

Notes on the Strumariinae (Amaryllidaceae-Amaryllideae). Six new taxa in *Strumaria* and *Hessea* from the central and northwestern Cape, South Africa, and southern Namibia

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ABSTRACT

Newly described are four species and a subspecies of *Strumaria* and one species of *Hessea*. *S. aestivalis* Snijman from the Langberg and *S. perryae* Snijman from the Bokkeveld escarpment are rare species closely allied to *S. pubescens* W.F. Barker. *S. discifera* Marloth ex Snijman is widespread on the Bokkeveld and Roggeveld escarpments but *S. discifera* subsp. *bulbifera* Snijman which comprises several clonal populations, is narrowly restricted to the dolerite ridges near Nieuwoudtville. *S. villosa* Snijman, a rare species, is localised on quartz hills near Kosies in the Richtersveld. *H. speciosa* Snijman occurs in red sand and friable loam from southern Namibia to the central Cape.

UITTREKSEL

Vier nuwe spesies en 'n subspesie van *Strumaria* sowel as 'n nuwe *Hessea*-spesie word beskryf. *S. aestivalis* Snijman van die Langberg en *S. perryae* Snijman van die Bokkeveld platorand is skaars soorte wat na aan *S. pubescens* W.F. Barker verwant is. *S. discifera* Marloth ex Snijman is wydverspreid langs die Bokkeveld- en Roggeveld-platorand. *S. discifera* subsp. *bulbifera* Snijman is beperk tot 'n aantal klonale populasies op die doleriet-heuwels naby Nieuwoudtville. *S. villosa* Snijman, 'n skaars soort, word slegs op die kwartsiet-heuwels naby Kosies in die Richtersveld aangetref. *H. speciosa* Snijman kom voor in rooi sand en bros leem vanaf suidelike Namibië tot in die Kaapse Middellande.

INTRODUCTION

The Strumariinae, an exclusively southern African subtribe of the Amaryllideae, is centred in the semi-arid winter rainfall region of the Cape Province. The often insignificant, hystranthous leaves and short-lived autumn flowers of the species, are phenological characteristics which render many members of the subtribe insufficiently collected. Thus since the last review of the Strumariinae (Müller-Doblies 1985) some 12 additional new taxa have been discovered, of which five have already been published (Snijman 1989; Snijman 1991).

The 37 known species of Strumariinae are currently placed in eight genera (*Namaquanula* D. & U. Müller-Doblies, *Kamiesbergia* Snijman, *Hessea* Herb., *Carpolyza* Salisb., *Strumaria* Jacq., *Bokkeveldia* D. & U. Müller-Doblies, *Gemmaria* Salisb. and *Tedingea* D. & U. Müller-Doblies). Phylogenetic studies in the Strumariinae using cladistic analyses (Snijman in prep.) have shown that *Strumaria*, *Bokkeveldia* and *Gemmaria* are weakly defined and paraphyletic and that they are best treated as a single genus *Strumaria*. Although the necessary generic redelimitation will be explained and effected elsewhere, it is important, notably for conservation purposes, to validate the names of the undescribed species of the subtribe. Four of the new species described here are assigned to *Strumaria*, here defined according to Ker-Gawler (1814), Bolus (1923), Barker (1943, 1944). The fifth new species is placed in *Hessea sensu* Müller-Doblies (1985), which has proven to be a monophyletic genus with the exclusion of the poorly known species *H. spiralis* Baker.

MATERIALS AND METHODS

This study was based on material from BM, BOL, K, NBG, PRE, SAM and WIND. Additional morphological and phenological data were gathered from the living collection of all known members of the Strumariinae at the National Botanical Garden, Kirstenbosch. Habitat information was derived from my own field observations. The dates accompanying the cited specimens are field collection dates of flowering bulbs. Specimens without dates comprise cultivated flowering material which was gathered over several years.

1. *S. aestivalis* Snijman, sp. nov., quoad tunicam luteam bulbi, folia pubescentia et flores infundibuliformes ad *S. pubescentem* W.F. Barker accedit, sed ab ea concavitatibus latis inter filamenta interiora et stylum differt. Figure 1.

TYPE.—Cape Province, 3018 (Kamiesberg): (–DB), Farm Langberg, NW of Loeriesfontein, fl ex NBG 31-1-1984, *Perry 1991* (NBG, holo.; K, PRE, MO).

Bulb solitary or occasionally forming bulblets, ovoid, 20–40 mm diam., with the outer fibrous covering ranging from brown to cream-coloured, fleshy and yellowish within; neck up to 70 mm long, rarely absent. *Leaves* absent at anthesis, 2 or rarely 3, recurved, lorate, 80–280 × 15–26 mm, canaliculate, both surfaces densely pubescent with 2 mm long, patent, silky, white hairs; amplexicaul cataphyll shortly exerted, tipped with red, soon withering down; non-amplexicaul prophyll hidden in the bulb. *Inflorescence* widely spreading, 60–100 mm across; scape 60–100 × 2.5–4.0 mm, pale green to glaucous, sometimes flushed with pink, pubescent or glabrous, breaking off at the base in fruit; spathe valves

