

A taxonomic revision of the southern African native and naturalized species of *Silene* L. (Caryophyllaceae)

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Keywords: Caryophyllaceae, new species, seed morphology, *Silene* L., southern Africa, taxonomy

ABSTRACT

The native and naturalized species of *Silene* L. in southern Africa are reviewed, with full synonymy and the description of two new species from the West Coast of Western Cape. Eight native species and three naturalized species are recognized, including the first identification in southern Africa of the Mediterranean *S. nocturna* L. The identity of *S. aethiopica* Burm., which has remained unknown since its description, is established and is found to be the oldest name for *S. clandestina* Jacq. Patterns of morphological variation within each species are discussed and subspecies are recognized for geographically segregated groups of populations that are \pm morphologically diagnosable. The following new names or combinations are made among the southern African taxa: *S. aethiopica* subsp. **longiflora**; *S. burchellii* subsp. **modesta**, subsp. **multiflora**, and subsp. **pilosellifolia**; *S. crassifolia* subsp. **primuliflora**; *S. saldanhensis*; *S. rigens*; and *S. undulata* subsp. **polyantha**. Each taxon is described, with information on ecology and distribution, and most species are illustrated, including SEM micrographs of the seeds.

INTRODUCTION

Silene L. (tribe Sileneae), with 600–700 species (Greuter 1995b), is distributed mainly through the temperate regions of the northern Hemisphere, with its principal centre of diversity in the Mediterranean and Middle East (Oxelman & Lidén 1995). Over 90 species are recorded in Africa, the vast majority in North Africa, with very few extending southwards into sub-Saharan Africa. Just three native and one introduced species of *Silene* are known from south tropical Africa (Turrill 1956a; Wild 1961), with several additional species currently accepted in southern Africa.

Consensus has still to be reached on the delimitation of *Silene*. The circumscription of the genus had been gradually expanded over the last few decades of the twentieth century until it coincided essentially with the delimitation of tribe Sileneae (Greuter 1995b). This consolidation was supported by a preliminary molecular sequence analysis of the tribe (Oxelman & Lidén 1995), which nested all previously recognized genera of Sileneae in *Silene*, with the possible exception of *Agrostemma* L., but had been presaged by the breakdown of morphological differences between recognized segregates when these were examined on a global scale. *Cucubalus* L., which is deeply nested in *Silene*, is distinguished primarily by its berry-like fruits, which evidently represent a specialized dispersal strategy. *Lychnis* L., which forms a discrete clade within Sileneae, was traditionally diagnosed by having capsules with as many teeth as styles (vs. twice as many in *Silene*) (e.g. Chowdhuri (1957) and Chater & Walters (1964)) but the two genera were diagnosed only with great difficulty by Bit-

trich (1993) using a combination of trivial characters, and his recognition of the two appears to have been provisional until *Silene* could be conserved against *Lychnis*, under which name it had earlier been included by Scopoli (1771). The generic name *Lychnis* therefore took priority until it was formally rejected in favour of *Silene* (Brummit 1994).

There are currently two opposing views on generic delimitation in Sileneae. The first, advocated by Greuter (1995b), is an inclusive one that recognizes just the two genera *Agrostemma* and *Silene*. In this sense, *Silene* is broadly distinguished within subfamily Caryophylloideae (Bittrich 1993) by its actinomorphic flowers with 3 or 5 styles. The alternative view, recently developed by Oxelman *et al.* (2000), proposes the partitioning of *Silene* among seven genera, of which only *Lychnis* (30 spp.) includes more than a handful of species. The clade that constitutes *Silene* in this narrow sense is only weakly supported in the molecular analysis and is also not easily diagnosed morphologically from its segregates. Although we favour a more inclusive circumscription of the genus, the native and introduced southern African species are all included in *Silene* either way.

We follow the infrageneric classification of *Silene* s. lat. proposed by Greuter (1995b), based largely on Chowdhuri (1957) with some rationalization and several nomenclatural corrections. Although there is mounting evidence (Petri & Oxelman 2011) that at least some of these sections are not monophyletic, no satisfactory alternative has yet been offered. Significant characters at sectional level are the type of inflorescence, presence or absence of septa in the ovary, number of styles, shape and venation of the calyx, number of teeth in the dehiscent capsule, and the shape of the seeds.

Four global treatments have laid the foundations for our present understanding of the genus (Oth 1824; Rohrbach 1869, 1869–1870; Williams 1896; Chowdhuri 1957), and several modern regional treatments of the European species have also been published (Greuter 1995b and references therein). Regional floristic studies

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exist for parts of North Africa (Wickens 1976; Gilbert 2000) and much of sub-Saharan Africa (Turrill 1956a; Wild 1961) but the taxonomy of *Silene* in southern Africa still rests largely on Sonder's (1860) treatment in *Flora capensis*, and only minor advances in our understanding of the southern African species have been made since then (Rohrbach 1869, 1869–70; Bocquet 1977; Masson 1989; Goldblatt & Manning 2000). The South African species of *Silene* are unique among the flora of the subregion in having been fundamentally misunderstood by Thunberg (1794), who misidentified the majority of his collections as European species (Table 1), leaving it to later authors to recognize that they were indigenous to the country and undescribed. Burman (1768) had earlier made the same mistake, identifying as European all but two (*S. crassifolia* L. and *S. aethiopica* Burm.) of the eight species that he listed from the Cape. Two previous attempts at revising the southern African species, by G. Bocquet in the 1970s and D. Masson in the 1980s, were never completed but many of the southern African herbarium collections bear annotation labels reflecting Masson's unpublished species concepts and names, adding further to the confusion. This revision of *Silene* in southern Africa aims to redress the situation and provide a base for future studies of the genus in the subcontinent. This is especially important as the South African winter rainfall region is a minor centre of diversification for *Silene* in Africa.

