

A taxonomic revision of the South African endemic genus *Dasispermum* (Apiaceae, Apioideae)

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Abstract

A taxonomic revision of the recircumscribed South African endemic genus *Dasispermum* Raf. is presented, including keys to the species, complete nomenclature, typifications, descriptions, and geographical distributions. In addition, two new species, *D. grandicarpum* Magee & B.-E. van Wyk and *D. perennans* Magee & B.-E. van Wyk, are described. Seven species of *Dasispermum* are now recognised and can be distinguished from one another by their habit (life history and growth form), leaf morphology (leaf texture, leaf colour and width of the ultimate leaflet segments), inflorescence structure (length of the peduncle, presence or absence and division of involucre and involucre bracts), fruit morphology (relative length of the styles, fruit size and the prominence and relative orientation of the ribs) and fruit anatomy (shape of the cells external to the vittae).

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1. Introduction

The circumscription of the genus *Dasispermum* Raf. was expanded by Magee et al. (2009b) to include five species previously treated as *Sonderina* H. Wolff as well as the only South African species of *Stoibrax* Raf., namely *S. capense* (Lam.) B.L. Burtt. As a result, this previously monotypic genus now comprises seven South African endemic species, two of which (*Dasispermum* sp. 1 and *D.* sp. 2) were undescribed at the time and are here formalised as *D. perennans* Magee & B.-E. Van Wyk and *D. grandicarpum* Magee & B.-E. van Wyk respectively.

This conclusion resulted from a thorough taxonomic study of *Dasispermum* and related genera using molecular, morphological and anatomical data (Magee et al., 2009b). The geographically disjunct *Stoibrax* was shown to be polyphyletic, with the type of the genus from North Africa placed within the tribe Apieae and the only South African species embedded

within the genus *Sonderina*. Such a treatment was proposed by Adamson (1939) who considered *Sonderina hispida* (Thunb.) H. Wolff and *Stoibrax capense* to be closely related (as did Sonder, 1862). Furthermore, *Sonderina* was rendered paraphyletic by the inclusion of *Dasispermum suffruticosum* (Berg.) B.L. Burtt, which was strongly allied to a clade including *Sonderina hispida* and *Sonderina* sp. 1 (described here as *D. perennans*). *Dasispermum* s.s. is traditionally defined by the succulent or semi-succulent leaves and often winged fruit, both of which were argued by Magee et al. (2009b) to be adaptations to the harsh littoral conditions in which this species occurs. Leaf succulence and rolled margins are both common halophytic adaptations (Mucina et al., 2006b). Based on the results of phylogenetic analyses of separate and combined molecular and morphological data (Magee et al., 2009b), an expanded *Dasispermum* s.l. was strongly supported as part of the *Capnophyllum* group (together with the Cape endemic genera *Capnophyllum* Gaertn. and *Scaraboides* Magee & B.-E. van Wyk) within the *Lefebvreia* clade of the tribe Tordylieae. The genus, in its new circumscription, can be distinguished from all other genera within the *Lefebvreia* clade by a combination of characters, namely the sympodial growth habit (resulting in leaf-opposed umbels), papillose petals, isodiametric

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fruit with the median and/or lateral ribs as prominent as the marginal ribs, the narrow commissure extending, at most, to the base of each rib, and the presence of square or radially elongated (upright) cells external to the vittae of the fruit.

2. Materials and methods

The complete collections of *Dasispermum* from the following herbaria were studied: BM, BOL, JRAU, K, LE, MO, NBG (including SAM and STE), PRE and S. This information was supplemented by extensive field work of almost all the taxa throughout much of their known geographical distributions. The recorded distribution of each species was verified and mapped using this material, together with geographical information from Leistner and Morris (1976). The species are arranged in the taxonomic treatment according to phylogenetic results recovered by Magee et al. (2009b) in the combined analysis. FAA and rehydrated herbarium material were used to study the fruit anatomy. This material was treated according to a slight modification of the method of Feder and O'Brien (1968) for embedding in glycol methacrylate (GMA), involving a final infiltration of the material in GMA for five days. Transverse sections, about 3 µm thick, were made using a Porter-Blüm ultramicrotome and stained using the periodic acid Schiff/toluidine blue (PAS/TB) method of Feder and O'Brien (1968). Voucher specimens for the fruit anatomical study are as follows: *Dasispermum capense*: Anon. sub PRE 7732 (PRE); Salter 7733 (BOL); Boatwright et al. 212 (JRAU). *D. grandicarpum* Magee & B.-E.van Wyk: Lutzeyer s.n. (JRAU). *D. hispidum*: Van Wyk 3518 (JRAU); Van Wyk 3539 (JRAU). *D. humile* (Meisn.) Magee & B.E.van Wyk: Van Wyk 1759 (JRAU); Van Wyk 1895 (JRAU). *D. perennans*: Magee & Boatwright 105 (JRAU). *D. suffruticosum*: Du Plessis 14 (PRE); Reyneke 32 (PRE); Retief 1196 (PRE); Tilney 204 (JRAU); Arnold 1170 (PRE); Winter 78 (JRAU); Winter & Tilney 153 (JRAU); Taylor 9876 (PRE). *D. tenue* (Sond.) Magee & B.E.van Wyk: Van Wyk 3433 (JRAU); Zeyher s.n. (K).

3. Results and discussion

3.1. Vegetative morphology

The species of *Dasispermum*, with the exception of *D. grandicarpum*, exhibit a sympodial growth habit as found in the other taxa of the *Capnophyllum* group. *Dasispermum suffruticosum* and *D. perennans* differ in being short-lived suffrutices with a permanent, slightly woody stem (Fig. 1a–e) — the others are all annuals. The young plants of both these species have an erect, only slightly branched habit but become well-branched and sprawling due to sprouting and subsequent seasonal growth from the nodes of the main stem. *Dasispermum hispidum* and *D. capense* can often be distinguished from one another by their habit. In *D. hispidum* (as in *D. humile* and *D. tenue*) the branches are usually erect to ascending or somewhat sprawling, while in *D. capense* they are almost always decumbent or prostrate (Fig. 1f), although exceptions to this have been recorded. Due to a great deal of ambiguity regarding the concepts of many of the species, the

herbarium records and previous treatments of the South African flora (Goldblatt and Manning, 2000; Mucina et al., 2006a) have consistently misidentified small forms of *Dasispermum hispidum*, particularly in the Northern Cape Province, as *D. tenue*. Although *D. tenue* is indeed a relatively small herb (Fig. 1g), all of the species of *Dasispermum* exhibit considerable variation in the size of the mature plants depending on environmental factors. The herbaceous stems are conspicuously purple-blotched in *D. grandicarpum*, while in the other species they are immaculate (green, glaucous or reddish in colour). The littoral *D. suffruticosum* is easily distinguished from the other species by the usually firm and semi-succulent leaves with the ultimate leaflet segments curled inwards (Fig. 1b). The ultimate leaflet segments of the other species are herbaceous or coriaceous (Fig. 1c–g) and usually less than 1 mm broad, except in *D. humile* where they are diagnostically broader and ≥2 mm wide.

3.2. Reproductive morphology

The umbels of all the species except *D. grandicarpum* are leaf-opposed due to the sympodial growth habit, as is also found in *Capnophyllum* and *Scaraboides* (Magee et al., 2009a,b). In contrast, the main axis of *D. grandicarpum* appears to have monopodial growth which terminates in a primary umbel. *Dasispermum tenue* is most easily distinguished from the other species by the consistently sessile or subsessile umbels (Fig. 1g). While subsessile umbels may occur in the other species, particularly in the closely related *D. humile*, only in *D. tenue* are all of the umbels borne on a peduncle less than 4 mm long. The presence or absence of involuclal and involuclal bracts, a character emphasised in the treatment of Wolff (1927), as well as their division and texture, are useful diagnostic characters. Involuclal bracts are almost always absent in *D. humile* and *D. tenue*, as well as the involuclal bracts in the latter species. In *D. capense*, *D. hispidum* and *D. perennans* at least one of the involuclal bracts is often pinnately divided and thus resembles the leaves. Similarly, the involuclal and involuclal bracts of *D. suffruticosum* share the somewhat succulent texture typical of the leaves of this species. Unlike the species of *Capnophyllum*, the rays and raylets of *Dasispermum* are generally scabrid and not glabrous (Magee et al., 2009a).

The flowers are similar in all the species: white and diagnostically with a papillose surface sculpturing, as found in most of the species of the *Capnophyllum* group (except *Dasispermum suffruticosum* and *Scaraboides manningii* Magee & B.-E.van Wyk). This character was reconstructed as either a synapomorphy for the *Capnophyllum* group, with reversals in *Scaraboides manningii* and *Dasispermum suffruticosum*, or as a convergent character supporting both *Capnophyllum* and *Dasispermum* s.l., with a reversal in *Dasispermum suffruticosum* (Magee et al., 2009b). The species of *Dasispermum* generally have a deeply emarginate petal apex which is a useful distinguishing floral character when compared to the usually truncate apices found in the genus *Capnophyllum*. *Dasispermum tenue*, however, differs from the other species in the generally smaller petals with truncate to only slightly emarginate apices. As in *Capnophyllum*, the styles of all the species are at first erect and short, but often



Fig. 1. The diversity in habit found amongst the species of *Dasispermum*. The habit varies from short-lived perennial suffrutices, as in *D. suffruticosum* (a, b) and *D. perennans* (c–e), to annuals, as in *D. capense* (f) and *D. tenue* (g). Photographs taken by A.R. Magee except (a) by Ms M.M. le Roux and (g) by Mrs A. le Roux.

lengthen and become reflexed as the fruit mature. In most of the species, the styles usually extend beyond the base of the stylopodium and in *D. capense* may often extend well beyond the base of the fruit. Only in *D. tenue* do they remain short, becoming reflexed and extending at most to near the base of the stylopodium.