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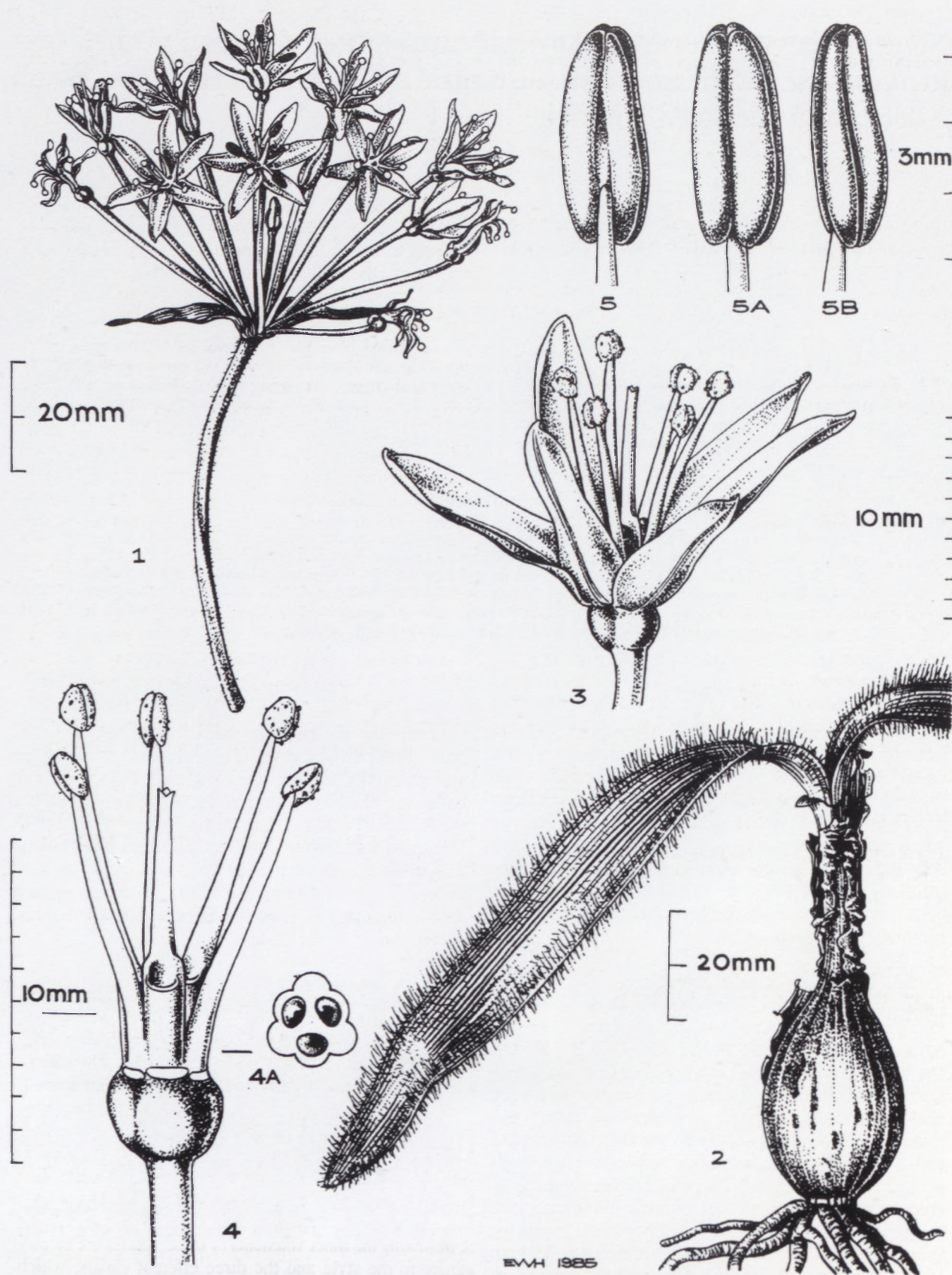


FIGURE 1.—*Strumaria aestivalis*. 1, inflorescence; 2, vegetative habit; 3, whole flower; 4, androecium and gynoecium with free portion of foremost stamen removed; 4A, transverse section through base of androecium and style showing nectar wells between inner filaments and style; 5, anther attachment, dorsal view; 5A, ventral view; 5B, lateral view. Drawn from Perry 1991.

lanceolate, $30\text{--}50 \times 5\text{--}7$ mm; bracteoles filiform, up to 20 mm long. Flowers 10–20, spreading, widely funnel-shaped, white, with a pale pink median dorsal band on each tepal, turning deeper pink with age, heavily scented; pedicels straight to upwardly curved, 40–55 mm long,

pale greenish-pink. Tepals free to the base, spreading, oblong-lanceolate, $12\text{--}14 \times 3\text{--}5$ mm. Stamens equalling the tepals, spreading slightly from near the base; filaments separate, 7–10 mm long, adnate to the broadened style base for up to 4 mm; the inner face of the inner whorl

free with only the lateral margins adnate to the broadly triquetrous style, forming 3 tubular nectar wells; anthers subcentrifixed, ± 3 mm long before opening, wine-red; pollen cream-coloured. *Ovary* with 1–2 ovules per locule. *Style* up to 17 mm long, broadly triquetrous in the proximal third, tapering and slender distally. *Seeds* fleshy, ovoid, 4–6 mm diam., green to reddish brown. *Chromosome number*: $2n = 20$.

Diagnostic features: *Strumaria aestivalis* is remarkable in having three wide nectar wells formed by the fusion of the lateral margins of the inner filaments with the winged edges of the triquetrous style (Figure 1.4A). This specialisation is also well developed in the species of *Strumaria* with leaves arranged in a fan (*S. truncata* Jacq., *S. hardyana* D. & U. Müller-Doblies, *S. barbarae* Oberm. and *S. phonolithica* Dinter) and indicates parallel development in *S. aestivalis* and this group. *Strumaria aestivalis* is most closely related to *S. pubescens* with which it shares yellow-fleshed bulbs and broadly lorate, pubescent leaves. Yellow inner bulb tunics were previously reported as a restricted character (Müller-Doblies 1985) but the data given here indicate that it is more widespread.

Distribution and phenology: the northwestern foothills of the Langberg, northwest of Loeriesfontein, is the only known locality of *S. aestivalis* (Figure 2). The population is confined to the southeast-facing banks of a seasonal stream, where the bulbs are aggregated in the shade of rocks or low shrubs, amongst shale chips overlying heavy loam, at elevations of 950 m. This site which lies east of the main winter rainfall region where *Strumaria* is centred, is located within a zone where the probability of rain is greatest in March (Zucchini & Adamson 1984). *S. aestivalis* responds rapidly to scattered summer thunder-showers and flowers during January and February.

CAPE. — 3018 (Kamiesberg): Farm Langberg, NW of Loeriesfontein, (—DB), Perry 1991 (K, MO, NBG, PRE); 20-1-1986, Snijman 1006 (MO, NBG).

2. *S. perryae* Snijman, sp. nov., ex affinitate *S. pubescentis* W.F. Barker et *S. aestivalis* Snijman, ab utroque bulbi tunicis albidis et foliis anguste loratis differt. Figure 3.

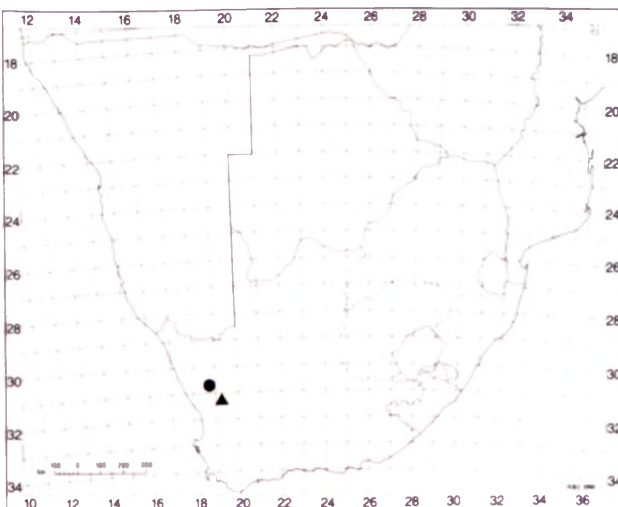


FIGURE 2.—The known geographical distribution of *Strumaria aestivalis*, ●, and *S. perryae*, ▲.

