Three new species of *Diascia* (Scrophulariaceae) from the Western Cape, South Africa

K.E. STEINER*

**Keywords:** *Diascia* Link & Otto, new species, oil-collecting bees, oil-secreting trichomes, Scrophulariaceae, South Africa, Western Cape

**ABSTRACT**

Three new annual species of *Diascia* Link & Otto are described from the Western Cape Province of South Africa. *D. collina* is characterized by greyish magenta flowers with two divergent yellow sacs containing oil-secreting trichomes. It is restricted to granite outcrops in the vicinity of Saldanha Bay, from the West Coast National Park and Langebaan north to Vredenburg. *D. pusilla* is closely related to *D. collina*, but differs from that species in having smaller flowers with shorter, ± parallel sacs, and posticous filaments that lack a protuberance where they bend sharply backwards towards the upper lip. It occurs in grey to whitish sands usually near seasonally moist or wet areas. It has not been found more than 35 km from the coast and ranges from Modderrivier, south of Darling, north to Lambert’s Bay. *D. appendiculata* is related to *D. diffusa* (Thunb.) Benth. and is characterized by having small, mainly reddish lilac to greyish magenta flowers, two shallow depressions in the corolla tube at the base of the upper lip, and posticous filaments with sterile appendages. It is known from only six localities in the general vicinity of Citrusdal and occurs in fynbos vegetation on lower mountain slopes or flats, in loose alluvial sands derived from Table Mountain Sandstone.

**INTRODUCTION**

*Diascia* Link & Otto is a genus of ± 72 species of annual and perennial herbs endemic to southern Africa. Two sections have been recognized, section *Racemosae* with 27 species and section *Diascia* with about 45 species (Hilliard & Burtt 1984; Steiner unpubl.). Section *Racemosae* was revised by Hilliard & Burtt (1984) and three additional taxa were described more recently (Steiner 1989, 1999). Section *Diascia* has not been revised since Hiem’s (1904) treatment in *Flora capensis*, although many new species have been described in recent years as part of a revisionary study (Steiner 1992a, b, c, d 1995). Section *Diascia* consists solely of annual species, whereas section *Racemosae* is mostly perennial (81%). Three additional new species in Section *Diascia* from the Western Cape are described here. All descriptions are based on living material collected from the field. Flower colours are based on the *Methuen handbook of colour* (Kornerup & Wanscher 1984). Chromosome counts of these species were reported by Steiner (1996).

*Diascia collina* K.E.Steiner, sp. nov., *D. pusilla* K.E.Steiner proxima, sed differt corolla grandiore, sacculus corollae grandioribus divergentibus non parallelibus, et filamentis posticis protuberationibus instructis.

**TYPE.**—Western Cape, 3318 (Cape Town): Postberg Nature Reserve, Vlaeberg loop road, picnic and view site, ± 200 m, (AA), 14 Sept. 1988, Steiner IS 16 (NBG, holo.; BOL, E, K, MO, PRE, US, iso.).