Species delimitation in the genus is notoriously difficult and most African species, especially those with a wider distribution, display a complex and often confusing pattern of local variation that defies formal classification (Gilbert 2000). The primary reason for this is almost certainly that the species are often facultatively autogamous, which facilitates the differentiation of local phenotypes, probably independently and repeatedly. Population genetic studies are likely to shed significant light on the nature and origin of these local forms. We have recognized as species only entities that are morphologically (and preferably also ecologically) discontinuous, based on the assumption of \pm complete interspecific infertility. Although Stace (1978) observed that interspecific hybridization is generally rare in *Silene*, recent molecular investigations (e.g. Erixon & Oxelman (2008) and Frajman *et al.* (2009)) suggest that it is an important consideration in some species groups. Where possible, we recognize infraspecific taxa for geographically coherent groups of populations that show evident but incomplete morphological differentiation. We have uniformly applied the rank of subspecies to these taxa but experimental investigation might indicate that other

ranks may be useful in some instances, such as in *S. aethiopica*, where subsp. *longiflora* may be better treated at the level of *forma*. The genetics of the maritime forms of *S. aethiopica* and *S. undulata* also require investigation. Our intention, therefore, is to present a preliminary classification that can form the basis for future experimental studies in the genus.

Another intriguing aspect of the genus is its history and diversification in southern Africa. The indigenous species are currently distributed among three sections, all of which are best represented in the northern hemisphere and presumably originated there. *Silene burchellii* (sect. *Fruticulosae*) is widely distributed through the eastern half of the continent, from Ethiopia (and Arabia) to the Cape Peninsula in the extreme south, and the most parsimonious interpretation is that the species migrated from North Africa southwards along the East African Afromontane corridor. *Silene undulata* (sect. *Elisanthe*), in contrast, is largely southern African, extending only as far north as the highlands of eastern Zimbabwe, and its origin in southern Africa remains unclear but long-distance dispersal appears to be more likely. Both sections have subsequently undergone minor adaptive radiation in the coastal regions of the subcontinent. The third lineage is represented by *S. aethiopica* (sect. *Dipterospermae*), the only native southern African annual species. Essentially endemic to the winter-rainfall region in the extreme south and southwest, with no track in tropical Africa, *S. aethiopica* most likely arrived in the subcontinent through long-distance dispersal.

MATERIALS AND METHODS

All relevant types were examined, as well as all herbarium material from BOL, MO, NBG, PRE, and SAM (acronyms after Holmgren *et al.* 1990), the primary collections of species from southern Africa. All species were also studied in the field.

Ripe seeds from dehisced capsules were mounted directly on aluminium stubs and coated with gold-palladium before viewing at the SEM Unit, University of Cape Town. Seeds were sampled from at least two different collections per species (Figures 1, 2).

TAXONOMY

***Silene* L.**, Species plantarum: 416 (1753), nom. cons. against *Lychnis* [Brummit: 272 (1994)]. Lectotype:

TABLE 1—South African *Silene* species in the Thunberg Herbarium (UPS-THUNB). Native South African taxa in bold.

Thunberg (1794) and Thunberg Herbarium name	Current name	Specimen (UPS-THUNB no.)
<i>S. bellidifolia</i> Juss. ex Jacq.	S. ornata Aiton	10705
S. cernua Thunb.	S. aethiopica Burm.	10713, 10714, 10715
S. crassifolia L.	S. crassifolia L.	10726
<i>S. gallica</i> L.	<i>S. gallica</i> L.	10744
<i>S. noctiflora</i> L.	S. rigens J.C.Manning & Goldblatt	10774, 10775
<i>S. nutans</i> L.	S. burchellii Otth	10780
<i>S. ?pendula</i> L.	<i>S. nocturna</i> L.	10790 (left hand plant)
<i>S. ?pendula</i> L.	S. undulata Aiton	10790 (right hand plant)