TYPE.—Cape Province, 3119 (Calvinia): (—AA), between Grasberg and Theunisdriest, NW of Nieuwoudtville, 15-5-1980, Perry 997 (NBG, holo.; K, PRE, MO).

Bulb solitary, globose, 10–15 mm diam, with lightly fibrous light brown outer tunics, fleshy and whitish within; neck up to 45 mm long. *Leaves* absent at anthesis, 2, suberect to recurved, narrowly lorate to lanceolate, 50–150 (–250) \times 2.5–5.0 mm, softly pubescent with hairs up to 2 mm long on both surfaces, flushed with red towards the base of the abaxial surface, subtended by a subterranean amplexicaul cataphyll and non-amplexicaul prophyll. *Inflorescence* somewhat clustered, 25–30 mm across; scape erect to flexuose, 50–165 (–240) mm long, ± 1 mm diam., reddish pink with a grey bloom, rarely pubescent, breaking off at the base in fruit; spathe valves linear-lanceolate, 15–20 \times 1–2 mm; bracteoles filiform, up to 6 mm long. *Flowers* 3–11, more or less ascending, widely funnel-shaped, scentless; pale pink with a deeper pink median dorsal band on each tepal, turning deep pink with age; pedicels straight to upwardly curved, 20–30 (–60) mm long, pale green to reddish pink. *Tepals* shortly adnate to the filaments for up to 1 mm, otherwise free, the outer spreading more widely than the inner, oblong-lanceolate, 10–17 \times 2.5–4.0 mm. *Stamens* suberect to slightly spreading, exerted beyond the tepals; filaments separate, up to 17 mm long, with the outer and inner whorls adnate to the style base for up to 2.5 mm and 3.5 mm respectively; anthers subcentrifixed, ± 3 mm long before opening, dark maroon; pollen cream-coloured. *Style* up to 19 mm long, equalling or slightly exceeding the stamens, slightly thickened and trigonous proximally, tapering gradually upwards; with nectar collecting in 3 droplets between the style and inner filaments; stigma shortly trifid. *Seeds* fleshy, ovoid, 2.0–2.5 mm diam., green to reddish brown. *Chromosome number*: $2n = 20$.

Flowering time: May, but commencing in April when cultivated.

Diagnostic features: the long, lorate, pubescent leaves and somewhat funnel-shaped flowers of *S. perryae* are characteristics also found in *S. pubescens* and *S. aestivalis*, and indicate a close affinity with these species. The narrow leaves of *S. perryae* are diagnostic (at most 5 mm across). In contrast, *S. pubescens* and *S. aestivalis* have leaves more than 10 mm wide and the synapomorphy of yellow inner bulb tunics. The adnation of the filaments to the style is well developed and reaches a length of 3.5 mm. This feature is also conspicuous in specimens of *S. pubescens*, *S. watermeyeri* L. Bolus, as well as *S. aestivalis*. Unlike *S. aestivalis* the inner filaments of these species are closely adnate to the style and the three efferent canals, which conduct nectar from the septal nectary to the sinus between the inner filaments and style, are only microscopically visible.

Distribution and habitat: *S. perryae* is known from a single small population on the northern Bokkeveld escarpment between Grasberg and Theunisdriest, north-west of Nieuwoudtville (Figure 2). Plants grow in clay soil in association with low karroid shrubs.



FIGURE 3.—*Strumaria perryae*. 1, inflorescence; 2, vegetative habit; 3 & 4, whole flowers; 5, androecium and gynoecium with free portion of foremost stamen removed and with nectar between the inner filaments and style; 6, transverse section through column formed by fusion of the stamens to the style; 7, anther attachment, lateral view; 7A, dorsal view; 7B, ventral view. Drawn from Perry 997.

Etymology: the epithet honours Miss Pauline Perry of the National Botanical Garden at Worcester, who discovered this species. She has also located several rare and poorly documented species of *Strumariinae* from Namaqualand.

CAPE. — 3119 (Calvinia): between Grasberg and Theunisdrift, NW of Nieuwoudtville, (—AA), 15-5-1990, *Perry 997* (K, MO, NBG, PRE); ± 7 km from Grasberg homestead towards Theunisdrift, (—AA), 8-5-1985, *Snijman 867* (NBG).

3. *S. discifera* Marloth ex Snijman, sp. nov., a speciebus ad *Strumarium* sensu lato pertinentibus, bulbi tunicis interioribus albidis, foliis longis lanceolatis (ad 160 mm), pubescentia (certe in iuvenilibus), floribus stellaribus, tepalis canaliculatis, styli basi strumosa et strumae forma manifeste bulbiformi vel discoidea distincta.

TYPE. — Cape Province, 3118 (Vanhynsdorp): (—DB), Bokkeveld Mountains, top of Koebee Pass, 18-4-1981, *Snijman 443* (NBG, holo.; K, PRE).

Bulbs solitary or forming large clumps, ovoid to subglobose, 10–20 mm diam., with outer tunics light brown and softly fibrous, fleshy and white or occasionally pale mauve within; neck (10–) 20–60 mm long. **Leaves** absent or incipient at anthesis, 2 or occasionally 3, suberect to prostrate, narrowly lanceolate, 20–160 \times 3–10 mm, pubescence variable, with long soft hairs or short hairs covering both surfaces or the adaxial surface only, rarely glabrous, sometimes flushed with red towards the base of the abaxial surface, subtended by a subterranean amplexicaul cataphyll and non-amplexicaul prophyll. **Inflorescence** spreading, 25–130 mm across; scape somewhat flexuose, 50–140 mm long, \pm 2 mm diam., green to reddish brown, glabrous or rarely pubescent, usually breaking off at ground level while fruiting; spathe valves linear-lanceolate, up to 30 \times 3 mm; bracteoles filiform, up to 5 mm long. **Flowers** (2–) 5–16, spreading, stellate, glistening white, with an olive-green to pink median dorsal stripe on each tepal, scented or scentless; pedicels straight to upwardly curved, 20–75 mm long, concolorous with the scape. **Tepals** free to base, outspread, with the outer whorl often deflexed, oblong-lanceolate, 4–7 \times 1.5–3.0 mm, channelled, sometimes abruptly conduplicate in the proximal third. **Stamens** equalling or slightly shorter than the tepals, spreading; filaments separate, adnate proximally to the swollen style, with the inner whorl usually attached slightly higher up than the outer; anthers subcentrifixed, approximately 2 mm long and wine-red before opening; pollen cream-coloured. **Ovary** with 1–3 ovules per locule. **Style** up to 7 mm long, equalling or shortly exceeding the stamens, variably dilated in the proximal half, either somewhat bulbiform or discoid with a prominent distal irregular rim, narrowly terete in the distal half, with nectar collecting in 3 droplets between the base and inner filaments; stigma shortly trifid. **Seeds** fleshy, ovoid 2.5–4.0 mm diam. green to reddish brown. **Chromosome number:** $2n = 20$.