Annual herb, rosulate, glabrous, simple or branching from base. *Stems* decumbent, up to 340 mm long, angular, up to 6-sided, ribs 2 or more, sides up to 2 mm wide. *Leaves* simple, alternate, opposite or whorled, petiolate; lamina ovate to obovate, 4–33 (–60) × 3–11 (–13) mm, apex rounded to acute or apiculate, base attenuate; margins lobed to divided, lobes or divisions oblong-ovate to triangular, entire, opposite or subopposite, occasionally alternate, apices rounded to acute or apiculate; petioles up to 37 mm long; cauline leaves progressively smaller upwards. *Flowers* axillary, 1 or 2 open per stem, faintly sweet-scented, nodding in early bud stage; flowering pedicels 20–65 mm long, ascending, dorsiventrally flattened especially where attached to flower, recurving in fruit except for upward curving apical portion. *Calyx* lobes 5, spreading, lanceolate, ± equal, 3.2–3.6 × 1.4–1.8 mm, acuminate, the two lower sepals slightly reflexed; margins white-ciliate. *Corolla* bilabiata, 5-lobed, limb 13.3–23.0 × 14.3–26.0 mm; lobes broadly oblong-ovobate, falciform, outer sides longer than inner sides, 4.4–7.1 × 5.2–5.7 (–7.9) mm, apices rounded, bases oblique; lateral lobes broadly ovobate, emarginate, 5.4–7.1 × 5.2–6.8 (–8.3) mm, sides ± equal; lower lobe obcordate, 6.2–9.7 × 5.4–8.1 (–11.4); upper lobes greyish magenta (14D6) with deep magenta veins or lines at base; other lobes similar in colour but without veining, all with scattered, dark purple, peltate glandular trichomes, especially where attached to flower, recurving in fruit except for upward curving apical portion. *Capsule* ovoid; *Ovary* oblong-ovoid, 5.1–8.1 × 3.3–5.8 mm, exceeding sepals at maturity, base oblique. *Seeds* reniform, 1.0–1.2 mm long, dorsal surface ridged, ventral surface with an oblong keyhole-like...
Bothalia 39,1 (2009)

FIGURE 1.—Diascia collina, Steiner 2219 (NBG). A, habit. B–D, flower: B, C, front and rear views; D, side view partially cut away. E, calyx; F, pistil; G, capsule. H, I, seed: H, ventral view; I, side view. Scale bars: A, 10 mm; B, C, 4 mm; D, E, 1 mm; F, 3 mm; G, 2 mm; H, I, 0.5 mm. Artist: Ellaphie Ward-Hilhorst.

opening formed by extensions of seed coat, long sides of opening bearing a reniform perforation; embryo curved. Chromosome no.: 2n = 18. Flowering time: August–September. Figure 1.

Diagnostic features: Diascia collina is most similar to D. pusilla, but it differs from that species in having a larger corolla (13.3–23.0 × 14.3–26.0 mm vs 9.1–13.5 × 9.0–14.3 mm), longer corolla sacs (4–5 mm vs 2.2–
2.5 mm long) and a protuberance from the posticus filaments where they bend backwards (Figure 1). *D. collina* is also similar to *D. capensis* (L.) Britten, but differs from that species in having stamens that are ± half the size and backwards-bending, rather than forward-arching. *D. collina* also has a shorter style (1.3—2.0 mm vs 3.5—5.2 mm) that is less curved, and corolla sacs that are strongly divergent, not ± parallel like those of *D. capensis*.

**Etymology:** the name refers to the hills of granite where the species occurs.

**Distribution and habitat:** *Diascia collina* is known only from the Postberg section of the West Coast National Park, from undeveloped areas in and around the town of Langebaan directly across the lagoon from Postberg, and from the granite outcrops on the southern end of Vredenburg (Figure 2). It ranges in elevation from near sea level to about 200 m. In Postberg, *D. collina* is fairly common around the Uitkyk picnic area on Vlaeberg ridge overlooking Langebaan Lagoon. It has also been seen near the entrance to the SADF restricted area at the northwest end of the Postberg Reserve. *D. collina* occurs under and around medium to large shrubs and can be considered endemic to Saldanha Granite Strandveld vegetation (Mucina & Rutherford 2006). In Langebaan and Vredenburg, this habitat is quickly disappearing due to residential expansion.

**Pollination and breeding system:** based on observations of cultivated plants, *Diascia collina* is self-incompatible and, at Postberg, it is pollinated by two species of oil-collecting bees, *Redhvilla peringueyi* Friese and *R. aurata* Whitehead & Steiner (Melittidae) (Whitehead & Steiner 2001). These bees use the specially modified stetae on their forelegs to collect oil from the paired yellow corolla sacs. The pollen is deposited on the frons or face of the pollinating bees.