The size and shape of the fruit (Fig. 2) are important diagnostic characters. *Dasispermum grandicarpum* (Fig. 2f) and often *D. suffruticosum* (Fig. 2g) have relatively large fruit that are ≥ 4 mm in length, although those of *D. suffruticosum* may be much smaller (Fig. 2g2). *Dasispermum capense*

(Fig. 2d) has the smallest fruit, not much larger than the ovary at maturity. In this species the fruit bulge dorsally outwards so that in lateral view they are broader than long with a prominently cordate base. Although the fruit of *D. hispidum* (Fig. 2c) may occasionally almost approach those of *D. capense* in shape, becoming broadly ovate, they are never broader than long. Furthermore, *D. capense* is easily distinguished from the other species, including *D. hispidum*, by the strongly concave appearance of the marginal ribs in lateral view. The two ribs are widely separated from one another, while in all the other species they are close together and parallel, or at most only very slightly



Fig. 2. Variation in fruit morphology (a–d) of *Dasispermum* species: (a) *D. tenue*, (b) *D. humile*, (c) *D. hispidum*, (d) *D. capense*, (e) *D. perennans*, (f) *D. grandicarpum*, (g) *D. suffruticosum*. Vouchers: a1. Van Wyk et al. 3433 (JRAU); a2. Bolus 11291 (BOL); a3. Schlechter 1703 (BOL); b1. Flanagan 1183 (BOL); b2. Van Wyk & Van Wyk 1895 (JRAU); b3. Hilliard & Burt 148b (PRE); b4. Rudatis 1811 (PRE); c1. Magee et al. 107 (JRAU); c2. Magee et al. 109 (JRAU); c3. Hugo 1988 (PRE); c4. Magee et al. 108 (JRAU); c5. Van Wyk et al. 3518 (JRAU); c6. Rodin 1252 (BOL); c7. Stirton 11190 (PRE); d1. Thompson 2829 (NBG); d2. Stephens & Gloven 8723 (BOL); d3. Schlechter 11404 (BOL); d4. Compton 22244 (NBG); d5. Salter 7732 (BOL); e1. Magee & Boatwright 105 (JRAU); f1. Lutzeyer s.n. (JRAU); g1. Magee et al. 117 (JRAU); g2. Boucher 3985 (PRE). Scale: 1 mm.

concave, and separated from one another. The ribs are usually cartilaginous and only slightly prominent, except in *D. suffruticosum* (Figs. 2g and 3g) where they are corky (at least before desiccation of the fruit) and either very prominent or more usually extending into broad wings. In *D. grandicarpum* (Fig. 2f), *D. humile* (Fig. 2b) and *D. tenue* (Fig. 2a) the ribs have a prominent fibrous ridge on the dorsal surface that is not present in the other species. The fruit are glabrous to only very slightly scabrid in *D. grandicarpum*, *D. humile*, *D. suffruticosum* and *D. tenue*. In *D. capense* (Fig. 2d) they may be scabrid to pustulate, while in *D. hispidum* (Fig. 2c) the fruit may be slightly scabrid to densely pilose. Traditionally, *Sonderina caruifolium* was largely distinguished from *S. hispida* by the glabrous as opposed to hispid or pilose fruit. However, after extensive field studies of these

species throughout their range, it was observed that this character varied considerably even within populations. As a result, Magee et al. (2009b) treated *Sonderina caruifolium* as a synonym of *Dasispermum hispidum*.

In transverse section the fruit of *Dasispermum* (Fig. 3a–g) are isodiametric and either homomericarpic, as in *D. capense* (Fig. 3e), *D. grandicarpum* (Fig. 3f), *D. hispidum* (Fig. 3d), *D. humile* (Fig. 3c), *D. perennans* (Fig. 3b) and *D. tenue* (Fig. 3g), or often heteromericarpic as in *D. suffruticosum* (Fig. 3a1, a2). As mentioned in Magee et al. (2009b), one of the diagnostic characters for the genus is that the median and/or lateral ribs are \pm as well developed as the marginal ribs. In all the species there are two commissural and four vallecular vittae. The cells external to both the commissural and vallecular vittae are prominent and

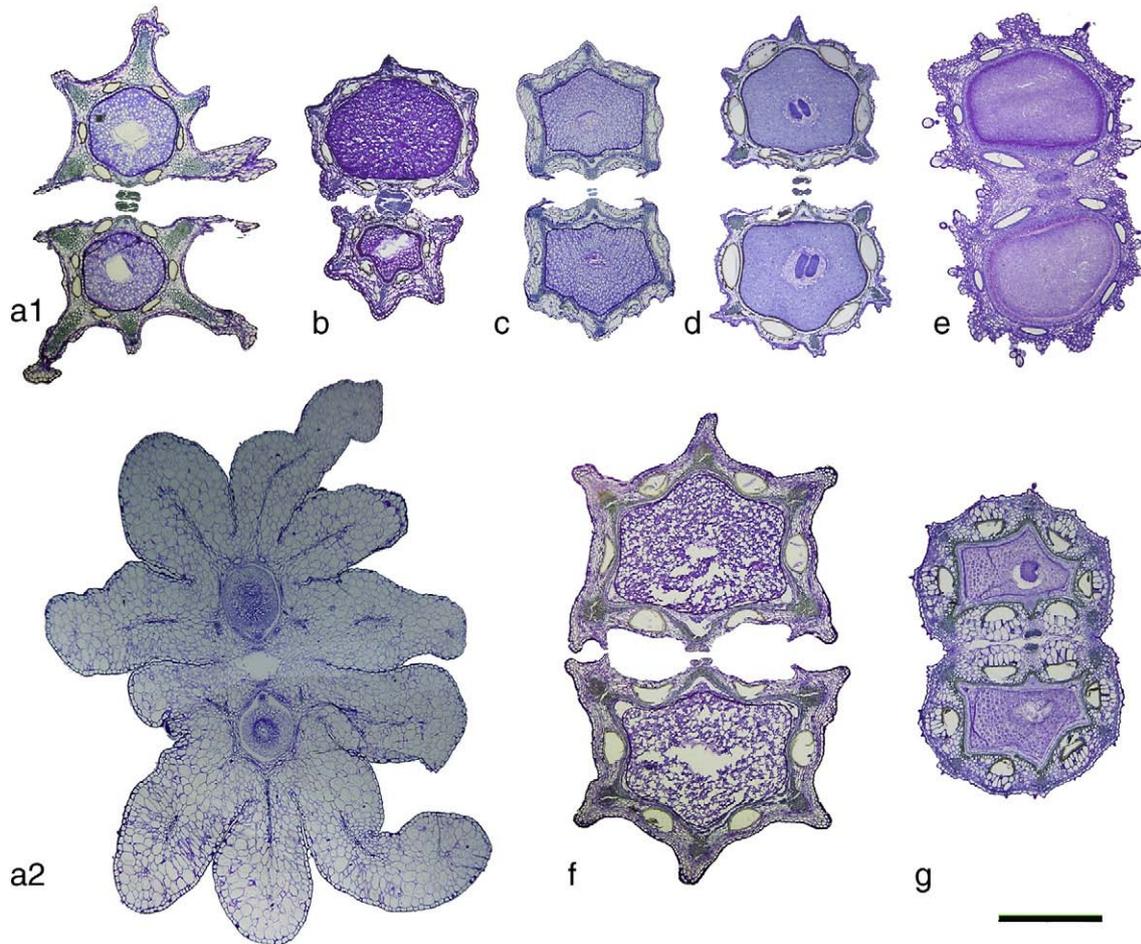


Fig. 3. Transverse sections through the fruit of *Dasispermum* species. (a) *D. suffruticosum*, (b) *D. perennans*, (c) *D. humile*, (d) *D. hispidum*, (e) *D. capense*, (f) *D. grandicarpum*, (g) *D. tenue*. Vouchers: a1. Taylor 9896 (PRE); a2. Tilney 204 (JRAU); b. Magee & Boatwright 105 (JRAU); c. Van Wyk & Van Wyk 1895 (JRAU); d. Van Wyk et al. 3539 (JRAU); e. Boatwright et al. 212 (JRAU); f. Lutzeyer s.n. (JRAU); g. Van Wyk et al. 3433 (JRAU). Scale: 0.7 mm.

either square (Fig. 4c–g) or radially elongated (Fig. 4a–b), forming a distinct layer. This layer of square or radially elongated cells around the vittae is a distinct generic apomorphy for an expanded *Dasispermum* s.l. (Magee et al., 2009b). The cells around the vittae of *D. capense* (Fig. 4f), *D. grandicarpum* (Fig. 4g), *D. hispidum* (Fig. 4e), *D. perennans* (Fig. 4c) and *D. suffruticosum* (Fig. 4d) are square, while those in *D. humile* (Fig. 4a) and *D. tenue* (Fig. 4b) are radially elongated. Those of *D. tenue* are the most prominent as they are enlarged and usually composed of two or three layers of radially elongated cells. Unfortunately, this character is not always visible in rehydrated fruit. The commissure is narrow and does not extend beyond the base of the marginal ribs. All other genera within the *Lefebvreia* clade have a broad commissure which extends well beyond the base of the marginal ribs and often to their tips.

4. Taxonomic treatment

4.1. *Dasispermum*

Dasispermum Raf., Good Book 56 (1840), reimp. Scad. Gen. Omb. Pl. 56 (Amer. Midl. Nat. Repr. no. 3. 1913); Merrill, Index Raf. 179 (1949); B.L. Burt in Notes RBG Edinb. 45: 92 (1988);

emend. Magee and B.-E. van Wyk in Magee et al., Syst. Bot. 34: 589 (2009). Type: *D. maritimum* Raf., nom. illeg. (= *D. suffruticosum* (Berg.) B.L. Burt)

Heteroptilis [E. Mey. ex.] Meisn. in J.D. Hook., Lond. J. Bot. 2: 534 (1843); Leute in Ann. Nathist. Mus. Wien 73: 89 (1969). Type: *H. arenaria* Meisn.

Sonderina H. Wolff in Pflanzenr. Heft 90: 92. 1927. Type: *Sonderina hispida* (Thunb.) H. Wolff (lecto., designated by Burt 1991).

Carum sect. *Brachyapium* Baill., Hist. Pl. 7: 118 (1879). *Brachyapium* (Baill.) Maire in Bull. Soc. Hist. Nat. Afr. Nord 23: 186. 1932. Type: *Ptychotis didyma* Sond.

Erect to sprawling or prostrate, sympodial or rarely monopodial annual or short-lived perennial herbs or suffrutices, 0.03–0.8 m tall. *Stems* herbaceous or permanent and woody, immaculate or sometimes purple-blotched, simple to well-branched; branches erect to decumbent or prostrate, sometimes sprouting at the nodes. *Leaves* cauline, 15–120 × 6–50 mm, becoming smaller acropetally, glabrous or scabrid, pinnate to 2-pinnate, herbaceous to coriaceous or firm and semi-succulent; ultimate leaflet segments linear-oblong to oblong, laminate to subterete or turgid, sometimes strongly involute (curled inwards), concolorous or discolorous, green or glaucous, apex acute to obtuse, margins entire or toothed, venation