Flowering time: March to May.

Diagnostic features: in comparison to the group of closely allied pubescent-leaved species with white-fleshed bulbs and stellate flowers, *S. discifera* has consistently long, narrowly lanceolate leaves, distinctly channelled tepals and a conspicuous bulbiform to discoid swelling at the base of the style.

Distribution and variation: *Strumaria discifera* is distributed between Vanrhynsdorp and Nieuwoudtville eastwards to Calvinia and the Roggeveld escarpment in the northwestern Cape (Figure 5).

The species includes a polymorphic range of populations. From the dolerite ridges on the outskirts of Nieuwoudtville the bulbs are densely clump-forming, whereas other known populations comprise scattered solitary bulbs. The shape of the swelling at the base of the style is also variable. The clump-forming bulbs have a pronounced discoid styler swelling with a frilly rim. This character state is fairly consistent within the population and is probably maintained through recurrent vegetative propagation. Collections east of Nieuwoudtville to the Hantamsberg and Bloukranz Pass near Calvinia also have disc-like swellings, but these are not as broad as those in the Nieuwoudtville populations and lack a prominent rim. Elsewhere in the distribution range the styler swelling tends to be bulbiform in shape. Since the specimens from the clonal population on the dolerite koppies at Nieuwoudtville can be adequately diagnosed, these are described here as a new subspecies.

3a. *S. discifera* subsp. *discifera*. Figure 4.

Bulbs solitary. **Leaves** 20–120 \times 4–10 mm, with 1–3 mm long, soft patent white hairs, occasionally both surfaces glabrous but then juveniles pubescent. **Scape** glabrous. **Tepals** 5–6 \times 1.5–3.0 mm, channelled evenly throughout. **Style** smoothly bulbiform or irregularly thickened and longitudinally ridged in the proximal quarter.

Distribution and habitat: the known distribution extends from near Vanrhynsdorp, eastwards onto the Bokkeveld escarpment, across the high-lying plateau to Calvinia, then southwards along the edge of the Roggeveld escarpment to near Middelpos (Figure 5). Occupying gentle slopes and depressions, the taxon inhabits heavy loamy soils, most commonly derived from Nama and Ecce shales. The bulbs often grow in association with renosterbos (*Elytropappus rhinocerotis* (L.f.) Less.).

CAPE. — 3019 (Loeriesfontein): Kafferdam, about 6 km NW of Loeriesfontein on road to Kubiskouw Mountain, (—CD), *Lavranos 27602* (NBG). 3118 (Vanhynsdorp): N banks of Wiedourivier, near bridge between Klawer and Vanrhynsdorp, (—DA), *Snijman 261* (K, MO, NBG, PRE); top of Koebee Pass, Bokkeveld Mountains, (—DB), 26-4-1988, *Snijman 1172* (NBG, PRE), *Snijman 443* (K, NBG, PRE). 3119 (Calvinia): Glenridge, (—AC), *Barker 4672* (NBG); Glen Lyon, (—AC), 3-4-1982, *Perry 1824* (K, MO, NBG, PRE); *Mauve & Oliver sub G.N. 19699* (PRE); 5 miles E of Nieuwoudtville towards Calvinia, (—AC), 18-4-1969, *Barker 10613* (NBG); 11 km E of Nieuwoudtville towards Calvinia, (—AC), *Perry 1014* (MO, NBG, PRE); Akkerdam, lower slopes of Hantam Mountains, (—BD), *Barker 9344* (NBG); Bloukranz Pass, (—DA/DB), *Bayer 1853* (NBG); Farm Blomfontein, Roggeveld escarpment, (—DD), 10-5-1985, *Snijman 876* (NBG).

3b. *S. discifera* subsp. *bulbifera* Snijman, subsp. nov., a subspecie typica bulbo prolifero, styli basi strumosa, strumae forma discoidea et margine irregulari prominenti supra strumam distincta.

TYPE. — Cape Province, 3119 (Calvinia); (—AC), Nieuwoudtville Wildflower Reserve, 19-4-1983, *Perry & Snijman 2042* (NBG, holo.; K, MO, PRE, S). Figure 6.

Bulb producing bulblets and forming dense clumps. **Leaves** 6.5–150.0 \times 3–10 mm, both surfaces covered with