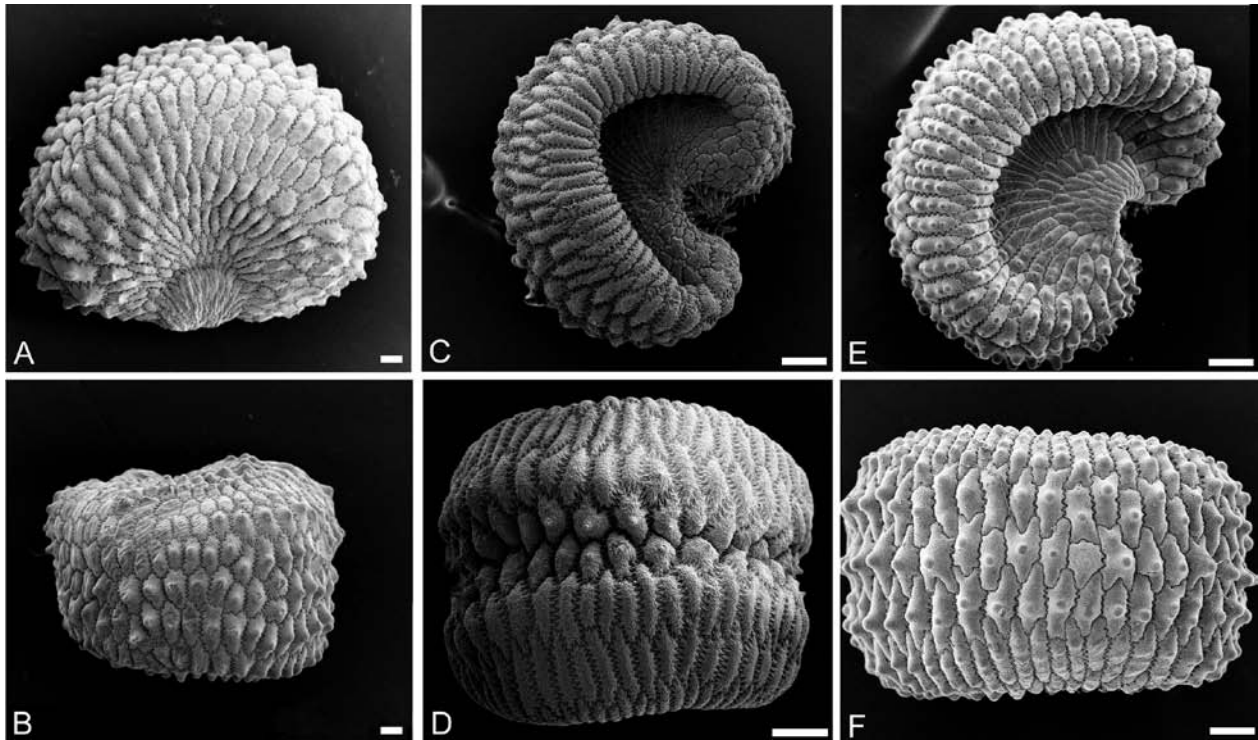


FIGURE 1.—Seed morphology and testa sculpturing in non-native southern African *Silene* sect. *Behen* and sect. *Silene*. A, B, *S. vulgaris*, Moffet 613 (NBG): A, side; B, back. C, D, *S. nocturna*, Goldblatt & Porter 13551 (NBG): C, side; D, back. E, F, *S. gallica*, Bohnen 6351 (NBG): E, side; F, back. Scale bar: 100 μ m.

Silene anglica L., nom. rej. in favour of *S. gallica* L., designated by Britton & Brown: 62 (1913) = *S. gallica* L., nom. cons.

Cucubalus L.: 414 (1753). Type: *Cucubalus baccifer* L. = *Silene baccifera* (L.) Roth.

Lychnis L.: 436 (1753), nom. rej. in favour of *Silene* L. [Brummit: 272 (1994)]. Lectotype: *Lychnis chalcidonica* L., designated by Britton & Brown: 62 (1913) = *Silene chalcidonica* (L.) E.H.L.Krause

Viscaria (DC.) Röhl.: 37 (1812). *Lychnis* sect. *Viscaria* DC.: 761 (1805). Type: *Viscaria vulgaris* Röhl. = *Silene viscaria* (L.) Jess.

Annual, biennial or perennial herbs, rarely geophytes or small shrubs, sometimes caespitose, rarely scandent, glabrous or variously pubescent, sometimes glandular-pubescent, rarely gynodioecious or dioecious. *Leaves* opposite, sometimes slightly connate at base, sessile or shortly petiolate, exstipulate. *Inflorescence* a dichasium or monochasium, rarely 1-flowered or sometimes \pm capitate. *Flowers* erect, spreading or pendulous, usually bisexual, petals and stamens basally connate with floral axis forming a short anthophore [*vide* Greuter 1995b]. *Calyx* tubular or dilated, sometimes strongly inflated, 5-toothed, 10(–60)-nerved, usually longitudinally ribbed and \pm plicate. *Petals* 5(0), usually white or pink, clawed, limb entire to deeply lobed, mostly variously bifid, often with paired coronal scales at base of limb, claw glabrous or ciliate. *Stamens* 5 + 5 in male or bisexual flowers. *Ovary* shortly stipitate, unilocular but usually 3(–5) septate in lower part, styles 3(6 or 10). *Carpel* subglobose to ovoid, borne on persistent carpophore [anthophore], cartilaginous and dehiscing apically by usually twice as

many (rarely as many) teeth as styles, rarely berry-like. *Seeds* numerous, \pm reniform, compressed, sometimes disc-like and peripherally winged, variously sculptured, often \pm colliculate.

600–700 spp., mainly temperate Eurasia (\pm 600 spp.), Africa (\pm 90 spp.) and N America (\pm 65 spp.).

