Pienaars River (–CB), Dec 1957, *Merxmüller 209* (MO); Pretoria University Farm, 1445 m (–CB), 3 Nov 1943, *Mogg 17,023* (PRE); Roodeplaatdam Nature Reserve (–CB), 16 Nov 1979, *van Rooyen 2148* (PRE); Pretoria, Brooklyn (–CC), 28 Dec 1985, *Clarke 1510* (PRE); Fountains Valley, 1540 m (–CC), 28 Dec 1928, *Repton 202* (PRE); 3 Oct 1948, *Watt 4537* (J); Randburg district, Farm Bothasfontein 408 JR, adjacent to Swiss Club, 1600 m (–CC), 15 Feb 1997, *Reddy et al. 207* (J); Hennops River (–CC), 16 Dec 1923, *Moss 8687* (J); Menlo Park, intersection of N1 highway and Atterbury Road (–CD), 2 Dec 1984, *Clarke 1056* (PRE); 25.6 km E of Pretoria, Zwavelspoort, 1385 m (–CD), 9 Feb 1958, *Mauve 7* (PRE); Faerie Glen (–CD), 24 Nov 1973, *Retief 133* (PRE). **2627 (Potchefstroom)**: Abe Bailey Nature Reserve (–AD), 17 Jan 1983, *van Wyk 467* (PUC); Krugersdorp, Zwartkrans 67, Isaac Stegman Nature Reserve, Sterkfontein Caves, 1585 m (–BA), 7 Jan 1970, *Mogg 35,306* (J); 14 Dec 1971, *Mogg 35,797* (J); Witpoortjie Kloof (–BB), 24 Sep 1922, *Moss 7130* (J); 29 Jan 1928, *Moss 16,767* (J); Randburg district, Robindale, park on c/o Bellairs St and Gaiety Ave, 1800 m (–BB), 24 Sep 1997, *Reddy et al. 443* (J, PRE); Ruimsig Entomological Reserve (–BB), 1630 m (–BB), 3 Oct 1997, *Reddy et al. 531* (J); 4.8 km N of Krugersdorp, 1700 m (–BB), 29 Oct 1947, *Codd 3175* (PRE); Leeuwkuil Research Station (–DB), 19 Oct 1939, *Acocks 16,174* (PRE). **2628 (Johannesburg)**: Frankenwald, 1600 m (–AA), 5 Dec 1935, *West sub J71290* (J); 9 km south of Johannesburg, near Klipriviersberg, Mondeor Reserve, 1900 m (–AA), 25 Mar 1985, *Bourell et al. 2648* (J); 3.2 km W of Alberton, on Klipriviersberg 106 IR, end of Soetdoring Rd, 1735 m (–AA), 12 Oct 1992, *Balkwill et al. 7011a* (J); Edenvale district, Marais Steyn Park, 1500 m (–AA), 22 Oct 1992, *Balkwill & Reddy 7149* (J); Parkview (–AA), 9 Dec 1923, *Moss 8569* (J); Melville Koppies Nature Reserve (–AA), 12 Nov 1922, *Moss 9204* (J); 1 Nov 1973, *Forbes & Munday 524* (J); 15 Dec 1965, *Lucas 108* (J); 10 Oct 1979, *Schijf 122* (J); near Benoni (–AB), 26 Sep 1926, *Moss 3444* (J); Suikerbosrand Nature Reserve, 1800 m (–AD), 27 Dec 1983, *Balkwill & Manning 1315* (NU); Suikerbosrand, Langkloof, 1720 m (–CA), 23 Oct 1971, *Bredenkamp 195* (PRE, PRU).

5. *Dyschoriste stolonifera* K.Balkwill sp. nov. Type: South Africa, KwaZulu-Natal, 2930 (Pietermaritzburg): Cato Ridge, north of N3

national road (–DA), 750–780 m, 7 Dec 2021, *Styles & Heiduk 5963* (J, holo.; E, K, MO, PRE, iso.).