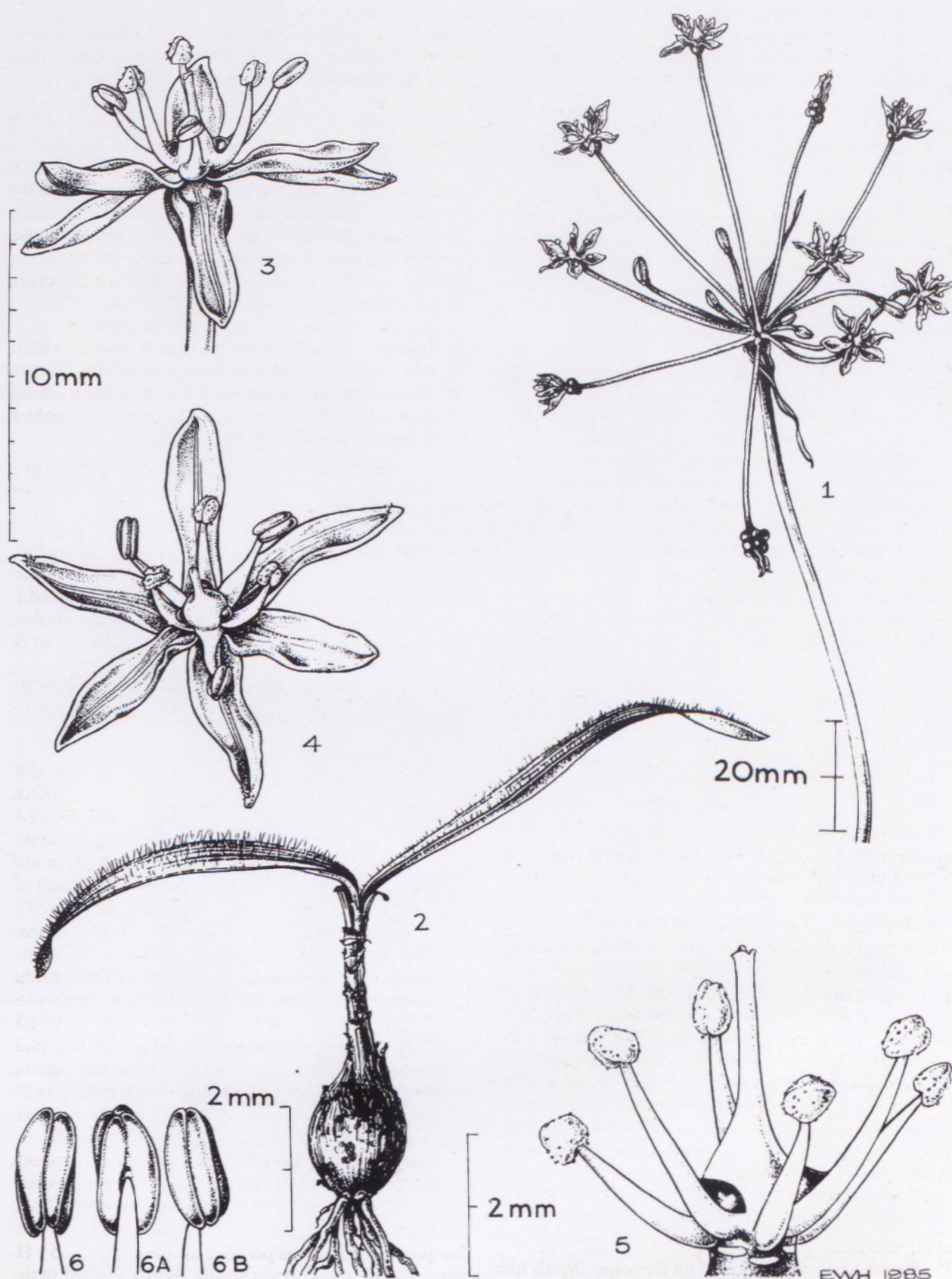


FIGURE 4. — *Strumaria discifera* subsp. *discifera*. 1, inflorescence; 2, vegetative habit; 3 & 4, whole flowers; 5, androecium and style with nectar droplets between the inner filaments and style; 6, anther attachment, ventral view; 6A, dorsal view; 6B, lateral view. Drawn from Snijman 261.

2 mm long, white, patent hairs; adaxial surface flushed with red proximally. Scape minutely pubescent or glabrous. Tepals 5–7 × 2–3 mm, abruptly conduplicate at a point almost a third from the base, otherwise channelled; outer whorl slightly deflexed. Style discoid proximally,

with a prominent irregular rim on the disc distally, abruptly narrowed into a slender column above.

Distribution and habitat: subsp. *bulbifera* inhabits slopes and hollows of low exposed dolerite ridges on the Bokke-

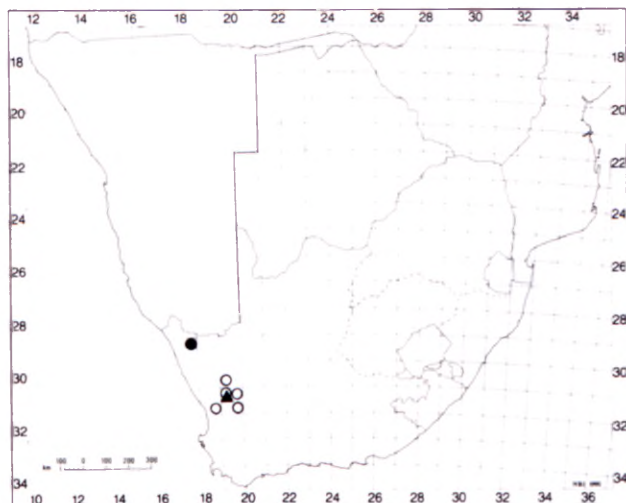


FIGURE 5.—The known geographical distribution of *Strumaria discifera* subsp. *discifera*, ○; *S. discifera* subsp. *bulbifera*, ▲; and *S. villosa*, ●.

veld escarpment near Nieuwoudtville (Figure 5). The densely aggregated bulbs grow in deep, red loamy soils, in association with open low, succulent shrubland.

CAPE.—3119 (Calvinia): Meulsteen Vley, (—AC), 2-5-1927, *Watermeyer in Herb. Afr. Bol. 18648* (BOL); top of Vanrhyn's Pass, (—AC), 30-4-1946, *Smith 6490* (NBG); Farm Glen Lyon, (—AC), 8-5-1985, *Snijman 863* (NBG, PRE); Nieuwoudtville Wildflower Reserve, (—AC), 19-4-1983, *Perry & Snijman 2042* (K, MO, NBG, PRE, S).

4. *S. villosa* Snijman, sp. nov., a speciebus ad *Strumariam* sensu lato pertinentibus, bulbi tunicis interioribus luteis, foliis glaucis, pubescentia in pagina adaxiali folii, floribus stellaribus, styli basi amplificata distincta. Figure 7.

TYPE.—Cape Province, 2917 (Springbok): (—BA), Richtersveld, 29° 10.05'S, 17° 41.49'E, E of Kosies, 3200 ft, 29-3-1981, *Van Berkel 311* (NBG, holo.; K, PRE).

Bulb solitary, subglobose, 15–25 mm diam., with light brown lightly fibrous outer tunics, fleshy and yellowish within; neck up to 35 mm. *Leaves* absent at anthesis, 2 prostrate, narrowly elliptical to lorate, 30–85 × 10–15 mm; adaxial surface glaucous, covered with 2.5 mm long, soft white, patent hairs; abaxial surface glabrous, shiny green, subtended by a subterranean amplexicaul cataphyll and non-amplexicaul prophyll. *Inflorescence* spreading, 30–100 mm across; scape slightly flexuose, 60–140 × 2–3 mm, pale green to pink with a grey bloom, breaking loose at the base in fruit; spathe valves linear-lanceolate, 15–20 × 4 mm; bracteoles filiform, up to 5 mm long. *Flowers* 8–14, spreading, stellate, pure white or white to pale pink with a pale pink median dorsal stripe on each tepal, scentless; pedicels straight to upwardly curved, 35–80 mm long, concolorous with the scape. *Tepals* free to the base, outspread to slightly deflexed, oblong-lanceolate, 6.5–8.5 × 2–3 mm, distinctly channelled with slightly undulate margins proximally. *Stamens* equalling or slightly shorter than the tepals, spreading; filaments separate, adnate to the broadened style base, with the inner whorl attached higher up than the outer, broad but not bulbous basally, tapering slightly upwards; anthers sub-centrifixed, 1.5 mm long and wine-red before dehiscing; pollen whitish. *Ovary* with 1–4 ovules per locule. *Style* up to 5 mm long, more or less equalling the stamens,

tapering smoothly upwards from a broad obscurely conoidal base, with nectar collecting in 3 droplets between the style base and inner filaments; stigma shortly trifid. *Seeds* fleshy, ovoid, approximately 2 mm diam. green to reddish brown. *Chromosome number*: $2n = 20 + 2-3B$.