Key to species [introduced taxa marked with an asterisk]

- 1a Inflorescence a \pm divaricately branched dichasium; plants perennial:
 - 2a Plants entirely glabrous, \pm glaucous; calyx inflated, papery, loosely investing capsule, equally 20-veined with veins not raised; petal limbs divided to base, coronal scales obsolete, claw abruptly narrowed and filiform in lower half; ovary distinctly septate (sect. *Behen*) 1. *S. vulgaris**
 - 2b Plants pubescent with eglandular and glandular hairs; calyx not inflated, unequally veined with median veins thickened and prominent; petal limbs bifid, coronal scales well-developed, claw gradually tapering to base; ovary unilocular (sect. *Elisanthe*):
 - 3a Lower portion of stem villous with spreading or shaggy, eglandular hairs 1–2 mm long, sometimes mixed with shorter eglandular or glandular hairs, upper part of stem partly or entirely glandular-haired; calyx vestiture partly or entirely eglandular (rarely entirely glandular), lobes always fringed with eglandular hairs; stamens and styles often ultimately well-exserted; carpophore (2–)4–10(–15) mm long; widespread through southern Africa 2. *S. undulata*
 - 3b Stem either entirely glandular-haired or with a mix of gland-tipped hairs and short, eglandular hairs 0.25–0.50 mm long; calyx vestiture entirely glandular and lobes fringed with glandular hairs; stamens and styles included or very shortly exserted; carpophore 2–4 mm long; coastal sands and calcrete in extreme southwestern Western Cape:
 - 4a Stems stiffly erect, vestiture entirely of gland-tipped hairs, without admixture of acute, eglandular hairs; flowers relatively small, claws 8–10 mm long; cap-

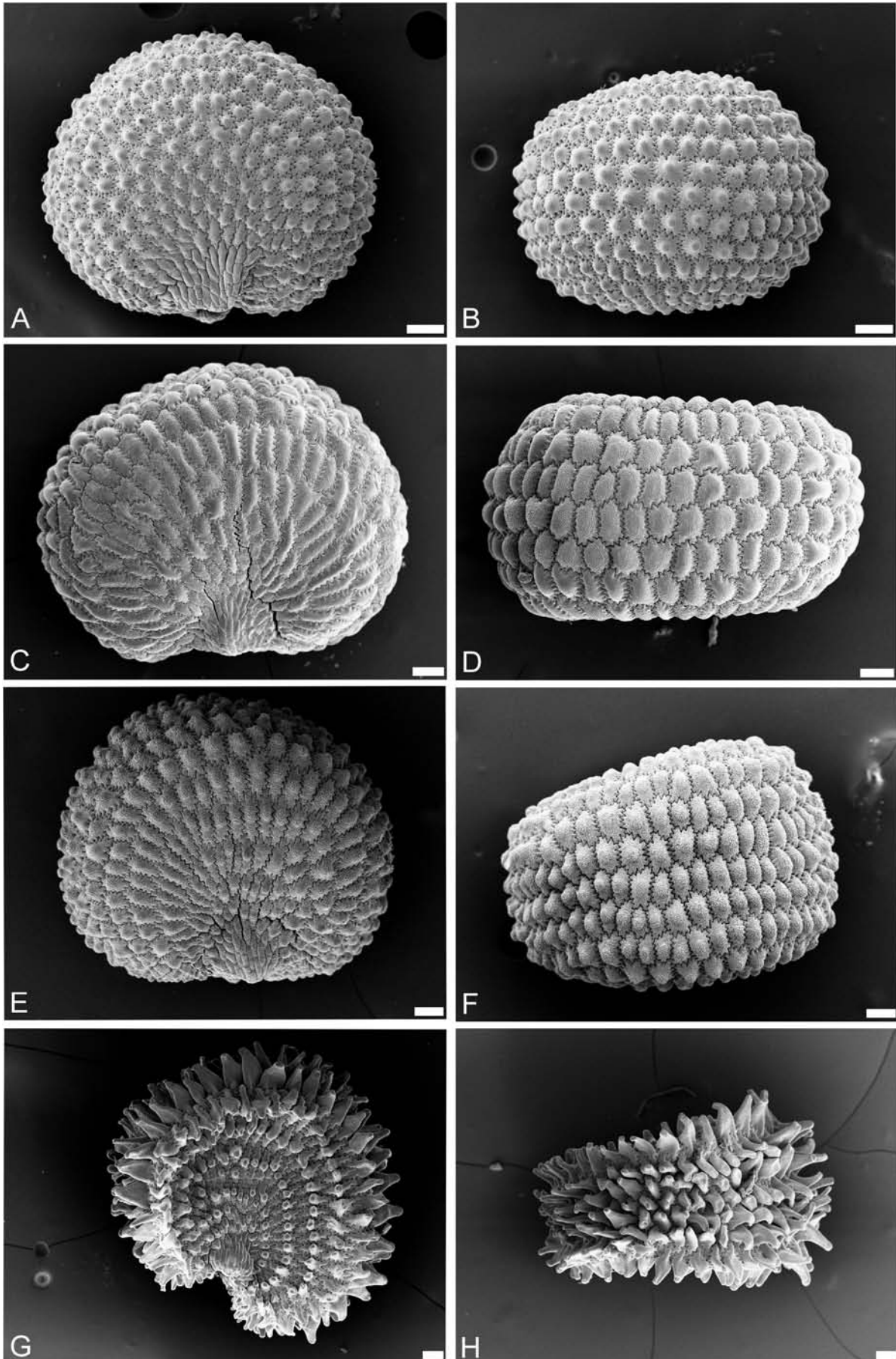


FIGURE 2.—Seed morphology and testa sculpturing in southern African *Silene* sect. *Elisanthe*. A, B, *S. undulata*: A, side; B, back, *Goldblatt 13549* (NBG). C, D, *S. saldanhensis*, *Goldblatt & Manning 13646* (NBG): C, side; D, back. E, F, *S. ornata*, *Goldblatt & Porter 13254* (NBG): E, side; F, back. G, H, *S. rigens*, *Goldblatt & Porter 13291* (NBG): G, side; H, back. Scale bar: 100 μ m.