Perennial herb resprouting from a woody perennial underground rootstock after fire, rootstock produces woody underground rhizomes and some horizontal stems that act as stolons to establish new plants; erect stems 200–300 mm tall and 1 mm in diam. and creeping stems to 400 mm long and 1 mm in diam. at the internodes; young upright stems sub-circular in cross-section, with many multicellular retrorse eglandular hairs, young horizontal stems square in cross-section with similar retrorse hairs on two flattened faces and cystoliths on the rounded faces; older upright stems becoming similar to horizontal stems. Leaves glabrous above, with cystoliths of about 0.7 mm long visible in dried material and with pin-headed glandular trichomes on the lower surface, sparse on the lower leaves, but denser on the bracts subtending the inflorescence; lamina elliptic to obovate with long-tapering base, largest 15–24 × 6–9 mm; apex acute to obtuse sometimes apiculate; petiole 3–7 mm long. *Flowers* rarely solitary, usually in 3- to many-flowered cymes on upper nodes of vertical stems and some nodes of horizontal stems, denser towards the tips of branches; bracts subtending inflorescences leaflike; bracteoles linear, 7 × 0.7 mm. *Calyx* 10.5–13 mm long, with mainly eglandular appressed hairs on the tube and bases of the lobes, and long stalked gland-tipped hairs becoming more common distally; tube about 2.5–3 mm long, membranous between lobes, lobes 8–10 mm long. *Corolla* tubular below, 2-lipped above, zygomorphic, white flushed lilac or lilac with mauve stripes or speckles in throat and on lobes, 19–23 mm long; tube 11–13 mm long, 1.2–1.5 mm in diam., throat about 3 mm long and 3–3.2 mm deep, with dense soft glandular and eglandular hairs up to 0.3 mm long; lips 8–8.5 mm long; upper lobes erect, oblong, 7–8 × about 2.5 mm, lower lobes 7–8.5 × 3–3.5 mm. *Stamens* 2 fertile and 2 staminodes; filaments free from corolla for 5 mm, glabrous; anthers 1.2–1.5 mm long, shortly spurred; staminodes 1.4 mm long, filament united to filament curtain for about 1 mm, without anthers. *Capsule* about 11 × 2.5 × 2 mm, with minute thick-stalked gland-headed trichomes scattered near the apex. *Seeds* lenticular, about 2.2 × 1.8 mm. *Figs. 9A–C, 2E and 10.*

Etymology: The specific epithet refers to the characteristic stoloniferous habit of this species.

Diagnostic characters: The two stamens and two staminodes separate *D. stolonifera* from the other southern African species traditionally treated as *Dyschoriste*, which have four stamens. The unique stoloniferous habit and the larger flowers (19–23 mm long with lips 8–8.5 mm long) as opposed to about 13 mm long with lips about 3.5 mm long in *D. setigera*, about 17 mm long with lips about 5–6 mm long in *D. glandulifera*, about 17.5 mm long with lips about 4 mm long in *D. burchellii*, about 14 mm long with lips 3.5–4.5 mm long in *D. costata* and about 14.5 mm long with lips 3.6–4 mm long in *D. tshwanensis* distinguish it from the currently known species that also have two stamens. The leaves of *D. stolonifera* have many gland-headed hairs, which is not the case for *D. setigera*, *D. burchellii* and *D. costata*, and *D. tshwanensis* has both eglandular and gland-tipped hairs on the leaves. The long tapering leaf base of *D. stolonifera* separates it from *D. setigera*, *D. glandulifera*, *D. burchellii*, *D. costata* and *D. tshwanensis*, which all have cuneate to rounded leaf bases.

Distribution and Ecology: *Dyschoriste stolonifera* is restricted to a small area in KwaZulu-Natal and was known from two sites, namely Matabetule Plateau near Inanda and Harrison Flats between Cato Ridge and Camperdown (*Fig. 11*). It is currently only known from the latter. It occurs in shallow soils on or near sandstone outcrops.

Phenology: Plants have been collected in flower from September through to December and in fruit in November and December.

Conservation Notes: The species was originally known from two areas giving an EOO of about 170 km², but it has most likely been extirpated at one of those sites through urban expansion and sand mining (Supplementary Document 1), so that the remaining EOO is 12 km². The current AOO at Harrison Flats is 1.6 km². At this site, at least 10,000 of the up to



Fig. 9. Habit, calyx morphology and indumentum and stem indumentum. A–C. *Dyschoriste stolonifera*; D–F. *D. tshwanensis*. Vouchers: A–F. Edwards 421 (NU); D–F. van Wyk 2458 (PRE).



Fig. 10. *Dyschoriste stolonifera*: A. plant with woody base and stolon; B. habit showing stolons; C. inflorescence; D. habitat. Photographer: David Styles.



Fig. 11. Distribution of *Dyschoriste stolonifera* based on herbarium specimens. Cartographer: M. Lötter.

40,000 plants (i.e. about 25 %) have been destroyed by various formal and informal developments. There are ongoing and proposed developments that will destroy thousands more of the plants. The N3 highway, the R103 regional road and two railway lines traverse the surviving subpopulation, causing fragmentation. Thus, with an EOO less than 100 km², an AOO less than 10 km², the one remaining subpopulation which is already fragmented (and likely to become more so), along with the anticipated reduction in EOO and AOO, the deterioration of habitat and the decline in number of mature individuals, *D. stolonifera* would qualify for Critically Endangered under Criterion B, i.e. CR B1ab (i,ii,iii,v) + B2ab(i,ii,iii,v).