Flowering period extends from March to April.

Diagnostic features: the leaves of *S. villosa* are softly villous on the adaxial surface and are characteristically glaucous. Unlike other pubescent-leaved species of the *Strumariinae* with white, stellate flowers and filaments adnate to the style, *S. villosa* is specialized in having yellow inner bulb tunics.

Distribution and habitat: this rare species is known from only one locality in the Richtersveld, near Kosies, (Figure 5). Locally abundant on low hills, the species is confined to exposed, east-facing slopes amongst quartz pebbles which overlie weathered granite soil.

CAPE.—2917 (Springbok): 29° 10.05'S, 17° 41.49'E of Kosies, (—BA), *Van Berkel 156* (NBG); 29-3-1981, *Van Berkel 311* (K, NBG, PRE); *Perry 1544* (K, MO, NBG, PRE, S).

5. *H. speciosa* Snijman, sp. nov., quoad tubum brevissimum perigonii et tepala plana ad *Hesseam pilosulam* D. & U. Müller-Doblies et *H. incanam* Snijman accedit, sed ab amobus foliis glabris et staminibus longioribus (aequantibus vel superantibus tepala) satis differt. Figure 8.

TYPE.—Namibia, 2818 (Warmbad): (—CA), Warmbad District, Farm Witpütz, 15-5-1963, *Giess, Volk & B. Bleissner 6960* (WIND, holo.; PRE).

Bulb solitary, deep-seated, subglobose, 25–60 mm diam., covered with several layers of cream-coloured cottony fibrous tunics, extended into a stout neck 100–170 mm long. *Leaves* absent at anthesis, 2, recurved, lorate, up to 120 × 4–6 mm, plane, glabrous, dark green and flushed with red towards the base; amplexicaul cataphyll remaining subterranean; prophyll unknown. *Inflorescence* dense, hemispherical to spherical, 70–120 mm across; scape erect to somewhat flexuose, 60–160 × 3–5 mm, initially green, breaking off at the base in fruit; spathe valves linear-lanceolate, 20–40 × 3–7 mm; bracteoles filiform, up to 25 mm long. *Flowers* (20–) 30–65, spreading, stellate, white to delicate pink with deep pink or greenish median stripes on the undersurface, ageing to light brown, with a heavy coconut-like scent; pedicels straight, 20–50 mm long, becoming straw-coloured. *Tepals* almost free to the base or very shortly adnate to the staminal tube for up to 0.25 mm, otherwise outspread, oblong-lanceolate, 8–15 × 2–4 mm, with plane edges. *Stamens* equalling or up to 2 mm longer than the tepals, becoming outspread; filaments connate proximally into a tube protruding from the perigone throat by (1.0–) 1.5–4.0 mm, subulate above, occasionally shortly toothed in the axils between adjacent filaments; anthers centrifixed, 3 mm long and dark wine-red before opening; pollen cream-coloured. *Style* up to 15 mm long, narrow throughout, with nectar collecting in a well around the base; stigma shortly trifid. *Seeds* not known. *Chromosome number*: $2n = 22$.

Flowering time: from late March into May.

Diagnostic features are the deep-seated bulb with a long neck (up to 170 mm); the somewhat spherical inflores-