**Other specimens examined**

WESTERN CAPE.—3217 (Saldanha): Vredenburg, new housing development at Witklip near old granite quarry (S32° 55.228′ E 17° 58.700′), ± 150 m, (–DD), 16 Sept. 2004, Steiner 4101 (CAS); ibid., 2 Sept. 2005, Steiner 4121 (CAS, K, NBG, PRE, US). 3318 (Cape Town): Postberg Nature Reserve, Vlaeberg loop road, picnic and view site, (–AA), 5 Sept. 1990, Steiner 2219 (NBG). Langebaan Hill, sandy slopes, (–AA), 24 Aug. 1995, Goldblatt & Manning 10280 (NBG); ibid., 25 Sept. 1995, Goldblatt & Manning 10321 (NBG); Langebaan, rocky outcrop near town, (–AA), 23 Aug. 1998, Goldblatt & Manning 10994 (NBG); Langebaan, hills, above town, in vacant lot opposite 82 Sunbird Lane (S 33°06.172′ E 18°02.574′), ± 18 m, (–AA), 30 Aug. 2001, Steiner 3697 (NBG, CAS); Langebaan, between day care centre and Pikkieldal fun park, (S33°05.461′ E18°02.207′), ± 5 m, (–AA), 6 Sept. 2002, Steiner 3870 (NBG, CAS).

**Diascia pusilla** K.E.Steiner, sp. nov., *D. collinae* K.E.Steiner proxima, sed differt corolla breviore, sacculis corollae parallellis non divergentibus et filamentis posticus sine protuberantibus.

**TYPE.—** Western Cape, 3218 (Clanwilliam): Farm Droogerivier, road 365, 8.6 km N of turnoff to Alexandershoek, ± 200 m west of road, (–BC), 16 Sept. 1988, Steiner 1819 (NBG, holo.; K, MO, PRE, iso.).

Annual herb, rosulate, glabrous, simple or branching from base. **Stems** decumbent, up to 150 mm long, angular, up to 6-sided, ribs 2 or more, sides up to 2 mm wide. **Leaves** simple, opposite or alternate, petiolate; lamina obovate to elliptic, 5—28 × 2—9 mm, apex acute to apiculate, base attenuate; margins lobed to divided, lobes or divisions ovate to triangular, entire, acute to apiculate; petioles up to ± 12 mm long; cauline leaves progressively smaller upwards. **Flowers** axillary, 1 to 3 open per branch, unscen ted; pedicels 17—23 mm long, ascending, dorsiventrally flattened especially where attached to flower, recurved in fruit except for upward curving apical portion. **Calyx** lobes 5, spreading, lanceolate, ± equal, 2.3—2.9 × 1.0—1.2 mm, acuminate; margins white-ciliate. **Corolla** bilabiata, 5-lobed, limb 9.1—13.5 × 9.0—14.3 mm; lobes broadly ovate; upper lobes 2.6—3.5 × 2.9—4.0 mm, outer sides longer than inner sides, apices rounded to emarginate, bases oblique; lateral lobes 2.5—3.5 × 3.0—3.5 mm, sides ± equal, apices rounded; lower lobe 3.3—5.0 × 3.2—5.8 mm, emarginate to obcordate; upper lobes greyish magenta (14D6) on inner surface, pinkish white (13A2) on reverse side, with deep magenta (14E8) lines at base; other lobes similar in colour but lacking lines, sparsely glandular puberulous with dark violet, glandular trichomes, especially on inner surface near base; tube shallowly cupped, deep magenta and yellow, bissaccate, sacs ovate in outline, 2.2—2.5 × 1.2—1.4 mm, projecting downward and diverging slightly at tips, yellow, oil-secreting glandular trichomes within; central stamen-bearing boss oblique, anticus portion 1.2—1.9 mm high, deep magenta (14E8), posticus portion 0.3—0.5 mm high, yellow. **Stamens** 4, erect, partly hidden; anticus filaments (twisted at base and appearing posticus) falciform, 3.0—3.2 mm long, bases strongly curved, sparsely pubescent, trichomes clavate; posticus filaments geniculate, thickened, 2.0—2.5 mm long, bend pubescent, trichomes clavate, dark violet, apical portions, below antlers, bent forward without enlargement; all filaments greyish magenta (13E6) except...
just below anthers; anthers 0.3–0.5 mm long, strongly cohering, grey; pollen yellow to orange. Ovary oblong-ovoid, laterally compressed contrary to septum, 1.2–1.5 \( \times \) 0.9–1.0 mm; style 1.3–1.5 mm long, curving forward at tip; stigma subcapitate, surrounded by anthers; ovules \( \pm 23–38 \). Capsule falciform ovoid, 6.0–7.1 \( \times \) 3.5–4.6 mm, \( \pm \) twice as long as calyx at maturity. Seeds reniform, 0.9–1.2 mm long, dorsal surface ridged, ventral surface with an oblong, keyhole-like opening formed by extensions of seed coat, long sides of open-
ing bearing a reniform perforation; embryo curved. **Chromosome no.:** 2n = 18. **Flowering time:** August—September. Figure 3.