4.5. Additional specimens examined

2930 (Pietermaritzburg): Camperdown, 615 m (–DA), 21 Oct 1910, *Franks sub Wood 11,737* (NU, PRE); Harrison's Flats (–DA), 18 Nov 1988, *Edwards 421* (NU); Cato Ridge, Harrison Flats (–DA), 18 Nov 2012, *Styles 3822* (J, NH, PRE); Inanda (–DB), 11 Oct 1881, *Wood 213* (PRE); no date, *Wood 10,625* (PRE); Matabethule Plato, Mzinyati Nature Reserve (–DB), 18 Sep 1987, *van Wyk 8184* (PRU); Matebetule Plateau (–DB), 22 Oct 1987, *Ngwenya 438* (NH).

iNaturalist observations: 101457921, 101457948, 101458577.

6. *Dyschoriste tshwanensis* K.Balkwill sp. nov. Type: South Africa, Gauteng, 2528 (Pretoria): Pretoria, CSIR Reserve (–CB), Feb 1977, *Liebenberg 8708* (PRE, holo.; MO, SRGH, iso.),

Upright to sprawling multi-stemmed herb to bushy shrublet up to 340 mm tall, resprouting from a woody perennial underground root-stock after fire, with woody roots up to 6 mm in diam.; stems initially

erect and then spreading, up to 340 mm long, initially 1 mm in diam. at the internodes, young stems square in cross-section with rounded angles and with broad shallow groove on all faces, dense with patent straight ornamented eglandular hairs to 0.4 mm long and some gland-tipped hairs to 0.5 mm long; older stems up to 4 mm in diam., with similar hairs, but less dense, and with linear cystoliths to about 0.3 mm long, bark beige. *Leaves* with a dense indumentum of non-collapsing eglandular hairs up to 0.2 mm long on margins, veins and surfaces, interspersed with gland-headed hairs up to 0.4 mm long, linear cystoliths about 0.2 mm long visible on both surfaces when dry; lamina elliptic, 6–13 × 3–8 mm; apex acute or rounded and apiculate; margin entire; base cuneate; midrib and 3–4 secondary veins on each side of the midrib slightly raised above and below; petiole 0.5–2.5 mm long. *Flowers* single or in 3-flowered cymes, produced near the tips of branches; bracts subtending inflorescences leaflike; bracteoles narrowly elliptic, 5.5–7 × 2–2.2 mm, with similar hairs as on leaves. *Calyx* 8–9 mm long, dense with slightly retrorse or patent collapsing eglandular hairs and patent gland-tipped hairs on the tube and lobes, hairs to 0.7 mm; tube about 3 mm long, membranous between lobes, lobes 5.5–6.5 mm long, splitting to base and persistent once capsules have dehisced. *Corolla* tubular below, 2-lipped above, zygomorphic, white or cream, about 14.5 mm long; tube about 11 mm long, about 1.5 mm in diam. at base and widening to about 3 mm in diam. at throat, straight to slightly arcuate, with slightly retrorse eglandular hairs and short gland-tipped hairs on the upper half of the tube, throat and outer surfaces of the lobes; upper lip about 3.6 mm long, with 2 erect lobes, lobes oblong, about 3 × 2 mm; lower lip about 4 mm long with 3 deflexed lobes, lobes oblong, about 4 × 2.5 mm. *Stamens* 2; staminodes 2; filament curtain attached for length of tube; filaments free for about 3 mm from where lips diverge, glabrous; anthers about 1.5 × 0.7 mm, with minute peg at base; staminodes a flap of tissue at top of filament curtain, without anthers. *Style* with eglandular, appressed, upward-pointing hairs; stigma single-lobed, about 1 mm long, about same width as style. *Capsule* about 10 × 2.5 × 2 mm, glabrous, golden brown and brown. **Figs. 9D–F, 2F and 12.**

Etymology: The species is named for the city in which it occurs.

Diagnostic characters: Two stamens and two staminodes distinguish *D. tshwanensis* from the southern African species of *Dyschoriste* that have four stamens (they have traditionally been treated in that genus). The leaves of *D. tshwanensis* have both eglandular and gland-tipped hairs very common on both the upper and lower surfaces, whereas the leaves of *D. setigera* do not have gland-tipped hairs and the eglandular hairs are curved and restricted to the margins and veins; there are only gland-tipped hairs on the surfaces of *D. glandulifera* leaves and the eglandular hairs are short, curved and restricted to the margins and veins; the leaves of *D. burchellii* have long collapsing eglandular hairs forming a fringe around the margin and present on the veins and sparingly on the surface, the leaves of *D. costata* are either completely glabrous or have very few curved eglandular hairs restricted to the margins and veins. Although the leaves of *D. stolonifera* also have gland-tipped hairs, they are not accompanied by eglandular hairs as in *D. tshwanensis*.