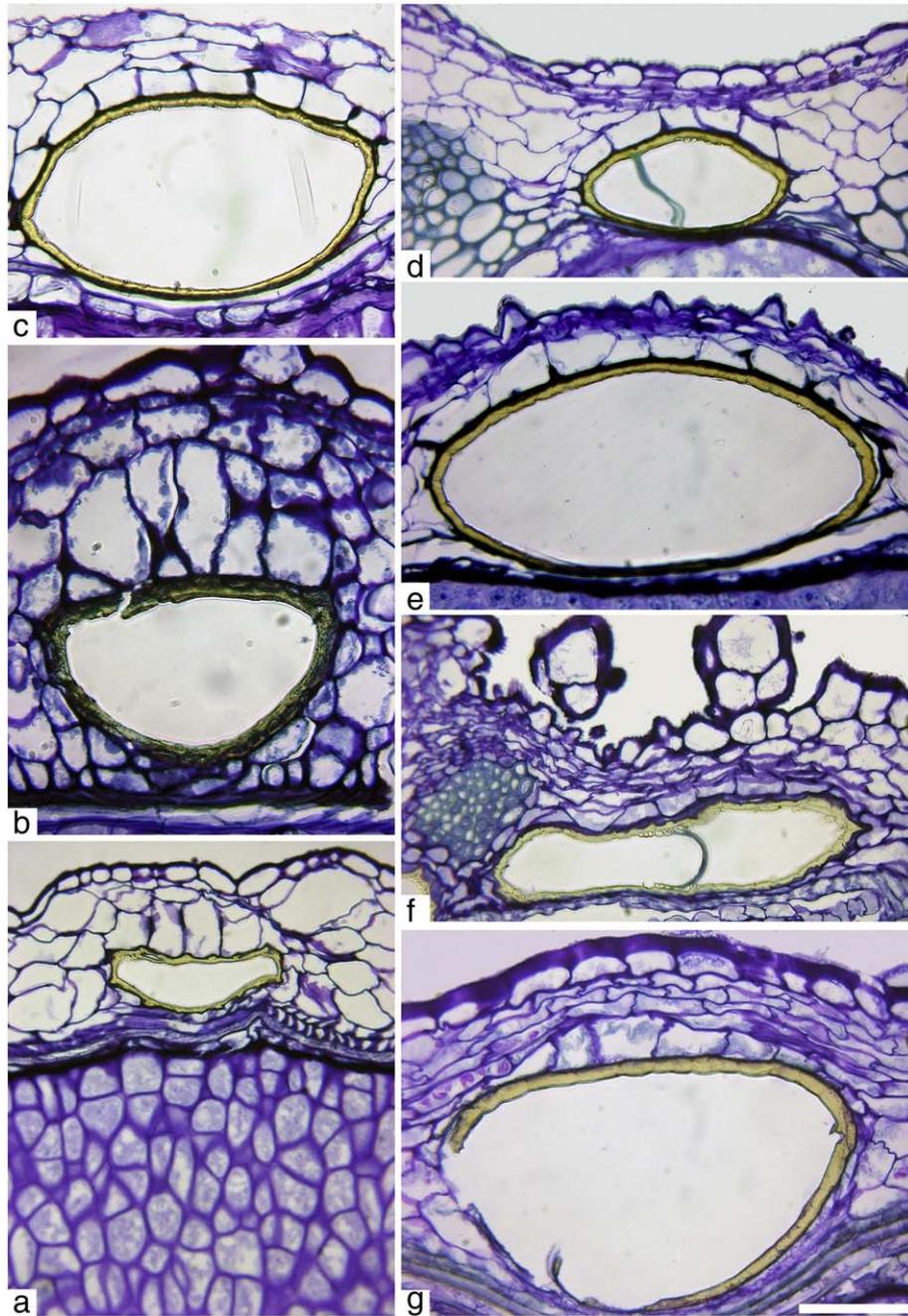


Fig. 4. Transverse sections through portions of the fruit of *Dasispermum* showing the radially elongated (a, b) or square (c–g) cells external to the vittae. Vouchers: a. *D. humile* (Van Wyk & Van Wyk 1895, JRAU); b. *D. tenue* (Van Wyk et al. 3433, JRAU); c. *D. perennans* (Magee & Boatwright 105, JRAU); d. *D. suffruticosum* (Taylor 9896, PRE); e. *D. hispidum* (Van Wyk et al. 3539, JRAU); f. *D. capense* (Salter 7733, BOL); g. *D. grandicarpum* (Lutzeayer s.n., JRAU). Scale: 0.07 mm.

visible or obscure. *Petioles* 5–60 mm long, basally sheathing, glabrous or scabrid. *Umbels* compound, sessile or peduncle to 100 mm long; involucre bracts 0 to 6, free, lanceolate to ovate or foliose, coriaceous or slightly succulent, acute to acuminate, margins often membranous, glabrous or scabrid; rays 3 to 26, 5–50 mm long at anthesis, glabrous or scabrid; involucre bracts 0 to 6, free, linear to lanceolate, coriaceous or slightly succulent, acute to acuminate, margins often membranous, glabrous or scabrid; raylets 4 to 14, 2–10 mm long at anthesis, glabrous or scabrid. *Flowers* hermaphroditic, pentamerous; sepals indistinct, triangular; petals white, broadly oblong to ovate or obovate, 0.4–1.2 × 0.4–1.2 mm,

acuminate but apices inflexed thus apparently truncate to deeply emarginated, septum present on inner face, smooth or papillose; stamens with anthers inflexed; ovary glabrous or pustulate or scabrid to densely pilose; stylopodium shortly conical; styles at first erect, short, 0.2–1.4 mm long, often lengthening as fruit matures, becoming reflexed and extending up to or beyond base of stylopodium. *Fruit* a schizocarp, isodiametric, elliptic or ovate to very broadly ovate or rotund, sometimes transversely oblong (broader than long) in lateral view, 0.6–6.0 × 1.0–5.0 mm, base obtuse to cordate, apex obtuse; mericarps homomorphic or rarely heteromorphic, glabrous or pustulate or scabrid to densely pilose; if

homomericarpic then with median and lateral ribs as well developed as marginal ribs, if heteromericarpic then with either median or lateral ribs as well developed as marginal ribs, slightly to very prominent or winged, cartilaginous or corky, dorsal surface sometimes with fibrous ridges, glabrous to densely pilose; marginal ribs parallel or strongly concave in lateral view; commissural vittae 2; vallecular vittae 4; commissure narrow, not extending beyond the base of the marginal ribs; carpophore bipartite.

4.1.1. Diagnostic characters

Dasispermum can be distinguished from all other genera within the *Lefebvrea* clade by a combination of characters, namely the mostly sympodial growth habit (resulting in leaf-opposed umbels), mostly papillose petals, isodiametric fruit with the median and/or lateral ribs as prominent as the marginal ribs, the narrow commissure extending to, at the most, the base of each rib, and the presence of a row of square or radially elongated cells external to the vittae of the fruit. When in flower the annual species may be confused with species of *Capnophyllum* but can be distinguished by the combination of the usually erect to ascending branches, glabrous and coriaceous leaves, scabrid rays and raylets, and the deeply emarginate petals.

4.1.2. Distribution and habitat

The seven species are endemic to South Africa (Figs. 5 to 9), occurring widely in the Eastern, Western and Northern Cape Provinces with *D. humile* and *D. suffruticosum* extending into KwaZulu-Natal. The species have been collected on littoral dunes or in fynbos, renosterveld, succulent karoo and grasslands.

4.1.3. Phenology

The annual species begin to flower in spring, with mature fruit forming from late spring to early summer. *Dasispermum*

tenu, however, appears to flower much earlier, with mature fruit recorded in early spring (September). The perennial species, *D. suffruticosum* and *D. perennans*, flower and fruit throughout much of the year depending on climatic conditions. Although *D. hispidum* often co-occurs with species of *Capnophyllum*, they appear to form a succession, with the plants of *Capnophyllum* already starting to wither when those of *D. hispidum* begin to flower and fruit.

4.2. Key to the species of *Dasispermum*

- 1a. Short-lived suffrutices, resprouting from a permanent somewhat woody base:
 - 2a. Fruit with very prominent, thick, corky ribs or wings, often heteromericarpic; leaves succulent to semi-succulent, firm in texture; ultimate leaflet segments turgid or rarely laminate, often curled inwards; a dune endemic, widely distributed along the coast from Vredendal to Port Shepstone *D. suffruticosum*
 - 2b. Fruit with only slightly prominent ribs, never fleshy or winged, invariably homomericarpic; leaves coriaceous; ultimate leaflet segments subterete, remaining erect; known only from around the Karbonkelberg on the Cape Peninsula..... *D. perennans*
- 1b. Annual herbs:
 - 3a. Fruit >3.9 mm long; stem with purple blotches; plants erect, 0.5–0.8 m tall; known only from Stanford in the Western Cape Province *D. grandicarpum*
 - 3b. Fruit <2.5 mm long; stem immaculate; plants erect or sprawling to procumbent, usually <0.4 m tall:

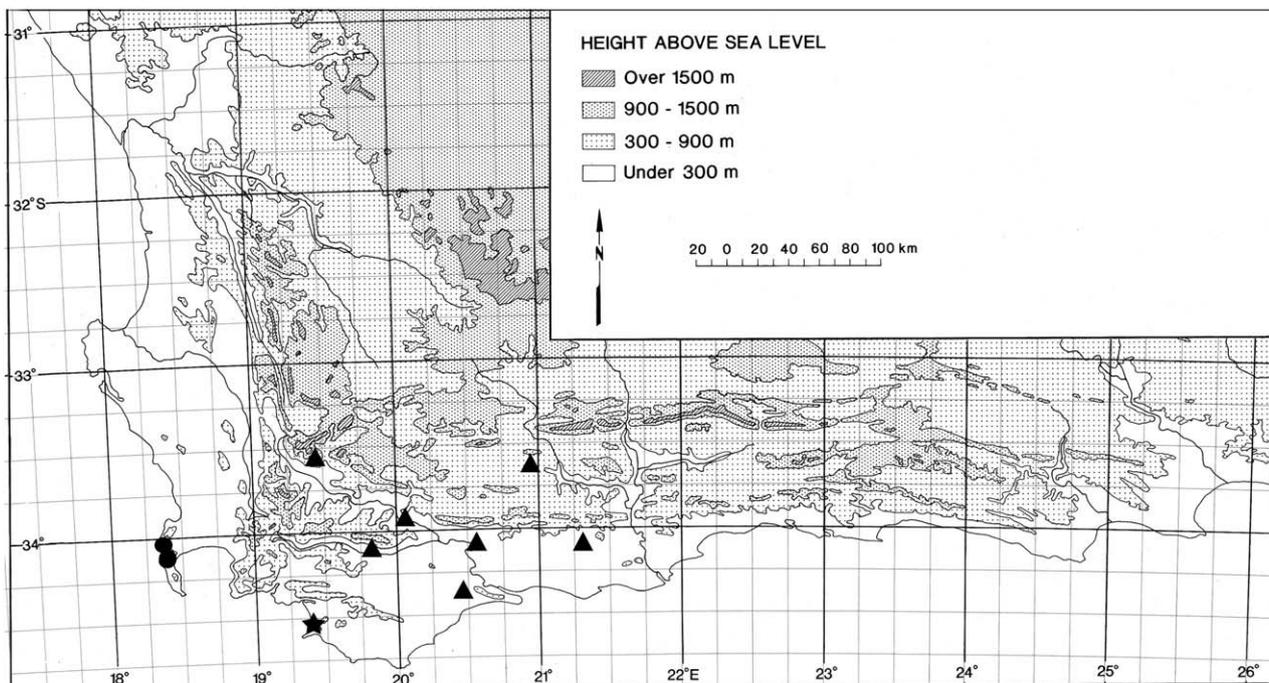


Fig. 5. Geographical distribution of *Dasispermum grandicarpum* (star), *D. perennans* (circle), *D. tenue* (triangle).