- sules broadly urn-shaped, 9–10 mm diam. at maturity, causing calyx to split longitudinally at least mid-way but often to base; seeds echinate 5. *S. rigens*
- 4b Stems sprawling, vestiture a mix of gland-tipped hairs and short, eglandular hairs; flowers larger, claws 15–18 mm long; capsules urn-shaped, 6–8 mm diam., not causing calyx to split; seeds collucate or tuberculate:
- 5a Plants mostly laxly sprawling, rarely compact in exposed situations, with flowering stems straggling; calyx without prominent, thickened ribs; petals deep carmine, limbs not overlapping; seeds tuberculate; growing on limestone outcrops in rocky pavement 3. *S. ornata*
- 5b Plants compact, ± cushion-like with flowering stems decumbent or erect; calyx with prominent, thickened ribs; petals mauve, limbs overlapping; seeds collucate; growing in deep, calcareous sands and consolidated dunes 4. *S. saldanhensis*
- 1b Inflorescence a raceme-like monochasium, rarely only 1- or 2-flowered; plants annual or perennial:
- 6a Annuals; upper stems and inflorescence axes glandular-

- pubescent; calyx urn-shaped with triangular or awl-shaped lobes, ribs bristly; carpophore < 1 mm long; seeds compressed and peripherally winged with back flat or shallowly grooved, testa collucate or tuberculate (sect. *Silene*):
- 7a Calyx glandular-pubescent and with glassy bristles 2–3 mm long on veins, without anastomising venation; petals entire 11. *S. gallica**
- 7b Calyx appressed-puberulous and eglandular, with only slightly longer hairs to 0.5 mm long on veins, anastomising venation developed in distal half at least; petals bilobed 10. *S. nocturna**
- 6b Perennials or annuals; stems and inflorescences eglandular-puberulous; calyx clavate with ovate lobes, uniformly shortly puberulous; carpophore 2–12 mm long; seeds compressed and disc-like, peripherally winged with back deeply and acutely grooved between wings, testa striate, cells radially fusiform:
- 8a Annuals (sect. *Dipterospermae*) 9. *S. aethiopica*
- 8b Geophytic perennials (sect. *Fruticulosae*):
- 9a Plants densely and closely branched, forming small prostrate mats or loose tangled mounds with the