**Diagnostic features:** Diascia pusilla differs from its nearest relative, *D. collina*, in corolla size, shape of the posticus filaments, size and shape of the corolla sacs, and habitat. The difference in flower size between the two taxa is not simply a function of plant vigour, since small plants of *D. collina* at Postberg, with only a few leaves, have much larger flowers than robust plants of *D. pusilla*. With many large leaves and long thick stems, at *pusilla*, lacks the protuberance on each posticus filament.

**Chromosome no.:**

Bothalia 39,1 (2009) 15

Bothalia 39,1 (2009)

Diascia appendiculata K.E.Steiner, sp. nov., *D. diffusae* (Thunb.) Benth. proxima, sed differt floribus brevioribus, sacculis corollae destitutis, staminibus erectis nec patentibus et filamentos glabris.

**TYPE.—** Western Cape, 3218 (Clanwilliam); Grey’s Pass (Modderriver), 4.2 km N of turnoff to Paleishewel, ± 290 m, (~DB), 9 Sept. 1989, Steiner 1978 (NBG, holos.; CAS, K, MO, PRE, US, iso.).

Annual herb, rosulate, glabrous, simple or branching from base. **Stems** decumbent, up to 220 mm long, angular, up to 6-sided, ribs 2 or more, sides up to 2 mm wide. **Leaves** simple, alternate, opposite or whorled, petiolate, erect or spreading; lamina mostly oblong, but also ovate to obovate, 9–35 × 3–9 mm, apex acute to rounded, base attenuate; margins sinuate, pinnatifid or pinnatisect, lobes up to ± 5 mm long, ovate, obovate or deltoid, apices rounded to acute; petioles to up to ± 15 mm long; cauline leaves progressively smaller upwards. **Flowers** axillary, 1 or 2 open flowers per stem, nodding in bud, long pedicelate; pedicels 17–53 mm long, ascending, dorsiventrally flattened especially where attached to flower, elongating and spreading at right angles to stem in fruit, with an abrupt downward curve 3–4 mm from base of developing capsule. **Calyx** lobes 5, spreading, lanceolate, acuminate, margins white-ciliate, upper 3 segments ± equal, 2.4–3.1 × 1.0–1.6 mm, lower 2 segments slightly wider. **Corolla** bilabiata, 5-lobed, limb 7.4–14.3 × 7.7–14.8 mm; upper lobes ovate to obovate, 2.0–4.7 × 2.5–5.2 mm, outer sides longer than inner sides, apices rounded to emarginate, bases oblique; lateral lobes oblong-ovate, 2.5–4.6 × 2.8–4.6 mm, sides ± equal in length, apices rounded to emarginate, lower lobe obcordate, 3.1–5.0 × 3.6–6.4 mm, all lobes reddish lilac (14C4) to greyish magenta (14D6) on inner surface and violet-white to purplish white on reverse side, with scattered black or clear glandular trichomes on both sides; tube shallowly cupped, dark ruby to violet-brown, very shallowly bisaccate, sacs or depressions 0.3–1.0 × 1.0–1.6 mm, 0.5–0.7 mm deep, yellow, oil-secreting trichomes clustered within; central stamen-bearing boss oblanceolate, sparsely glandular pubescent, anticorpus portion 0.5–1.0 mm high, ruby, posticus portion ± 2.0 mm high, yellow. **Staminodes** 4, erect from the boss; filaments ruby, usually glabrous, occasionally covered with dark purple, ciliate trichomes; anticorpus filaments (twisted at the base and appearing posticus) ± straight, 2.1–2.5 mm long, base strongly curved; posticus filaments ± 2.3 mm long, with sterile appendages, ± 0.8 mm from base, appendages 0.1–0.8 mm long, sometimes reduced in length to a small stub, filament above bend ± 1.5 mm long; anthers 0.3 mm long, strongly cohering, greenish yellow; pollen orange. **Ovary** ovoid, laterally compressed contrary to septum, 1.2–1.5 × 0.8–1.1 mm, falciform; ovules 27–47; style ± 1.2 mm long,
Bothalia 39,1 (2009)