- 4a. Ultimate leaflet segments 2–3 mm broad; restricted to the Eastern Cape and KwaZulu-Natal Provinces *D. humile*
- 4b. Ultimate leaflet segments ≤ 1 mm broad; occurring in the Northern, Western and Eastern Cape Provinces:
- 5a. All umbels sessile to subsessile, peduncle <4 mm long; involuclral and involucl bracts absent (very rarely with 4 involucl bracts); styles short (0.2–0.3 mm long), not extending beyond base of stylopodium; plants restricted to renosterveld vegetation between Bonnievale and Riversdale *D. tenue*
- 5b. Umbels usually on a peduncle more than 10 mm long, occasionally some sessile to subsessile; involuclral and involucl bracts present, often foliose; styles relatively long (0.3–1.3 mm long), usually extending well beyond base of stylopodium; plants not in renosterveld vegetation:
- 6a. Ovaries and fruit with marginal ribs markedly concave and widely separated (in lateral view); fruit broader than long; scabrid or pustulate; plants usually sprawling and prostrate *D. capense*
- 6b. Ovaries and fruit with marginal ribs parallel or very slightly concave; fruit not broader than long; scabrid to densely hispid; plants usually erect *D. hispidum*

4.3. *Dasispermum grandicarpum*

D. grandicarpum Magee and B.-E. van Wyk, sp. nov., ceteris speciebus *Dasispermum cellulis quadratis prominentibus circum vittas similis, sed annuis habitu majori erecto, caulibus purpureis maculatis fructuque multo majori a ceteris speciebus differt. D. humili et D. tenui costa fructus porcata fibrosa similis sed segmentis folioli ultimis teretiusculis subtiliter divisus praesentiaque bracteis et involuclralibus et involucllis differt. Type: South Africa, Western Cape, 3419 (Caledon): Grootbos Nature Reserve (–CB), 1 December 2006, Lutzeyer s.n. (NBG, holo.; JRAU, iso.).*

Erect, monopodial, annual herb, 0.5–0.8 m tall. *Stems* herbaceous, purple-blotched, not branched at base, simple or slightly dichotomously branched higher up; branches ascending to erect, not sprouting from nodes. *Leaves* 40–120 × 25–50 mm, 2-pinnate, coriaceous; ultimate leaflet segments linear-oblong, 3–10 × <0.5 mm, laminate to subterete, concolorous, green, margins entire, venation visible or obscure. *Petioles* 15–40 mm long, glabrous, purple-blotched. *Umbels* with peduncle short to long, 15–60 mm long; involuclral bracts 4 to 6, lanceolate, coriaceous, acuminate, margins membranous, glabrous; rays (6) 10 to 18, 15–35 mm long, scabrid; involucl bracts 4 to 6, linear to lanceolate, coriaceous, acuminate, margins membranous, glabrous; raylets 6 to 14, 4–8 mm long, scabrid. *Flowers* with

petals 0.8–1.0 mm × 0.6–1.0 mm, deeply emarginate, papillose; ovary scabrid; styles usually lengthening as fruit matures, 0.7–1.4 mm long, becoming reflexed and extending well beyond base of stylopodium. *Fruit* 4.0–6.0 × 3 mm, elliptic in lateral view, base obtuse; mericarps homomorphic; median and lateral ribs as well developed as marginal ribs, prominent, cartilaginous, dorsal surface with fibrous ridges, glabrous; marginal ribs parallel to very slightly concave in lateral view.

4.3.1. Diagnostic characters

Dasispermum grandicarpum is distinguished from all other species by the larger and more erect habit, the purple-blotched stems, and the much larger fruit, >3.9 mm long (<2.5 mm long in the other species). It shares the fibrous ridges of the fruit ribs with *D. humile* and *D. tenue* but also differs in the finely divided, subterete ultimate leaflet segments, the presence of both involuclral and involucl bracts, and the row of square cells external to the vittae.

4.3.2. Distribution and habitat

The species is known only from Grootbos Nature Reserve near Stanford in the Western Cape Province (Fig. 5), where it was collected in fynbos vegetation that had burnt the previous year. No plants could be located in subsequent searches by Mr H. Lutzeyer, suggesting that the species may be a short-lived fireweed.

4.3.3. Additional specimens examined

South Africa, WESTERN CAPE. **3419 (Caledon)**: Grootbos Nature Reserve (–CB), 20 October 2006, Lutzeyer s.n. (NBG).

4.4. *Dasispermum tenue*

D. tenue (Sond.) Magee and B.E. van Wyk in Magee et al., Syst. Bot. 34: 590 (2009). *Ptychotis tenuis* Sond. in Harv. and Sond., Fl. Cap. 2: 537 (1862). *Trachyspermum tenue* (Sond.) Engler, Pflanzenwelt Afrikas 3(2): 809 (1921). *Sonderina tenuis* (Sond.) H. Wolff in Pflanzenr. Heft 90: 93 (1927). Type: South Africa, Western Cape, 3420 (Bredasdorp): Buffeljagdrivier to Rietkuil (–BA), Zeyher 2672 (S!, holo.; LE!, iso.).

Sprawling or suberect, sympodial, annual herbs, 0.04–0.3 m tall. *Stems* herbaceous, immaculate, usually well-branched at base; branches decumbent or ascending, not sprouting from the nodes. *Leaves* 30–95 × 10–35 mm, 2-pinnate, herbaceous to very slightly coriaceous; ultimate leaflet segments linear-oblong, 2–7 × ≤ 1 mm, laminate, green, margins entire, venation visible. *Petioles* 15–50 mm long, slightly scabrid, green. *Umbels* sessile to subsessile on peduncles <4 mm long; involuclral bracts 0; rays 3 to 6, 5–20 mm long, scabrid; involucl bracts 0 (to 4), linear to narrowly ovate, coriaceous, acute, margins not membranous, glabrous; raylets 4 to 9, 2–5 mm long, scabrid. *Flowers* with petals 0.4–0.6 × 0.4–0.6 mm, truncate to shallowly emarginate, papillose; ovary scabrid; styles not markedly elongating in mature fruit, 0.2–0.3 mm long, remaining erect or becoming reflexed and extending almost up to base of stylopodium. *Fruit* 1.7–2.2 × 1.7–2.0 mm, broadly elliptic to rotund and convex in lateral view, base obtuse; mericarps homomorphic; median and lateral ribs as well developed as marginal ribs, prominent,

cartilaginous, dorsal surface with slightly fibrous ridges, scabrid; marginal ribs parallel to very slightly concave in lateral view.

4.4.1. Diagnostic characters

Dasispermum tenue resembles *D. humile* and *D. grandicarpum* in the presence of fibrous ridges on the dorsal surface of the fruit but differs from the former in the narrower ultimate leaflet segments and from the latter in the much smaller fruit and in the absence of involucre bracts. It is further distinguished by the sessile to subsessile umbels and the short styles which do not extend beyond the base of the stylopodium.

4.4.2. Distribution and habitat

This easily overlooked renosterveld endemic species is restricted to shale soils in the Western Cape Province, from Worcester in the west to Riversdale in the east (Fig. 5).

4.4.3. Additional specimens examined

South Africa, WESTERN CAPE. **3319 (Worcester)**: Hills between the Breede River and the Brandvlei Dam, S of Worcester next to the road to Rawsonville (–CB), *Le Roux* 306 (NBG); Karoo Garden Veld (–CB), *Perry* 497 (NBG). **3320 (Montagu)**: hills between Buffeljagsrivier and Rietkuil (–BA), *Zeyher* 2672 (BM photo., S); hills near Bonnievale (–CC), *Esterhuysen* 23797 (BOL); Touwsberg, farm Wolwefontein, kloof above house (–DB), *Van Wyk, Winter & Tilney* 3433 (JRAU, PRE). **3419 (Caledon)**: Lindeshof, *Zeyher s.n.* (S). **3420 (Bredasdorp)**: Windhoek, shale slopes at Apolsfontein (–AD), *Burgers* 2559 (CPA). **3421 (Riversdale)**: Riversdale (–AB), *Bolus* 11291 (BOL, K); *Schlechter* 1703 (BOL).

4.5. *Dasispermum humile*

D. humile (Meisn.) Magee and B.E.van Wyk in Magee et al., Syst. Bot. 34: 590 (2009). *Petroselinum humile* Meisn. in J.D. Hook., Lond. J. Bot. 2: 531 (1843). *Apium humile* (Meisn.) Benth. and Hook. f., Gen. Pl. 1: 888 (1867). *Sonderina humilis* (Meisn.) H.Wolff in Pflanzenr. Heft 90: 93 (1927). Type: South Africa. Stanger district (2931): Natal, near Port Natal (–CC), *Krauss* 418 (MO!, sheet with collection label in bottom left corner, lecto., here designated; BM!, K!, two sheets, MO!, NBG!, S!, isolecto.). [Note: The specimen in MO most closely matches the original protologue and is therefore selected here as lectotype.]

Ptychotis mesineri Sond. in Harv. and Sond., Fl. Cap. 2: 536 (1862), nom illegit. *Carum meisneri* (Sond.) Hiroe, Umbell. World 871 (1979), nom illegit.

Somewhat erect or rarely sprawling, sympodial, annual herbs, 0.15–0.5 m tall. *Stems* herbaceous, immaculate, slightly to well-branched at base; branches ascending to erect, not sprouting from nodes. *Leaves* 40–120 × 30–50 mm, 2-pinnate, herbaceous; ultimate leaflet segments narrowly oblong to oblong, 7–12 × 2–3 mm, laminate, concolorous or discolorous and green above and green or glaucous beneath, margins entire, venation visible. *Petioles* 15–60 mm long, slightly scabrid, green. *Umbels* sometimes sessile or usually pedunculate, peduncle 0–65 mm long; involucre bracts 0 (1), lanceolate, coriaceous, acuminate, margins membranous, glabrous; rays 3

to 8, 5–20 mm long, scabrid; involucre bracts (1) 2 to 4, linear to lanceolate, coriaceous, acute, margins sometimes membranous, glabrous; raylets 4 to 12, 2–5 mm long, scabrid. *Flowers* with petals 0.5–0.7 × 0.4–0.6 mm, deeply emarginate, papillose; ovary scabrid; styles usually lengthening as fruit matures, 0.4–0.8 mm long, becoming reflexed and extending up to or more commonly beyond base of stylopodium. *Fruit* 1.6–2.0 × 1.6–2.0 mm, broadly elliptic to rotund in lateral view, base obtuse; mericarps homomorphic; median and lateral ribs as well developed as marginal ribs, prominent, cartilaginous, dorsal surface with fibrous ridges, glabrous; marginal ribs parallel to very slightly concave in lateral view.

4.5.1. Diagnostic characters

D. humile shares the non-succulent leaves and only slightly prominent fruit ribs with *D. capense*, *D. grandicarpum*, *D. hispidum*, *D. perennans* and *D. tenue* but is distinguished from these species by the broader ultimate leaflet segments 2–3 mm broad (<1 mm in the other species). Among the other species mentioned, only the widespread *D. hispidum* is known to extend into the Eastern Cape. *Dasispermum humile* can be further differentiated from this species by the glabrous fruit, the fibrous ridges on the dorsal surface of the fruit ribs, and usually by the lack of involucre bracts.

4.5.2. Distribution and habitat

The species occurs from the Zuurburg in the Eastern Cape Province to Durban in KwaZulu-Natal (Fig. 6).

4.5.3. Additional specimens examined

South Africa. KWAZULU-NATAL. **2930 (Pietermaritzburg)**: Umlaas (–DA), *Krauss* 418 (BM, K, 2 sheets, S). **3030** (Port Shepstone): Umpampanyani-Dumisa (–AD), *Rudatis* 2166 (PRE).