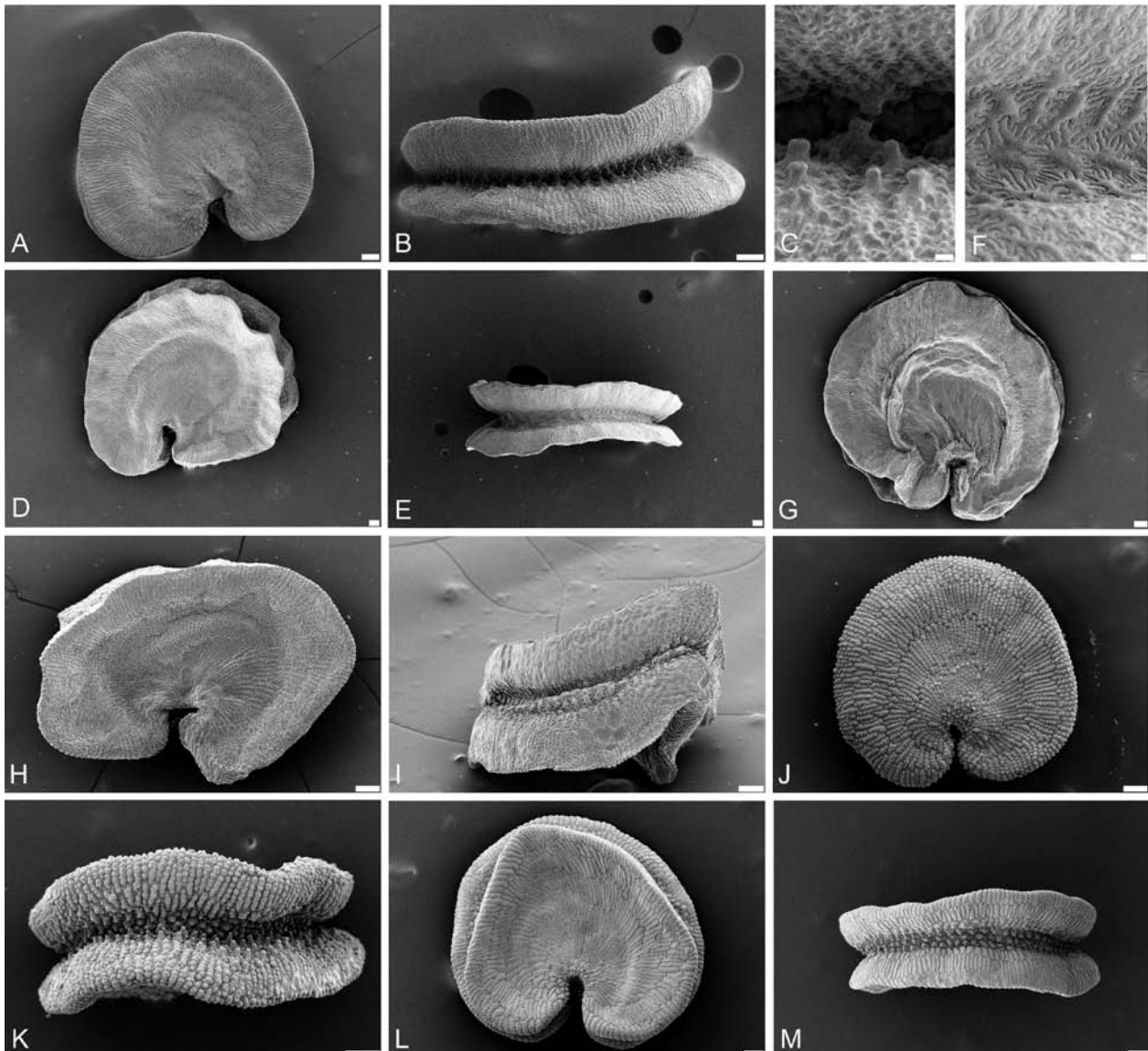


FIGURE 3.—Seed morphology and testa sculpturing in southern African *Silene* sect. *Fruticulosae* and sect. *Dipterospermae*. A–C, *S. burchellii* subsp. *burchellii*, *Penfold 111* (NBG): A, side; B, back; C, detail of dorsal groove. D–F, *S. crassifolia* subsp. *crassifolia*, *Goldblatt et al. 13447* (NBG): D, side; E, back; F, detail of dorsal groove. G, *S. crassifolia* subsp. *primuliflora*, *Middelmost 2046* (NBG): G, side. H, I, *S. mundiana*, *Van der Merwe 1871* (NBG): H, side; I, back. J, K, *S. aethiopica* subsp. *aethiopica* ‘typical form’, *Goldblatt et al. 13469* (NBG): J, side; K, back. L, M, *S. aethiopica* subsp. *aethiopica* ‘maritime form’, *Goldblatt & Porter 13569* (NBG): L, side; M, back. Scale bar: A, B, D, E, G–M, 100 µm; C, 10 µm; F, 30 µm.

- numerous inflorescences extending only shortly above the vegetative growth; inflorescence axis \pm filiform, 0.2–0.5 mm diam.; leaves 7–15 \times 1–3 mm; racemes 1- or 2-flowered 8. *S. mundiana*
- 9b Plants not forming tangled mounds or mats and with few inflorescences extending well above vegetative growth; inflorescence axis terete, 0.5–1.5 mm diam.; leaves 10–60 \times (1–)2–12 mm; racemes mostly more than 2-flowered:
- 10a Stems mostly erect or suberect, rarely decumbent, mostly annual, 0.5–1.5 mm diam. at base of inflorescence; leaves linear to oblanceolate, rarely obovate, thin-textured, clustered in lower half of stem and well separated from inflorescence; calyx weakly pleated; capsule ovoid, 8–10 \times 5–7 mm; plants inland or coastal but never on foredunes 6. *S. burchellii*
- 10b Stems \pm prostrate or decumbent, relatively robust, perennial and often branching, mostly 1.5–2.0 mm diam at base of inflorescence; leaves oblanceolate to suborbicular, \pm succulent, running into inflorescence; calyx strongly pleated; capsule broadly urn-shaped to subglobose, (8–)10–12 \times 7–10 mm; plants coastal on sandy foredunes 7. *S. crassifolia*

Silene sect. **Behen** Dumort., *Flora belgica*: 107 (1827). Sect. *Inflatae* (Boiss.) Chowdhuri: 241 (1957), superfluous name. *Silene* [unranked] *Inflatae* Boiss.: 573 (1867). Type: *Silene vulgaris* (Moench) Garcke

\pm 8 spp., Europe and extratropical Asia, N Africa and Atlantic islands; naturalized elsewhere.

Perennials or biennials, glabrous to sparsely eglandular-pubescent, often glaucous. *Leaves* lanceolate to orbicular. *Flowers* solitary or in few-flowered dichasia, half-pendent at anthesis, vespertine (sometimes indistinctly so); anthophore glabrous. *Calyx* glabrous, inflated, 10- or 20-veined, with conspicuous reticulate venation. *Petals*: claw glabrous, auriculate, limb bifid to base; coronal scales linear or reduced. *Stamens*: filaments glabrous. *Ovary* partially septate. *Capsule* subglobose. *Seeds* semicircular-reniform, with flat to convex flanks and back, radially colliculate-echinate.

1. ***Silene vulgaris*** (Moench) Garcke, *Flora von Nord- und Mittel-Deutschland*, ed. 9: 64 (1869). *Cucubalus behen* L.: 414 (1753), non *Silene behen* L. (1753). *Behen vulgaris* Moench: 709 (1794). *Silene cucubalus* Wibel: 241 (1799), nom. illegit. superfl. *Silene inflata* Sm.: 467 (1800), nom. illegit. superfl. Type: 'Habitat in Europae septentrionalis pratis siccis', *Herb. Linn.* 582.4 [LINN, lecto!], designated by Aeschmann & Bocquet: 204 (1983)].