Distribution and Ecology: *Dyschoriste tshwanensis* is restricted to Tshwane [Pretoria] (Fig. 13). It grows on rocky ridges between rocks or in grassland with shallow soil near rock outcrops.

Phenology: *Dyschoriste tshwanensis* has been collected in flower from September through to March, with most flowering specimens having been collected in October and November. Few specimens have been collected with fruit, but those that have are from October and November and one in January.

Conservation Notes: A polygon drawn around the known localities of *D. tshwanensis* provides an EOO of 75 km². Suitable habitat that is not irreparably destroyed by urbanisation is 10 % at best, providing an AOO of 7.5 km². Islands of natural vegetation within urban areas are threatened by lack of regular fire, encroachment by indigenous woody species, invasion by recognised alien invasives as well as many other garden escapes and disturbance by illegal dumping, vagrants and illegal encroachment by adjacent property owners. There are also constant



Fig. 12. *Dyschoriste tshwanensis*: A. habit among rocks; B. habit in shallow soil; C. tip of branch with white flower; D. tip of branch with light lilac flower. Photographers: A. Alison Young; B. Vincent van de Wiel; C. Henry de Lange; D. David Hoare.

threats from illegal developments, some sanctioned by corrupt officials. Thus, as the EOO is less than 100 km², the AOO is less than 10 km², the population is fragmented due to urbanisation, and there are constant threats to the quality of the remaining habitat, a threat status of Critically Endangered is recommended — i.e. CR B1ab(iii) + B2ab(iii).

4.6. Additional specimens examined

South Africa. GAUTENG. **2528 (Pretoria)**: Meintjies Kop, 1450 m (–CA), Mar 1905, *Burt Davy sub PRE 5385* (PRE); 24 Oct 1929, *Smith 3310* (PRE); 30 Sep 1934, *Dyer 2509* (PRE); 24 Mar 1987, *Isaacs 63* (PRE); Pretoria, koppies (–CA), 17 Oct 1908, *Leendertz sub TvlMus5742* (PRE); 19 Oct 1924, *Moss 10,563* (J); Daspoort Ridge, below River Redoubt (–

CA), 21 Oct 1917, *Pole-Evans 165* (PRE); Oct 1924, *Kaplan sub TvlMus26070* (PRE); behind Louis Botha home, 1380 m (–CA), 12 Oct 1925, *Smith 856* (PRE); E of Union Buildings, 1370 m (–CA), *Smith 1290* (PRE); Between Zoo and Louis Botha home, 1385 m (–CA), Oct 1926, *Smith 3276* (PRE); Koedoespoort (–CA), Nov 1929, *Obermeyer 27,624* (PRE); Wonderboom Reserve (–CA), 9 Nov 1944, *Repton 1939* (PRE); 17 Nov 1944, *Wasserfall & van Niekerk sub PRE39890* (PRE); Pretoria, Magaliesberge, 1500 m (–CA), 9 Jan 1961, *Schlieben & Strey 8458* (PRE); La Montagne, N of Chambord Flats (–CA), 11 Nov 1978, *van Wyk 2458* (PRE); Baviaanspoort (–CB), 22 Sep 1930, *Goossens 52* (PRE); Pretoria University Farm, near wireless masts, 1390 m (–CB), 16 Nov 1946, *Codd 2153* (PRE); Silverton, Botanical Reserve, 1219 m (–CB), 16 Nov 1946, *Story 1416* (PRE); Pretoria National Botanical Garden (–CB), 27 Oct



Fig. 13. Distribution of *Dyschoriste tshwanensis* based on herbarium specimens. Cartographer: M. Lötter.

1987, *Joffe* 431 (PRE); Brummeria, 4500 m (–CB), 25 Oct 1966, *Müller* 30 (PRE); 12 Jan 1970, *Wells* 4122 (PRE).

iNaturalist Observations: 18911791, 33120414, 35194862, 36754022, 37491434, 38084516, 47086210, 47246315, 54842129, 62022490, 63706061, 77466730, 95251482, 95457421, 96708018, 97632419, 98964011, 98993005, 99325278, 101021607, 102002448, 107395993, 140488723, 141062884, 143481357, 144065640, 145262178, 146169146, 186035155, 186037816, 191694047, 192090326, 193395700, 194289466, 196750278, 198553391, 199002385, 202798230, 210321202, 211437248, 244917089, 249875507, 251538128, 253511035, 254131864, 255166978, 263795390, 265398788, 275451339.

CRedit authorship contribution statement

K. Balkwill: Writing – original draft, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The author declares that he has no conflicts of interest.

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Supplementary materials

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