EASTERN CAPE. **3225 (Somerset East)**: Boschberg (–DA), *MacOwan* 390 (BOL, K). **–3227 (Stutterheim)**: King William's Town (–CD), *Sim s.n.* (PRE, 2 sheets); banks of the Kabusi River near Komga (–DB), *Flanagan* 1183 (BOL, 3 sheets, K, PRE, S). **–3228 (Butterworth)**: Kobinquba Forest (–CB), *Pegler* 1212 (BOL). **–3325 (Port Elizabeth)**: Zuurburg National Park (–AD), *B.-E. & M. Van Wyk* 1759 (JRAU, 2 sheets); Enon (–BC), *Thode* A2670 (K, PRE); Ouboskloof (–BC), *B.-E. & M. van Wyk* 1883 (JRAU, 2 sheets), *B.-E. & M. van Wyk* 1895 (JRAU, 2 sheets). **–3326 (Grahamstown)**: Bucklands (–BA), *Acocks* 23793 (PRE); Hopewell (–DA), *Acocks* 23899 (K, PRE). **–3327 (Peddie)**: road through Fort Grey forest (–BB), *Hilliard & Burt* 14861 (K, PRE, S). **Precise locality unknown**: *Drège* 9545 (S); *Thode* A2670 (K).

4.6. *Dasispermum capense*

D. capense (Lam.) Magee and B.E.van Wyk in Magee et al., Syst. Bot. 34: 590 (2009). *Caucalis capensis* Lam., Encycl. 1: 658 (1785). *Stoibrax capense* (Lam.) B.L.Burt in Edinb. J. Bot. 48(2): 251 (1991). Type: South Africa, [Western Cape], without precise locality or date, *Sonnerat s.n.* (P-LAM!, holo.).

Ptychotis didyma Sond. in Harv. and Sond., Fl. Cap. 2: 258 (1862). *Trachyspermum didymium* (Sond.) Drude in Engl. and

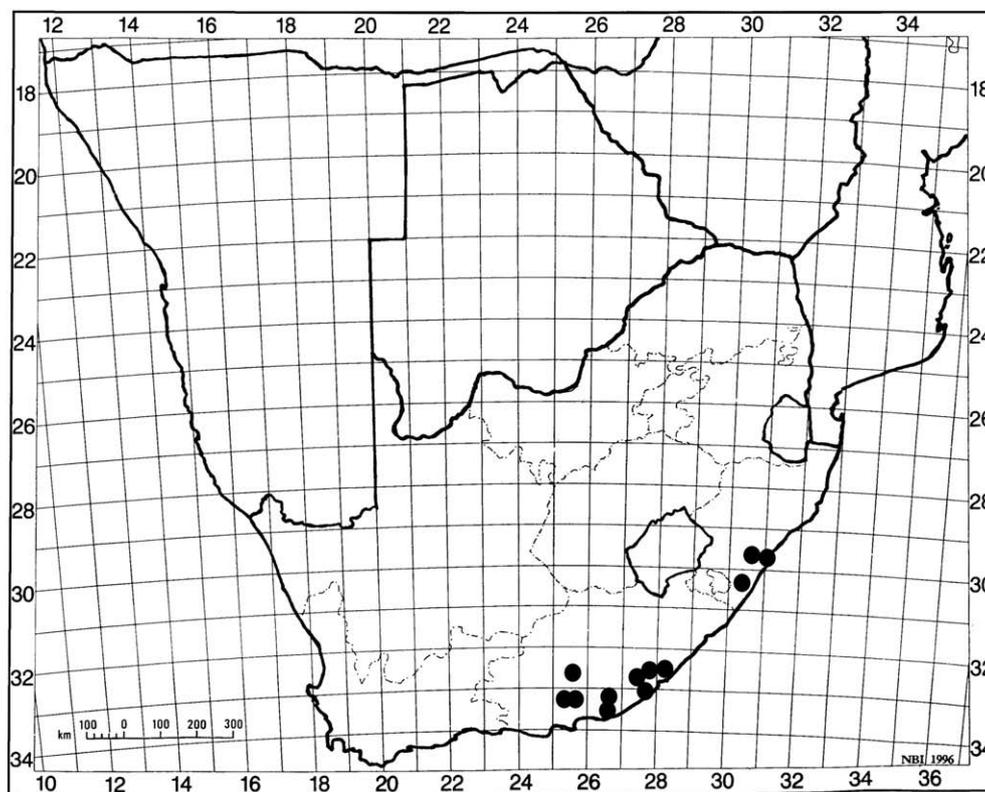


Fig. 6. Geographical distribution of *Dasispermum humile*.

Prantl, Pflanzenfam. 3(8): 189 (1898). *Tragiopsis didyma* (Sond.) H.Wolff in Pflanzenr. Heft 90: 96 (1927). *Sonderina didyma* (Sond.) Adamson in Adamson and Salter, J. S. Afr. Bot. 5: 55 (1939). *Stoibrax didyma* (Sond.) B.L.Burt in Tan, K., (ed.) Davis & Hedge Festschrift 145 (1989). Type: South Africa, Western Cape, woods near Tulbaghskloof, Zeyher 730 (S!, lecto., here designated; K!, two sheets, isolecto.). [Note: The specimen in S is chosen here as it is from Sonder's herbarium and the type locality is clearly recorded on the label.]

Sprawling or very rarely somewhat erect, sympodial, annual herbs, 0.03–0.25 m tall. *Stems* herbaceous, immaculate, usually very well-branched at base; branches prostrate to decumbent or rarely somewhat ascending to erect, not sprouting from the nodes. *Leaves* 15–60 × 6–20 mm, glabrous or scabrid, 2-pinnate, herbaceous to somewhat coriaceous; ultimate leaflet segments linear-oblong, 1–10 × <1 mm, laminate to subterete, concolorous, green or glaucous, margins entire, venation visible. *Petioles* 7–30 mm long, glabrous or scabrid. *Umbels* shortly pedunculate, very rarely sessile to subsessile, peduncles (0–) 6–30 mm long; involucre bracts 1 to 6, lanceolate to ovate or often foliose, coriaceous, acuminate, margins membranous, glabrous or scabrid; rays 4 to 12, 5–15 mm long, glabrous or scabrid; involucel bracts 2 to 6, linear to lanceolate, coriaceous, acuminate, margins often membranous, glabrous or scabrid; raylets 4 to 12, 2–5 mm long, glabrous or scabrid. *Flowers* with petals 0.7–1 × 0.7–1 mm, deeply emarginate, papillose; ovary scabrid to pustulate; styles lengthening as fruit matures, 0.7–1.3 mm long, becoming reflexed and extending well beyond base of stylopodium and often beyond base of fruit. *Fruit* 0.6–1.8 × 1.0–1.8 mm,

transversely oblong (broader than long), base cordate; mericarps homomorphic, scabrid to pustulate; median and lateral ribs as well developed as marginal ribs, slightly prominent, cartilaginous, dorsal surface without fibrous ridges, scabrid to pustulate; marginal ribs strongly concave in lateral view.

4.6.1. Diagnostic characters

Dasispermum capense is easily distinguished by the transversely oblong fruit (broader than long), with the marginal ribs strongly concave and separated from one another in lateral view. It is most often confused with *D. hispidum* from which it also differs in the usually procumbent branches and scabrid to pustulate (never pilose) fruit.

4.6.2. Distribution and habitat

The species occurs in sandy soils (at low and medium altitudes) from Port Nolloth in the Northern Cape southwards to the Cape Peninsula and eastwards to Witsands in Western Cape (Fig. 7).

4.6.3. Additional specimens examined

South Africa, NORTHERN CAPE. **2916 (Port Nolloth)**: near Port Nolloth (BB), *Bolus 9510* (BOL, K). **2917 (Springbok)**: Spektakel (–DA), *Bolus 9645* (BOL, K); Concordia (–DB), *Schlechter 11404* (BOL, K). **2918 (Gamoep)**: Koisabes Farm (–AB), *Le Roux 2529* (BOL, NBG); Goegap Nature Reserve (–CA), *Broodryk 151* (PRE). **3119 (Calvinia)**: Nieuwoudtville (–AC), *Galpin 1158* (PRE); Tuinlaagte, Oorlogskloof (–AC), *Magee et al. 128* (JRAU); Lokenburg (–CA), *Acocks 17221*

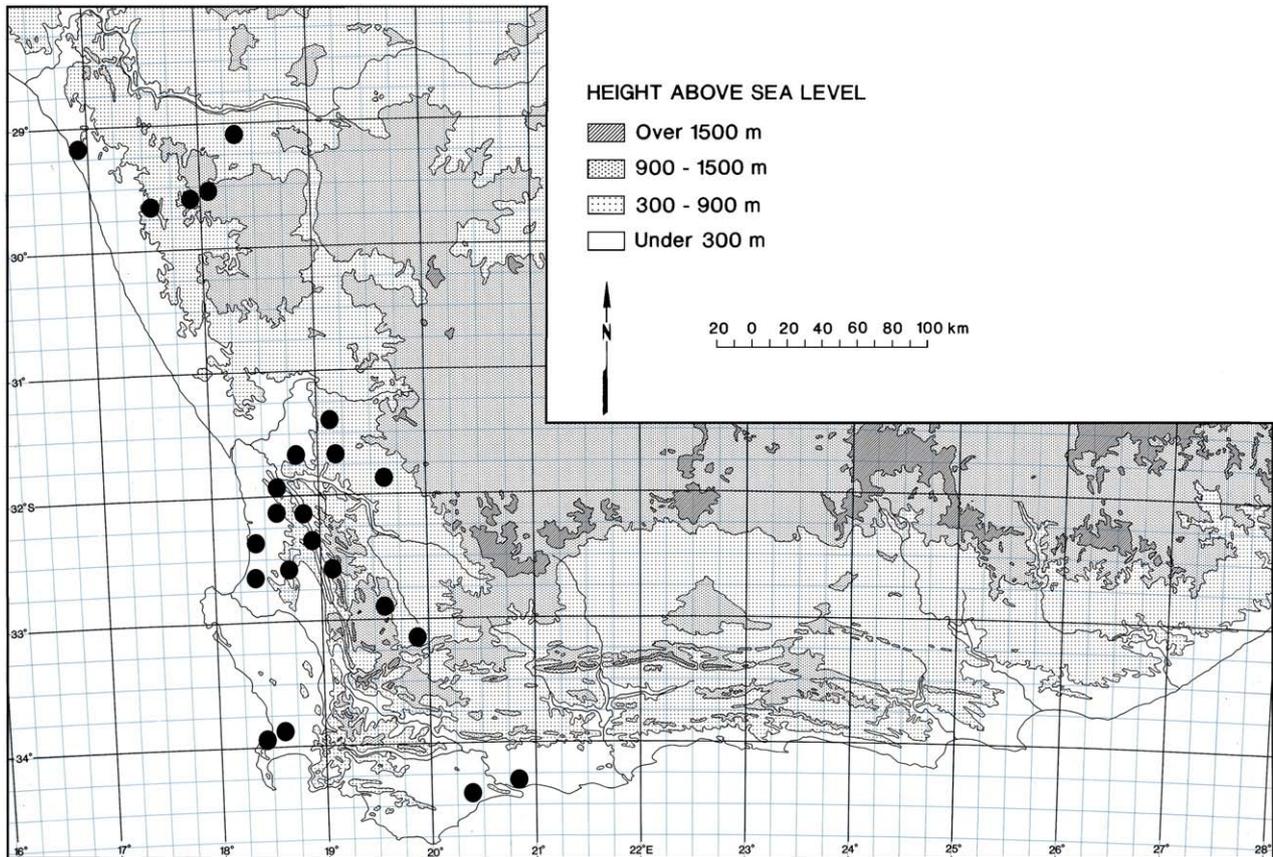


Fig. 7. Geographical distribution of *Dasispermum capense*.