[see Chater & Walter (1964) and Greuter (1997) for heterotypic synonyms]

Gynodioecious perennial to 60 cm tall, softly woody at base, stoloniferous; stems ascending or erect, 1–3 mm diam., usually branched, glabrous, with or without axillary non-flowering shoots. *Leaves* ovate-lanceolate or the lower oblanceolate, 30–90 \times 6–15 mm, acute to apiculate, base cuneate or narrowed and petiole-like in lower leaves, glabrous, glaucous, with evident side veins. *Inflorescence* a laxly divaricate dichasium, usually several-flowered; bracts smaller than leaves, ovate-attenuate, up to 15 \times 5 mm, thinly herbaceous with submembranous margins or entirely \pm scarious; pedicels mostly 10–15 mm long at anthesis but up to 30(–50) mm

long in fruit. *Calyx* inflated, urn-shaped and bladder-like, 10–12 \times 7–8 mm at anthesis but accrescent to 13 \times 10 mm in fruit and loosely investing capsule, base intrusive, whitish or pale green with darker veining, equally 20-veined with reticulate venation throughout, not plicate, lobes broadly triangular, 1.5 \times 2.0 mm, densely ciliolate along margins and inner face toward apex. *Flowers* spreading or \pm pendent at anthesis, bisexual or functionally female, lily-scented at night only but remaining open during day. *Petals* white or pink to purple, claw 10–11 mm long, cuneate and conspicuously auriculate in upper half, abruptly narrowed and filiform in basal half, limb deeply bilobed almost to base, 4–6 \times 4–5 mm, coronal scales obsolete. *Stamen* filaments \pm 18 mm long and exerted \pm 7 mm, or in functionally female flowers 5–6 mm long and deeply included, glabrous. *Ovary* ovoid, \pm 3 mm long; styles 18 mm long, exerted 7–8 mm. *Capsule* urn-shaped, \pm 10 \times 7 mm, usually \pm 3 \times longer than carpophore; carpophore 2.5–3.0 mm long, glabrous. *Seeds* reniform with flat or convex face and convex back, 1.0–1.5 mm, tuberculate, grey. *Flowering time*: Oct.–Dec.(–Jan.). Figures 1A, B, 4.

Vernacular name: bladder campion.

Distribution and ecology: native to Europe, where it is widely distributed across the continent through the Middle East into temperate Asia; introduced into Ethiopia, Australia, South Africa (where it is cultivated as an ornamental) and also North America, where it is considered a weed.

Diagnosis: readily distinguished by the complete lack of vestiture and by the pale greenish or whitish, inflated, bladder-like calyx with 20 equal longitudinal veins joined by extensive reticulated veining throughout. The petals, deeply divided to the base of the limb with the claw abruptly narrowed and filiform in the basal half, are also diagnostic. Flowers are either bisexual, with long, well-exserted filaments \pm 18 mm long, or functionally female, with relatively short filaments, 5–6 mm long, deeply included within the calyx.

The species is broadly circumscribed by Chater & Walters (1964), who recognize eight subspecies for the European material, most of which have been variously treated by other authors. The South African material is stoloniferous and is thus treated as subsp. *macrocarpa* Turrill (1956b).

subsp. ***macrocarpa*** Turrill, *Hooker's Icones plantarum* 36: t. 3551 (1956b). Type: Cyprus, Chionistra, 1 620 m, 4 Jun. 1940 [grown in the Herbarium Experimental Ground, Kew, from seeds collected 5 Jul. 1938], *Kennedy s.n. K2312* (K, holo.).

Distribution and ecology: widely distributed through the Mediterranean and long established in southwest Britain, whence it was presumably introduced to South Africa, probably as an ornamental. In South Africa the species has been recorded from mesic situations in the Western Cape winter-rainfall region (Tygerberg Hills, around Stellenbosch and Oudtshoorn, and in the Langkloof) and from the Hogsback in Eastern Cape, as a garden escape in waste places, along roadsides, around old lands, and in vineyards. It was first recorded as an