FIGURE 4.—Diascia appendiculata, Steiner 1978 (NBG). A, habit. B–D, flower: B, C, front and rear views; D, side view partially cut away. E, pistil; F, capsule; G, calyx. H, I, seed: H, ventral view; I, side view. Scale bars: A, 10 mm; B, C, 3 mm; D, E, 1 mm; F, 1 mm; G, 4 mm; H, I, 1 mm. Artist: Ellaphie Ward-Hilhorst.

deflected upwards, ± straight or curved forward near tip; stigma capitale, surrounded by anthers or emerging slightly. Capsule falciform ovoid, (5.0–)6.4–7.5 × (2.5–)4.0–5.0 mm, about twice as long as calyx at maturity, base oblique, often resting on soil surface during development with pedicel ascending just before dehiscence. Seeds reniform, 1.3–1.5 mm long, dorsal surface with parallel ridges, ventral surface with oblong keyhole-like opening formed
by extensions of seed coat, long sides of opening bearing reniform perforation; embryo curved. **Chromosome no.:** 2n = 18. **Flowering time:** August–September.

**Diagnostic features:** *Diascia appendiculata* is most closely allied to *D. diffusa*. Both species have posticous filaments with sterile appendages, but the stamens are erect in *D. appendiculata* and projecting forward in *D. diffusa*. Furthermore, the filaments in *D. appendiculata* are usually glabrous, whereas those of *D. diffusa* have clavate trichomes. Both species also have two localized patches of oil-secreting trichomes, but in *D. diffusa* they are clustered in two short, but distinct, spurs (at the base of the upper corolla lip), whereas in *D. appendiculata* they are present in two shallow, yellow depressions that may or may not be visible on the outside of the corolla as a slight swelling of the tube.

**Etymology:** the name refers to the filament appendages.

**Distribution and habitat:** *Diascia appendiculata* is known from only six localities in the general vicinity of Citrusdal (Figure 2). It occurs between elevations of 100 to 300 m in fynbos vegetation on lower mountain slopes or flats in loose alluvial sands derived from Table Mountain Sandstone. In five of the localities it occurred on first year burns, while in the other locality it was collected from a roadside area next to cultivated land at the northeastern base of the Piketberg. On Grey’s Pass, it was most abundant in the first season after fire, but was also observed in the second and third years (1990, 1991) after fire. It could not be found in the fifth and sixth years. The stimulation of germination in response to fire is also found in other *Diascia* species such as *D. elongata* Benth. and *D. maculata* K.E. Steiner.

**Pollination and breeding system:** *Diascia appendiculata* is facultatively autogamous. However, because it secretes floral oil, it is probably visited and cross-pollinated, at least occasionally, by small oil-collecting *Rediviva* bees (Melittidae) such as *R. parva* Whitehead & Steiner, *R. intermixta* (Cockrell) or *R. aurata* Whitehead & Steiner (Whitehead & Steiner 2001).