(PRE); along road between farms Soutpan and Vryheid (–CD), *Snijman 761* (K);

WESTERN CAPE. **3118 (Vanrhynsdorp)**: Wiedou Farm, 15 km S of Vanrhynsdorp (–DB), *Thompson 2829* (NBG, PRE). between Driefontein and Heerenlogement (–DC), *Pearson 6730* (BOL, K). **3218 (Clanwilliam)**: near Elandsbay (–AD), *Lavranos 11651* (MO, PRE); Graafwater (–BA), *Thode A2002* (PRE); near to Clanwilliam (–BB), *Schlechter 5072* (BM, BOL, K, PRE); Kriedouwkrans (–BD), *Pearson 5324* (BOL, K); Papkuilsfontein Farm (–CB), *Stirton & Zantovska 11413* (MO, PRE); Het Kruis (–DA), *Stephens & Glover 8723* (BOL, K). **3219 (Wuppertal)**: near Citrusdal (–CA), *Taylor 1335* (BOL); Knolfontein, Swarttruggens (–DC), *Jardine & Jardine 274* (NBG). **3318 (Cape Town)**: above Camps Bay (–CD), *Salter 7732* (BOL, K, PRE); W slopes of Lions Head (–CD), *Adamson 2128* (BM), *Wolley Dod 3133* (BOL); Vygekraal (–DC), *Mac Owan 1751* (PRE). **3319 (Worcester)**: Platfontein (–BB), *Compton 22244* (NBG). **3420 (Bredasdorp)**: De Hoop, just before main gate (–AD), *Magee et al. 131* (JRAU); De Hoop (–AD), *Van der Merwe 1160* (PRE); De Hoop, Melkkamer (–AD), *Van Wyk 1957* (NBG, PRE); Witsand, near mouth of the Breede river (–BD), *Ornduff 7685* (MO, PRE); Witsand (–BD), *Walgate 835* (PRE).

4.7. *Dasispermum perennans*

D. perennans Magee and B.-E. van Wyk, sp. nov., a *Dasispermum* hispidum habitu perenni repullanti et caule ligneo permanenti differt

et a *D. suffruticoso foliis teretiusculis coriaceis ceraceis viribus* (in *D. suffruticoso foliis succulentis, plerumque glaucis*), *petalis papillois et fructu costis modo leviter prominentibus* (in *D. suffruticoso manifeste costato vel alato*). Type: South Africa, Western Cape, 3418 (Simonstown): sandy flats between Noordhoek and Kommetjie (–AB), *Esterhuysen 34312* (BOL, holo.; BOL, 2 sheets, K, S, iso.).

Sprawling (erect when young), sympodial, short-lived suffrutices 0.15–0.5 m tall, resprouting. *Stems* permanent, woody, immaculate, at first simple becoming slightly to well-branched; branches ascending to somewhat decumbent, sprouting at nodes. *Leaves* 20–90 × 10–40 mm, glabrous, 2-pinnate, coriaceous; ultimate leaflet segments linear-oblong, 1–3 × < 1 mm, subterete, concolorous, bright green, margins entire, venation visible or obscure. *Petioles* 5–40 mm long, glabrous. *Umbels* with peduncle short to long, 20–100 mm long; involucre bracts 1–6, lanceolate to ovate or often foliose, coriaceous, acuminate, margins usually membranous, glabrous; rays (4) 10 to 20, 15–30 mm long, scabrid; involucre bracts 2 to 6, linear to lanceolate, coriaceous, acuminate, margins often membranous, glabrous; raylets 8 to 10, 3–5 mm long, glabrous or scabrid. *Flowers* with petals 0.8–1.2 × 0.8–1.2 mm, deeply emarginate, papillose; ovary glabrous; styles lengthening as fruit matures, ± 1.0 mm long, becoming reflexed and extending beyond base of stylopodium. *Fruit* 2.0–2.5 × 1.5–2.5 mm, broadly ovate in lateral view, base obtuse to very slightly cordate; mericarps homomorphic, glabrous; median and lateral ribs as well

developed as marginal ribs, slightly prominent, cartilaginous, dorsal surface without fibrous ridges, glabrous; marginal ribs parallel to very slightly concave in lateral view.

4.7.1. Diagnostic characters

Dasispermum perennans is vegetatively most similar to *D. hispidum* and *D. suffruticosum* but differs from *D. hispidum* in the perennial habit and permanent woody stem, and from *D. suffruticosum* in the subterete coriaceous, waxy green leaves (vs succulent, glaucous leaves in *D. suffruticosum*), papillose petals (vs glabrous) and fruit with only slightly prominent ribs (very prominently ribbed or winged in *D. suffruticosum*).

4.7.2. Distribution and habitat

The species is known only from the Cape Peninsula between Noordhoek and Karbonkelberg (Fig. 5) where it occurs on very deep sandy soils often amongst *Thamnochortus erectus* (Restionaceae).

4.7.3. Additional specimens examined

South Africa, WESTERN CAPE. **3418 (Simonstown):** Hout Bay (–AB), *Bond 434* (NBG); Karbonkelberg, on SE slopes (–AB), *Esterhuysen 28979* (BOL, K); Sandy Bay, Table Mountain National Park (–AB), *Magee & Boatwright 105* (JRAU, NBG); *Winter 3850* (JRAU!, PRE!).

4.8. *Dasispermum hispidum*

D. hispidum (Thunb.) Magee and B.E.van Wyk in Magee et al., Syst. Bot. 34: 590 (2009). *Sium hispidum* Thunb., Prodr. 51 (1794). *Ptychotis hispida* (Thunb.) Sond. in Harv. and Sond., Fl. Cap. 2: 537 (1862). *Carum hispidum* (Thunb.) Koso-Poljansky in Bull. Soc. Natur. Mosc. 30: 286 (1917). *Sonderina hispida* (Thunb.) H.Wolff in Pflanzenr. Heft 90: 94 (1927). Type: South Africa, [Western Cape], without precise locality or date, *Thunberg s.n.* UPS-THUNB 7046 (UPS-THUNB!, holo.).

Sium aperum Thunb., Prodr. 51 (1794). *Seseli asperum* (Thunb.) Sond. in Harv. and Sond., Fl. Cap. 2: 550 (1862). Type: South Africa, [Western Cape], Cape, without precise locality or date, *Thunberg s.n.* UPS-THUNB 7036 (UPS-THUNB!, holo.).

Anthriscus capensis Spreng. in Roem. and Schult., Syst. Veg. 6: 526 (1820), nom. Illeg.

Sonderina caruifolia (Sond.) H.Wolff in Pflanzenr. Heft 90:94 (1927). *Ptychotis caruifolia* Sond. in Harv. and Sond., Fl. Cap. 2: 537 (1862). *Trachyspermum caruifolium* (Sond.) Drude in Engl. and Prantl, Pflanzenfam. 3(8): 189 (1898). Type: South Africa, Western Cape, 3318 (Cape Town) Riebeeckasteel (–BD), *Zeyher 729* (S!, lecto., here designated; BM!, LE!, K!, two sheets, NBG!, isolecto.). [Note: The specimen in S is chosen here as it is from Sonder's collection and has the type locality clearly recorded on the sheet.]

Erect or occasionally somewhat sprawling, sympodial, annual herb, 0.04–0.6 m tall. *Stems* herbaceous, immaculate, remaining simple or slightly or rarely well-branched at base; branches erect or ascending rarely somewhat decumbent, not sprouting from nodes. *Leaves* 15–90×10–35 mm, glabrous or scabrid, 2-pinnate, herbaceous to coriaceous; ultimate leaflet segments

linear-oblong, 1–10×<1 mm, laminate to subterete, concolorous, green, margins entire, venation visible or obscure. *Petioles* 7–40 mm long, glabrous or scabrid. *Umbels* with peduncle short to long, (4) 10–80 mm long; involucre bracts 1–6, lanceolate to ovate or often foliose, coriaceous, acuminate, margins usually membranous, glabrous or scabrid; rays 3 to 25, 10–50 mm long, glabrous or scabrid; involucre bracts 2 to 6, linear to lanceolate, coriaceous, acuminate, margins often membranous, glabrous or scabrid; raylets 4 to 12, 2–10 mm long, glabrous or scabrid. *Flowers* with petals 0.7–1×0.7–1 mm, deeply emarginate, papillose; ovary almost glabrous or scabrid to densely pilose; styles lengthening as fruit matures, 0.3–1.0 mm long, becoming reflexed and extending usually beyond base of stylopodium, rarely just up to base of stylopodium. *Fruit* 1.0–2.0×1.0–1.8 mm, elliptic to broadly ovate (not broader than long) in lateral view, base obtuse to slightly cordate; mericarps homomorphic, almost glabrous or scabrid to densely pilose; median and lateral ribs as well developed as marginal ribs, slightly prominent, cartilaginous, dorsal surface without fibrous ridges, slightly scabrid to densely pilose; marginal ribs parallel to very slightly concave in lateral view.

4.8.1. Diagnostic characters

Dasispermum hispidum is most likely to be confused with *D. capense* or *D. perennans* with which it shares the prominent involucre bracts (one of which is often foliose) and the usually scabrid fruit with ribs that are not fibrously ridged on the dorsal surface. It differs from *D. perennans* in the annual habit and from *D. capense* in the usually erect growth form, fruit that are narrower or at most equal to their length (in lateral view) and with the marginal ribs of the ovary and young fruit remaining parallel or only slightly concave. Very small plants of *D. hispidum*, as often found in the Northern Cape Province, have consistently been misidentified as *D. tenue*, which is a Renosterveld species easily distinguished from *D. hispidum* by the consistently sessile to subsessile umbels and the absence of both involucre and involucre bracts.

4.8.2. Distribution and habitat

This widespread species is largely restricted to coastal sands, from around Lekkersing in the Northern Cape Province to St George's Strand in the Eastern Cape Province (Fig. 8).

4.8.3. Additional specimens examined

South Africa. NORTHERN CAPE. **2816 (Oranjemund):** 37 km N of Lekkersing (–DB), *Germishuizen 5596* (PRE); Richtersveld, Annisvlakte (–DB), *Jürgens 23129* (PRE); Taaibos Vlei, Little Namaqualand (–DB), *Marloth 12421* (PRE); Witbank, Little Namaqualand (–DC), *Pillans 5234* (BOL). **3017 (Hondeklipbaai):** between Hondeklipbaai and Swart Lintjies River (–AD), *Pillans 18056* (BOL); Farm Hardekoppie, 16 km N of Kotzesrus and 2 km W of Hardevlei (–DC), *Perold 1699* (PRE). **3117 (Lepelfontein):** Brand-se-baai (–BD), *Van Rooyen 2210* (PRE).