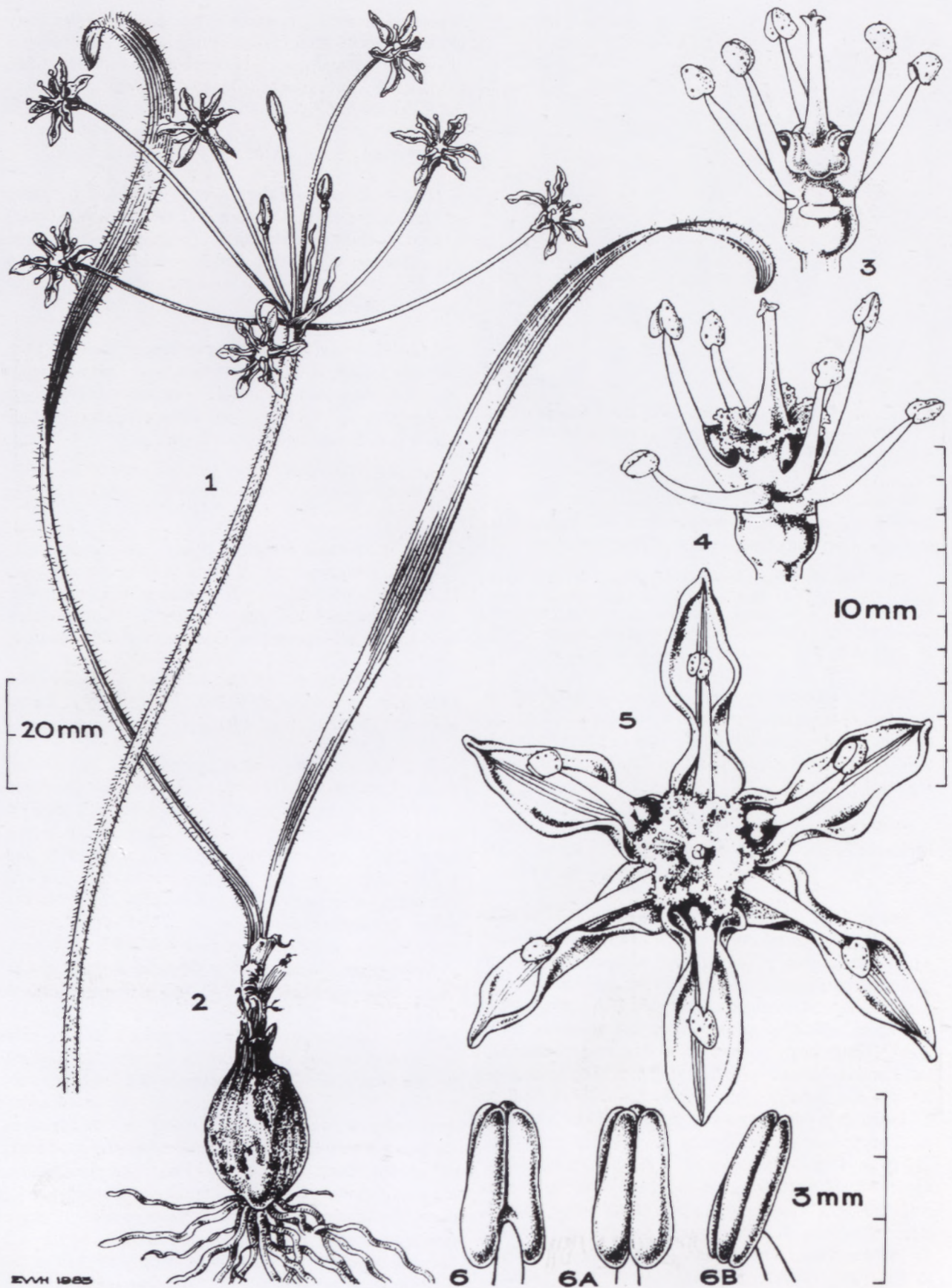
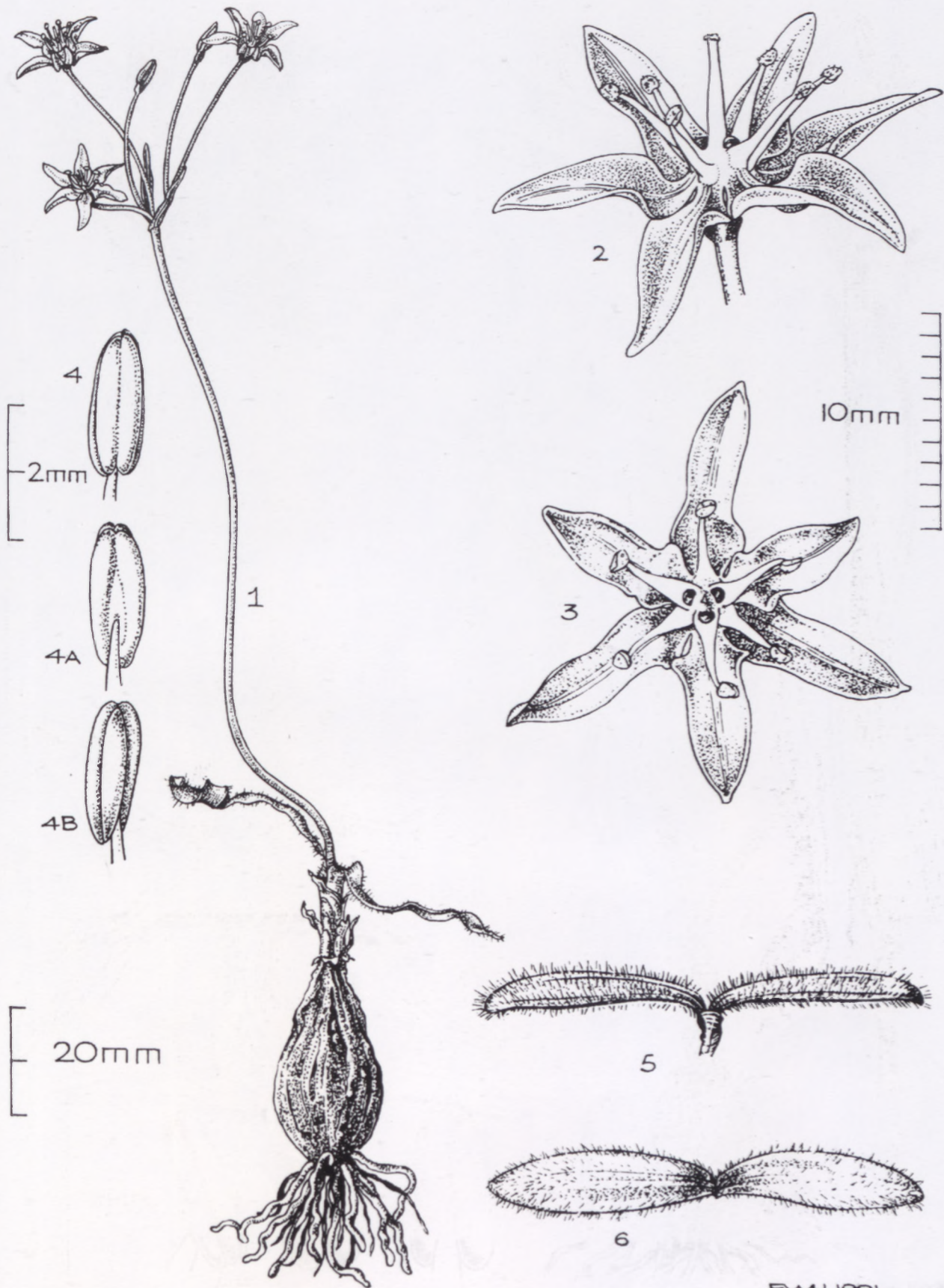


FIGURE 6.—*Strumaria discifera* subsp. *bulbifera*. 1, inflorescence; 2, vegetative habit; 3 & 4, flowers with tepals removed to show variable style sculpturing and nectar droplets between the inner filaments and style; 5, whole flower; 6, anther attachment, dorsal view; 6A, ventral view; 6B, lateral view. Drawn from Perry & Snijman 2042.



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FIGURE 7.—*Strumaria villosa*. 1, plant with inflorescence; 2 & 3, flowers indicating the attachment of the filaments to the style base and nectar droplets between the inner filaments and style; 4, anther attachment, dorsal view; 4A, ventral view; 4B, lateral view; 5 & 6, leaves. Drawn from Van Berkel 156.