**Other specimens examined**

**WESTERN CAPE.** 3218 (Clanwilliam): Farm Swartboskraal, 6.7 km N of turnoff to Citrusdal on Paarsheuwel-Sandberg road, 270 m, (-BC), 22 Aug. 1991, Steiner 2334 (NBG); ibid, 1.5 km S of farm entrance, 218 m, (-BC), 31 Aug. 2004, Steiner 4082 (NBG); Farm Kriegers, 7.2 km E of old Clanwilliam-Citrusdal road on road to Algeria, ± 290 m, (-BD), 16 Sept. 1989, Steiner 2099 (NBG); ibid., 24 Sept. 1989, Steiner 2025 (NBG); N7, 1.6 km N of turnoff to Citrusdal, ± 280 m, (-DB), 10 Aug. 1998, Steiner 3287 (NBG); Farm Kanarieberg, Road 366, 5.7 km S of junction with Road 365 to Lambert’s Bay, ± 110 m, (-DB), 21 Sept. 1984, Steiner 776 (NBG). 3219 (Wuppertal): Farm Moddersaele, 13.6 km south of Citrusdal on road to Keerom, ± 210 m, (-CA), 6 Sept. 1991, Steiner 2357 (NBG); Farm Kammelkies-vlei, 19.6 km south of Citrusdal on road to Keerom, ± 250 m, (-CC), 6 Sept. 1991, Steiner 2362 (NBG).

**ACKNOWLEDGEMENTS**

I thank Western Cape Nature Conservation and the Western Cape National Park (formerly Postberg Wildflower Reserve) for permission to collect in areas under their jurisdiction. I thank SANBI for the loan of specimens from NBG and PRE and for permission to use the illustrations by E. Ward-Hillorst. I also thank the Compton Herbarium for the use of their facilities and S. Smithies and T. Arnold for helpful comments on the manuscript.

**REFERENCES**

HIERN, W.P. 1904. Scrophulariaceae. In W.T. Thiselton-Dyer, *Flora capensis* 4.2: 121–420. Reeve, London.

HILLIARD, O.M. & BURTT, B.L. 1984. A revision of *Diascia section Racemosa*. *Journal of South African Botany* 50: 269–340.

KORNERUP, A. & WANSCHER, J.H. 1984. Methuen handbook of colour. Fletchcr, Norwich.

MUCINA, L. & RUTHERFORD, M.C. (eds). 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

STEINER, K.E. 1989. A new species of *Diascia* (Scrophulariaceae) from the southern Drakensberg. *South African Journal of Botany* 55: 250–253.

STEINER, K.E. 1992a. A new *Diascia* species (Scrophulariaceae) from the Richtersveld, South Africa. *South African Journal Botany* 58: 36–38.

STEINER, K.E. 1992b. Two new *Diascia* species (Scrophulariaceae) from the Little Karoo. *South African Journal of Botany* 58: 39-47.

STEINER, K.E. 1992c. Two new *Diascia* (Scrophulariaceae) species from the Nieuwoudtville area, western Cape. *South African Journal of Botany* 58: 202–206.

STEINER, K.E. 1992d. Three new species of *Diascia* (Scrophulariaceae) from the western Cape. *Bothalia* 22: 13–18.

STEINER, K.E. 1995. Three new *Diascia* species from arid areas of the Western Cape, South Africa. *South African Journal of Botany* 61: 72–79.

STEINER, K.E. 1996. Chromosome numbers and relationships in tribe Hemimerideae (Scrophulariaceae). *Systematic Botany* 21: 63–76.

STEINER, K.E. 1999. A new species of *Diascia* (Scrophulariaceae) from the Eastern Cape (South Africa), with notes on other members of the genus in that region. *South African Journal of Botany* 65: 223–231.

WHITEHEAD, V.B. & STEINER, K.E. 2001. Oil-collecting bees of the winter rainfall area of South Africa (Melittidae, Rediviva). *Annals of the South African Museum* 108: 143–277.