WESTERN CAPE. **3118 (Vanrhynsdorp):** Donkin's Bay (–CD), *Acocks 24166* (PRE); Vanrhynsdorp (–DA), *Compton 17173* (NBG); 7 miles N of Vanrhynsdorp (–DA), *Acocks*

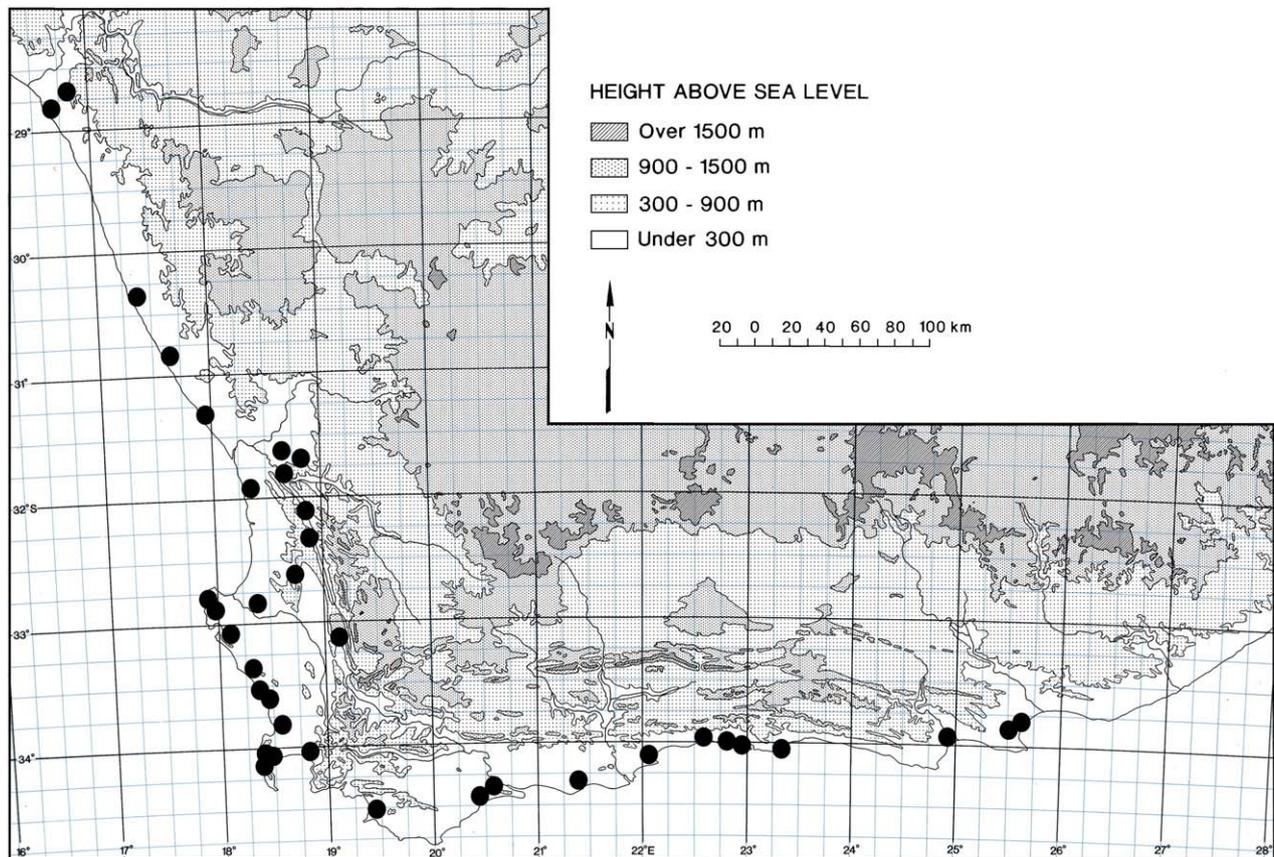


Fig. 8. Geographical distribution of *Dasispermum hispidum*.

19502 (PRE, K); 7 miles N.N.E. of Vanrhynsdorp (–DA), *Acocks* 14746 (K); Wiedou Valley on road to Gifberg (–DB), *Hugo* 702 (PRE); Wiedou, on the foot of the Gifberg (–DB), *Zietsman & Zietsman* 1162 (PRE); top of Gifberg (–DC), *Bayliss* 6148 (MO); Vleikraal, east of Klaver (–DC), *Walters* 51 (PRE, MO). **3217 (Vredenburg):** Cape Columbine (–DD), *Lavranos* 11710 (MO); Witklip Farm 1 mile S of Vredenburg (–DD), *Thompson* 2658 (PRE, 2 sheets). **3218 (Clanwilliam):** Clanwilliam (–BB), *Galpin* 10770 (PRE), *Leipoldt* 15 (BOL); Oliphants River Valley near Platte Kloof (–BB), *Pillans* 8741 (BOL, K, PRE); 4 km N of Algeria turnoff on N7 (–BD), *Goldblatt & Manning* 10404A (PRE); between Sauer and Velddrif (–CD), *Goldblatt & Manning* 11146 (MO); Het Kruis (–DA), *Werdermann & Oberdieck* 441 (K, PRE). **3318 (Cape Town):** Oosterwal, Langebaan (–AA), *Axelson* 562 (NBG); Darling Flora Reserve (–AD), *Rycroft* 2009 (NBG); Mud River, N of river near bridge (–AD), *O’Callaghan* 1322 (PRE); Mud River Kloof (–AD), *Acocks* 23381 (K, PRE), *Taylor* 5489 (NBG, K, PRE); Bokbaai near Darling (–CB), *Hilliard & Burt* 13020 (MO, K, PRE, S); Bok Point Gate (–CB), *Compton* 9418 (NBG); 9 km from Melkbosstrand to Velddrif (–CB), *Stirton* 11190 (PRE); Burgers Post Farm, near Pella (–DA), *Boucher & Shepherd* 4869 (K, PRE). **3319 (Worcester):** Saron (–AA), *Schlechter* 10638 (K, LE, MO, PRE), *Schlechter* 10652 (PRE); De Hoek Estates (–AA), *Levyns* 993 (BOL). **3322 (Oudtshoorn):** Wilderness (–DC), *Mogg* 11786 (PRE). **3418 (Simonstown):** Chapmans Bay (–AB), *Wolley Dod*

3606 (BOL); Fish Hoek (–AB), *Young* 268 (BOL); Prince’s Vlei (–AB), *Marloth* 9414 (NBG, PRE); Faure Flats (–BB), *Adamson* 10367 (NBG); Red Hill (–AB), *Salter s.n.*(BOL); Witsands Bay (–AB), *Werdermann & Oberdieck* 811 (BOL, K). **3419 (Caledon):** 1 km from Gansbaai on road to Stanford (–CB), *Germishuizen* 4140 (PRE). **3420 (Bredasdorp):** De Hoop, De Mond (–AD), *Magee & Boatwright* 12 (JRAU), *Magee et al.* 120 (JRAU), *Thompson* 3265 (NBG, PRE). **3421 (Riversdale):** Still Bay (–AD), *Muir* 4554 (BOL, K, PRE); Potberg Nature Reserve, De Hoop (–BC), *Burgers* 1569 (PRE). **3422 (Mossel Bay):** NE of Mossel Bay (–AB), *Acocks* 15394 (PRE); Belvidere, Knysna (–BB), *Duthie* 1181 (BOL, NBG); Ruigte Vlei, at Swart River (–BB), *Fourcade* 1552 (BOL, 2 sheets); camping area close to Swartvlei, Sedgefield (–BB), *Hugo* 1988 (NBG). **3423 (Knysna):** Plettenberg Bay (–AB), *Schlechter* 5937 (BM, K, S).

EASTERN CAPE. 3324 (Steytlerville): E of Kabeljousrivier (–DD), *Fourcade* 4017 (BOL, K). **3325 (Port Elizabeth):** Perseverance (–DC), *Rodin* 1252 (BOL, K, PRE, S); St George’s Strand (–DC), *Long* 839 (K, PRE).

4.9. *Dasispermum suffruticosum*

D. suffruticosum (Berg.) B.L.Burt in Notes RBG Edinb. 45: 93 (1988). *Conium suffruticosum* Berg., Pl. Cap. 77 (1767, September). *Cicuta suffruticosum* (Berg.) Poir., Encycl. Suppl. 2: 261 (1811). *Cnidium suffruticosum* (Berg.) Cham. and Schlecht.

in *Linnaea* 1: 387 (1826). *Selinum suffruticosum* (Berg.) Benth. and Hook. f., *Gen. Pl.* 1: 914 (1867). *Heteroptilis suffruticosa* (Berg.) Leute in *Ann. Nathist. Mus. Wien* 73: 89 (1969). Type: South Africa, Western Cape, Cape of Good Hope, without precise locality or date, *Grubb s.n.* (STB!, holo.).

Conium rigens L., *Mant.* 56 (1767, October); *Mantissa altera* 352, 512 (1771). *Cicuta rigidens* (L.) Lam., *Encycl. Méth.* 2: 4 (1786). *Bunium rigens* (L.) Spreng. in *Roem. and Schult., Syst. Veg.* 6: 500 (1820). *Trachyspermum rigens* (L.) G. Don in *Loudon, Hort. Brit.* 103 (1830). *Trachydium rigens* (L.) Hiroe, *Umbell. World* 702 (1979). Type: South Africa, Western Cape, “Habitat ad Cap. b. spei.”, *Herb. Linn. No.* 343.2 (LINN!, lecto., designated by *Burt:* 93 (1988); iso., E).

Sium patulum Thunb., *Prodr.* 51 (1794). Type: South Africa, Western Cape, in littore Houteniquas [Outeniquas], *Thunberg s.n.* UPS-THUNB 7055 (UPS-THUNB!, holo.).

Capnophyllum jacquinii DC., *Prodr.* 4: 187 (1830), p.p. max. *Conium jacquinii* (DC) D. Dietr., *Syn. Pl.* 2: 988 (1840). Type: *Cult. Hort. Trianon* [(G-DC, lecto., designated by *Burt:* 204 (1991)].

Dasispermum maritimum Raf., *Good Book* 56 (1840) and *Scad. Omb. Pl.* 56 (*Amer. Midl. Nat. Repr. No.* 3, 1913), nom illegit.

Heteroptilis arenaria [E. Mey. ex] Meisn. in *J.D. Hook., Lond. J. Bot.* 2: 534 (1843). Type: South Africa, Western Cape, 3322 (Oudtshoorn), George, Zwartevallei (–DC), *Krauss 1196* (specimen not located).

Sprawling to prostrate (erect when young), sympodial, short-lived suffrutices, 0.10–0.4 m tall, resprouting. *Stems* woody, immaculate, at first simple becoming slightly to well-branched; branches decumbent to prostrate, sprouting at nodes. *Leaves* 15–100 × 10–40 mm, glabrous, pinnate to 2-pinnate, firm and semi-succulent; ultimate leaflet segments oblong, 1–4 × 1–3 mm, turgid or rarely laminate, usually strongly curled inwards, concolorous, glaucous or sometimes green, margins entire or toothed, venation usually obscure. *Petioles* 5–40 mm long, glabrous. *Umbels* with peduncle short to long, 10–80 mm long; involucre bracts 4 to 6, lanceolate to ovate, slightly succulent, acute to acuminate, margins usually membranous, glabrous; rays 6 to 26, 8–32 mm long, glabrous or scabrid; involucre bracts 4 to 6, lanceolate, slightly succulent, acute to acuminate, margins often membranous, glabrous; raylets 6 to 14, 2–5 mm long, glabrous. *Flowers* with petals 0.8–1 × 0.8–1 mm, apex slightly to deeply emarginate, smooth; ovary glabrous; styles lengthening as fruit matures, 0.8–1.0 mm long, becoming reflexed and extending up to or beyond base of stylopodium. *Fruit* 2.5–6.0 × 3.0–5.0 mm, ovate to very broadly ovate in lateral view, base obtuse; mericarps homomorphic or heteromorphic, glabrous; if homomericarpic then with median and lateral ribs as well developed as marginal ribs, if heteromericarpic then with either median or lateral ribs as well developed as marginal ribs, very prominent to winged, corky, dorsal surface without fibrous ridges, glabrous; marginal ribs parallel in lateral view.