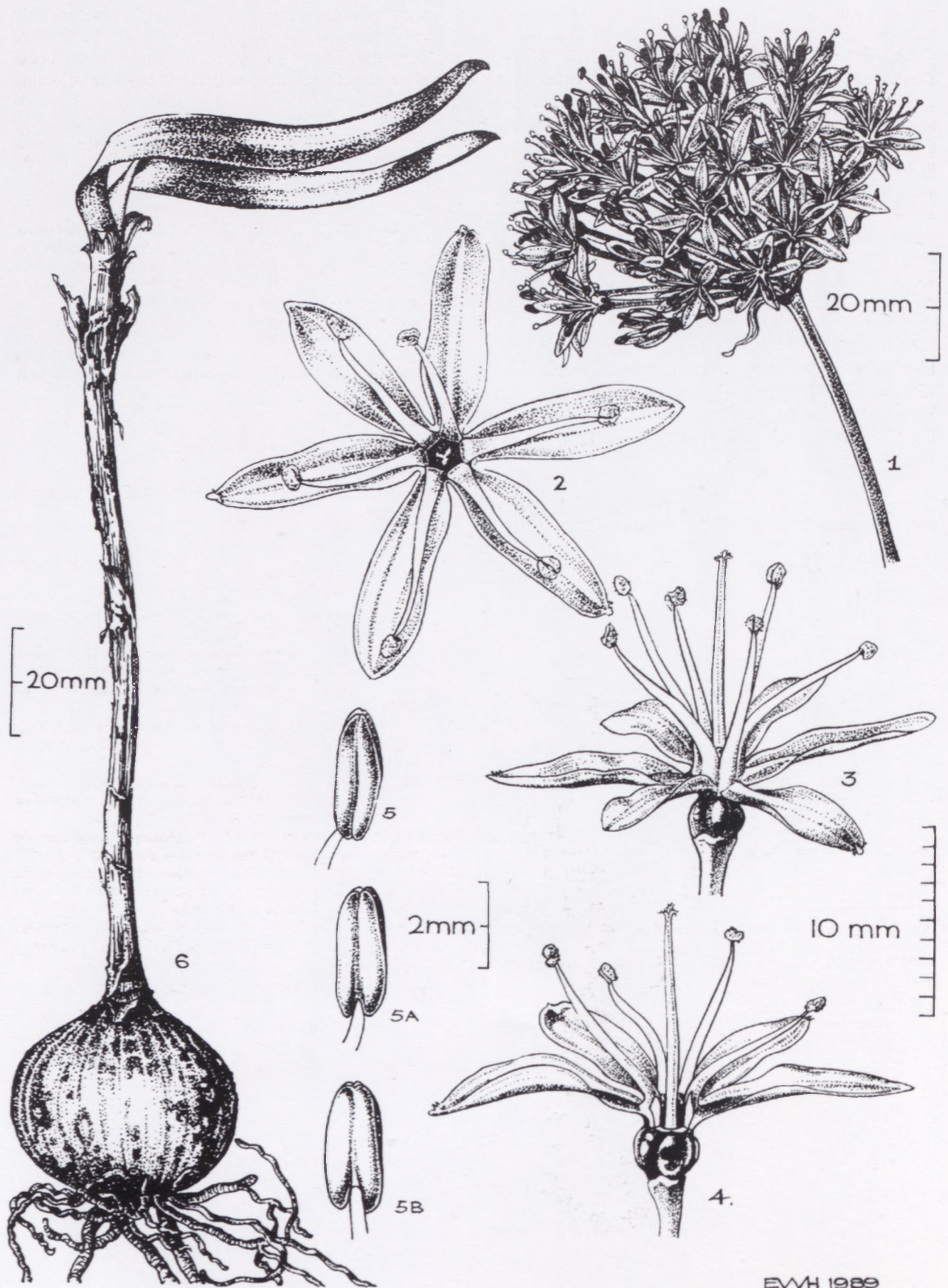


FIGURE 8.—*Hessea speciosa*. 1, inflorescence; 2 & 3, whole flowers; 4, partial section of flower; 5, anther attachment, lateral view; 5A, ventral view; 5B, dorsal view; 6, vegetative habit. Drawn from Snijman 1163.

cence; and the very short perigone tube (0.25 mm or less). In these respects *H. speciosa* is similar to the shortly pubescent-leaved species, *H. pilosula* D. & U. Müller-Doblies and *H. incana* Snijman, with which it also shares plane tepals. However, the glabrous leaves and the relative length of the stamens to the tepals distinguish it from these species. The stamens equal to or up to 2 mm longer than the tepals in *H. speciosa*, whereas they are distinctly shorter than the tepals (by 3 mm or more) in *H. pilosula* and *H. incana*. The inflorescence of *H. speciosa* may sometimes be confused with flowering material of *H. breviflora* Herb. from Namaqualand, but unlike this species the bulbs are without a conspicuous, exerted, red cataphyll which sheathes the foliage leaves.

Distribution and habitat: *Hessea speciosa* is recorded from red sand dunes and flats of friable loam, associated with the extensive drainage system of seasonal rivers from Warmbad in southern Namibia to Fraserburg in the central Cape. The associated vegetation is predominantly grassveld (Figure 9).

Variation: often the northerly populations have a distinct staminal tube (1.5–3.5 mm long), whereas specimens from

the south of the distribution range have only a shortly developed staminal tube (less than 1.5 mm). Both white and pale pink flower forms occur, as well as the occasional novelty of small teeth in the axils between adjoining filaments.

NAMIBIA.—2818 (Warmbad) Warmbad District, Farm Witputz, (–CA), 15-5-1963, *Giess, Volk & B. Bleissner* 6960 (PRE, WIND); 15-5-1963, *S. Bleissner* 268 (PRE).

CAPE.—2918 (Gamoep): Farm Eendop, SW of Klipvlei, (–AC), 1-5-1981, *Van Berkel* 331 (NBG); Aggenys Mine, (–BB), 23-5-1989, *S. Dean* 655 (NBG); Banke, Pofadder, (–DB), 3-5-1988, *S. Dean s.n.* (NBG). 2919 (Pofadder): Farm Kykgate, along road between Springbok and Pofadder, (–AC), 13-5-1969, *Van Breda* 4147 (PRE). 2921 (Kenhardt): Kenhardt, (–AC), 9-5-1927, *Long sub NBG* 947/27 (BOL); 14-5-1936, *Martin sub NBG* 1188/36 (BOL). 3120 (Williston): 40 miles N of Calvinia, (–AA/AB), 30-3-1953, *Hall* 684 (NBG); 36 km N of Downes towards Brandvlei, (–AC), 3-4-1988, *Snijman* 1163 (NBG, PRE). 3121 (Fraserburg): 49 miles from Fraserburg towards Williston, (–AC), *Smith* 6491 (NBG).

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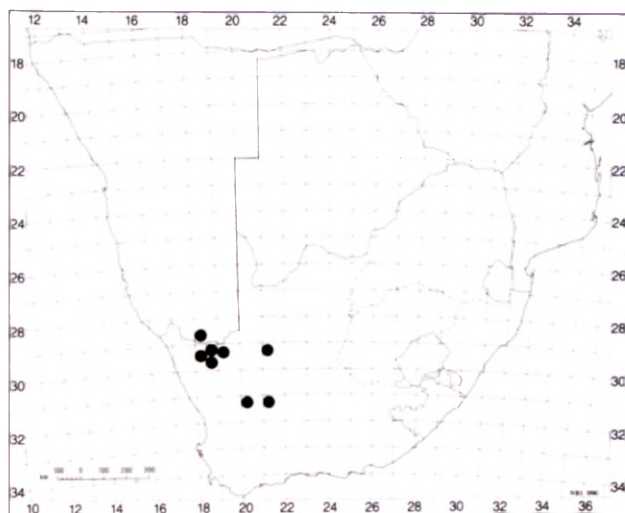


FIGURE 9. — The known geographical distribution of *Hessea speciosa*.