4.9.1. Diagnostic characters

This highly specialised littoral species can readily be distinguished from the other species of *Dasispermum* by the

suffrutescent habit (often with slender stems adapted to emerge and form new plants when covered by moving sand), the succulent leaves with the ultimate leaflet segments often curled inwards, and the prominently ribbed or often winged fruit, with the ribs or wings corky.

4.9.2. Distribution and habitat

Dasispermum suffruticosum is a halophytic species with a very wide distribution along the South African coastline, occurring on littoral dunes from Vredendal in the Western Cape to Port Shepstone in KwaZulu-Natal (Fig. 9).

4.9.3. Additional specimens examined

South Africa. KWAZULU-NATAL. **3030 (Port Shepstone):** Isipingo beach (–BB), *Forbes & Obermeyer 45* (PRE); Port Shepstone (–CB), *Bayliss 2199* (NBG), *Mogg s.n.* (PRE); between Ramsgate and Margate (–CD), *Whellan 1065* (PRE).

WESTERN CAPE. **3118 (Vanrhynsdorp):** district Papendorp, Farm Geelwalkaroo 262 (–CA), *Sachse 472* (PRE); Vredendal, dunes opposite Rob Island, N of Oliphants River Mouth (–CA), *Le Roux & Ramsey 77* (PRE). **3217 (Vredenburg):** Shell Bay near Veldrif (–DB), *Marsh 1283* (NBG). **3218 (Clanwilliam):** Papkuilsfontein, 5 ½ miles NW of L’ Agulhas (–CB), *Rycroft 1833* (NBG); Rocher Pan Nature Reserve (–CB), *Brandt 8* (NBG); beach N of Berg River Mouth (–CC), *O’Callaghan 184* (NBG). **3317 (Saldanha):** Hoedjies Point (–BB), *Van Rensburg 126* (PRE). **3318 (Cape Town):** Saldanha Bay between Churchhaven and South Point (–AA), *Brenan 14020A* (NBG), *Hall 855* (NBG); Sandveld Forestry Area (–AC), *Low 815* (NBG); Ysterfontein (–AC), *Glen 1090* (PRE), *Reyneke 32* (PRE); Koeberg beach (–CB), *Barnes 2441* (PRE); Bloubergstrand (–CD), *Compton 8920* (NBG), *Manning & Reeves 2819* (NBG), *Pole Evans 4389* (PRE), *Raitt s.n.* (NBG); Milnerton (–CD), *Andreae 381* (NBG). **3323 (Willowmore):** Nature’s Valley (–DC), *Stirton 9628* (PRE). **3418 (Simonstown):** Cape Peninsula, on sand dunes, Millers Point (–AB), *Bond 287* (NBG); Hout Bay (–AB), *Thode 6243* (NBG); Scarborough (–AB), *Goldblatt 6753* (PRE); Schuster’s River Mouth (–AB), *Whellan 1741* (PRE); Simon’s Bay (–AB), *Prior s.n.* (PRE); Cape of Good Hope Nature Reserve, Platboom Bay (–AD), *Taylor 6533* (NBG, PRE); Cape Point (–AD), *Marloth 3246* (PRE), *Phillips s.n.* (PRE), *Wall 166* (S); Skilpadvlei flats (–AD), *Van der Merwe 6069* (NBG); near Slangkop (–AD), *Marloth 11868* (PRE); Macassar beach (–BA), *Downing 402* (NBG); Macassar dunes (–BA), *De Bruyn s.n.* (NBG); Seekoei River Mouth (–BA), *Parsons 26* (NBG, PRE); Strandfontein (–BA), *Henderson 1164* (NBG), *Rycroft 2363* (NBG), *Taylor 3180* (PRE); Strand (–BB), *Parker 4395* (NBG, PRE), *Strand 4350* (NBG); Hol Bay Peninsula, E of Cape Hangklip (–BD), *Rourke 696* (NBG). **3419 (Caledon):** Kleinmond (–AC), *Van Wyk 6069* (NBG); Hermanus, Grotto Beach (–AD), *Taylor 9876* (NBG, PRE); Hermanus, Mossel River (–AD), *Guthrie s.n.* (PRE); Dawidskraal (–BD), *Walsh s.n.* (PRE); Pearly beach (–CB), *Maguire 24* (NBG), *Meyer 2388* (PRE), *Taylor 4045* (NBG, PRE). **3420 (Bredasdorp):** De Hoop, De Mond (–AD), *Jordaan s.n.* (NBG); Stilbaai (–BD), *Beyleveld s.n.* (NBG), *Bohnen 412.7* (NBG), *Rycroft 3079* (NBG, S); Witsand river mouth (–BD),

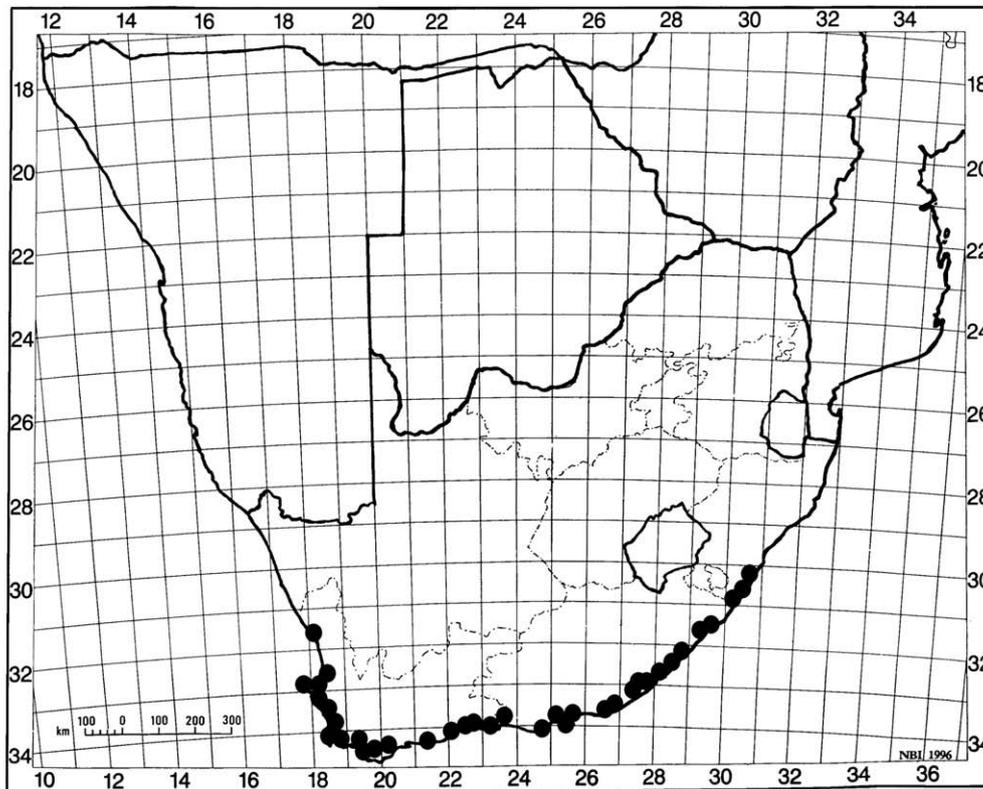


Fig. 9. Geographical distribution of *Dasispermum suffruticosum*.

Hugo 1908 (NBG, PRE); Arniston (–CA), Galpin 11348 (PRE); Waenhuiskrans (–CA), Greuter 21965 (PRE), Westhuizen 125 (PRE); Skipskop (–CB), Scott 478 (NBG); Agulhas (–CC), Fellingham 381 (NBG, PRE), Taylor 1588 (PRE). **3421 (Riversdale):** Still Bay (–AD), Bakker 5880 (PRE), Bohnen 412.7 (PRE), Muir 111 & 4533 (PRE). **3422 (Mossel Bay):** Blinde River Estuary (–AA), O’Callaghan, Fellingham & Van Wyk 263 (NBG, PRE); Hartenbos river mouth (–AA), Parsons 321 (NBG, PRE); Kleinbrakrivier (–AA), Du Plessis 14 (PRE), Meyer 2288 (PRE); Mossel Bay (–AA), Rogers 4243 (NBG, PRE), Glentana beach (AB), Goldblatt & Manning 9522A (NBG), Wilderness (–BA), Compton 10727 (NBG), Marloth s.n. (PRE), Mogg 11884 (PRE); Goukamma Nature Reserve (–BB), Anon. 187 (PRE); Kingfisher Creek, Sedgfield (–BB), Huddleston 2048 (NBG). **3423 (Knysna):** Brenton beach (–AA), Bos 969 (NBG, PRE); Keurboomstrand (–AB), Codd 3570 (PRE), Morris 432 (NBG), Taylor 4332 (NBG); Plettenberg Bay (–AB), Kapp 120 (PRE).

EASTERN CAPE. 3129 (Port St Johns): Umngazi River Mouth (–CB), Taylor 9000 (PRE, S); Bluff (–DA), Wood s.n. (PRE). **3227 (Stutterheim):** near King Williams Town (–CD), Sim s.n. (PRE). **3228 (Butterworth):** The Haven (–BB), Wisura 2681 (NBG); Mazeppa Bay (–BC), Hilnes 508 (PRE); Kei Mouth (–CB), Flanagan 257 (PRE, S); Strey 11239 (PRE); Kentani (–CB) Pegler 892 (PRE). **3325 (Port Elizabeth):** Van Stadens River Mouth (–CC), Klein 118 (PRE); Maitland River Mouth (–CD), Boucher 3347 (NBG); Fishwater Flats, Swartkopsrivier (–DC), Olivier 4881 (PRE); Humewood (–DC),

Compton 12144 (NBG); Markman Industrial Area, sand flats off Swartkopsrivier (–DC), Dahlstrand 3032 (NBG). **3326 (Grahamstown):** Kenton-on-sea, mouth of Kariega river (–DA), Hilliard & Burt 10875 (NBG, S); Kenton-on-sea, Joan Muirhead Nature Reserve (–DA), Mucina LM6161/2 (PRE); near Kenton-on-sea, Kasuka River Mouth (–DA), Phillipson 355 (PRE); Kowie (–DB), Britten 527 & 1894 (PRE); Port Alfred (–DB), Hutton 2736 (PRE). **3327 (Peddie):** Fish River Mouth (–AC), Phillipson 178 (PRE); East London (–BB), Commins 1034 (PRE), Galpin 3301 (PRE). **3424 (Humansdorp):** Jeffreys Bay (–BB), Stirton 9601 (PRE), Taylor 5146 (NBG); St Francis Bay (–BB), Brand 197 (PRE). **3425 (Skoenmakerskop):** Sea View (–AB), Long 253 (PRE).

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