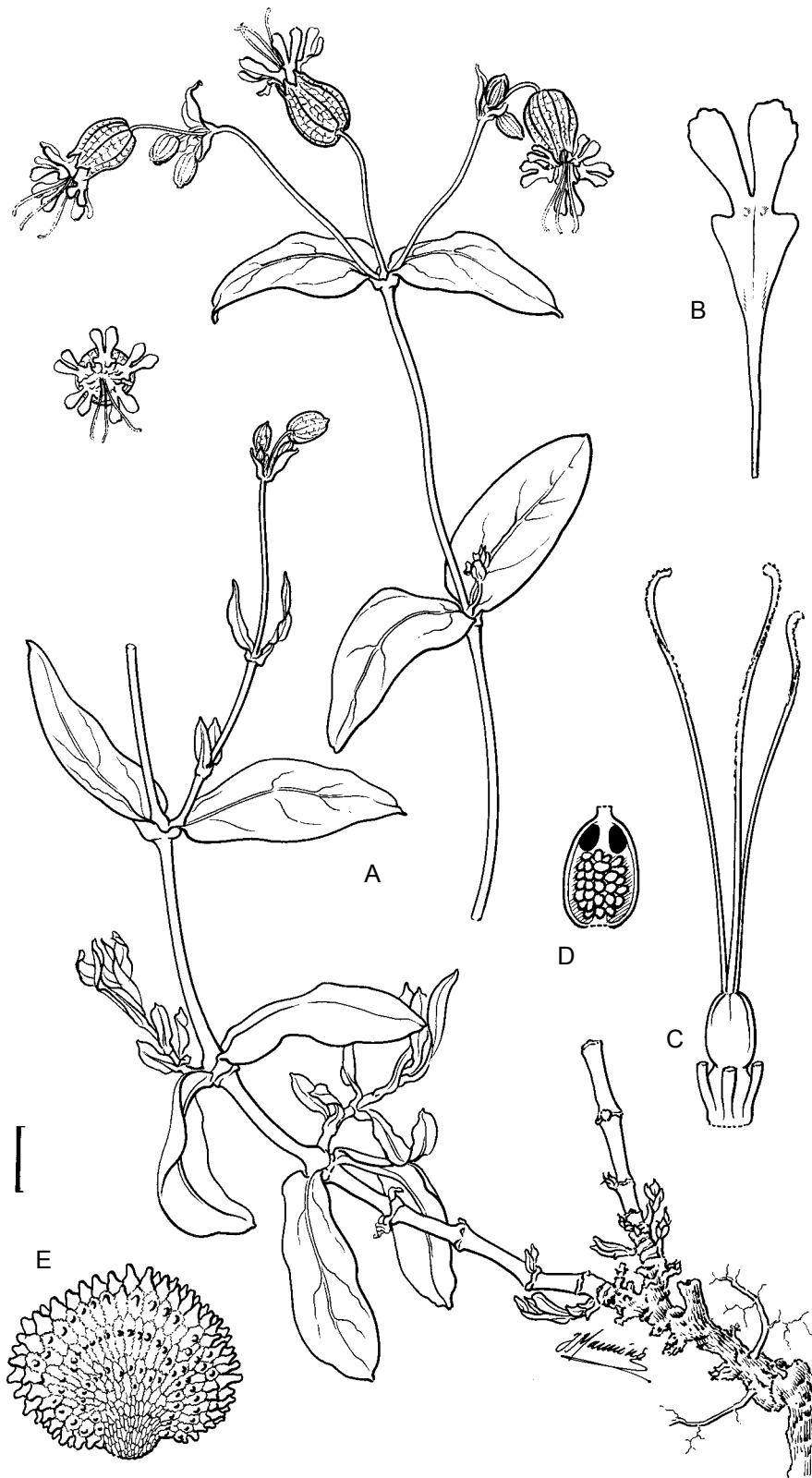


FIGURE 4.—*Silene vulgaris*, ex hort., no voucher. A, flowering stem; B, petal; C, gynoecium; D, ovary l/s; E, seed. Scale bar: A, 10 mm; B, C, 2.5 mm; D, 2 mm; E, 0.5. Artist: John Manning.

escape around Stellenbosch in the early twentieth century (Figure 5).

In South Africa, *Silene vulgaris* subsp. *macrocarpa* can form dense stands, propagating through stolons but always in transformed habitats and there is no indication that it is invasive. The extensive, stoloniferous rootstock may however become a problem for cultivation

if the plants are allowed to establish unchecked over several years in fallow lands, and subsp. *macrocarpa* has become a weed of agronomic importance in Europe (Aeschmann 1983).

Additional specimens

WESTERN CAPE.—3318 (Cape Town): Tygerberg Nature Reserve, (–DC), 12 Dec. 1975, *Loubser 3476* (NBG); Rustenberg

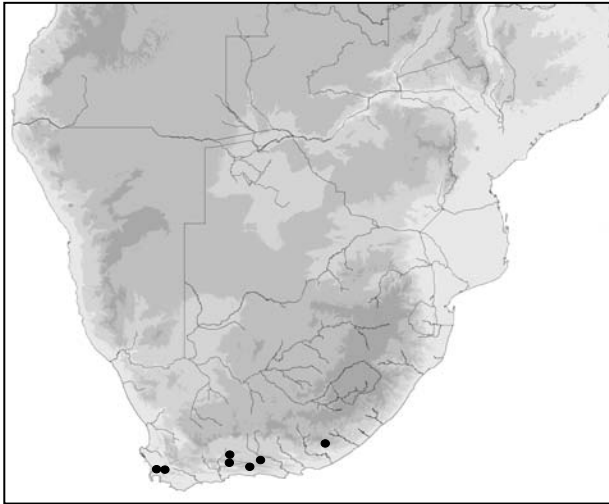


FIGURE 5.—Recorded distribution of *Silene vulgaris* in southern Africa.

Farm, (–DD), 7 Oct. 1973, *Taylor 8608* (NBG, PRE); Idas Valley, Schoongesicht Farm, (–DD), 26 Oct. 1973, *Neser s.n.* (NBG); Stellenbosch, Blaauwklip, (–DD), 10 Oct. 1928, *Gillett 582* (NBG); Stellenbosch, Devon Valley, (–DD), 21 October 1968, *Du Toit s.n.* (NBG); Jonkershoek, (–DD), 19 Oct. 1943, *Adamson 3514* (BOL). **3322** (Oudtshoorn): Prince Albert, (–AA), 8 Nov. 1988, *Dean 748* (PRE); Oudtshoorn Experimental Farm, (–AC), 29 Jan. 1970, *Maree 40* (NBG); Boomplaas, Cango Valley, (–AC), 5 Feb. 1975, *Moffett 613* (NBG). **3323** (Willowmore): Longkloof, (–BC), 13 November 1970, *Botha s.n.* (NBG, PRE); Avontuur, (–CA), 2 Jan. 1970, *Wiid s.n.* (NBG)

EASTERN CAPE.—**3226** (Fort Beaufort): Hogsback, Risingham, old cultivated land, (–DB), 10 Jan. 1989, *King s.n. PRE60819* (PRE).

***Silene* sect. *Elisanthe* (Fenzl. ex Endl.) Ledeb., Fl. Ross. 1: 314 (1842). *Saponaria* sect. *Elisanthe* Fenzl. ex Endl., Gen. Pl.: 972 (1840). *Silene* sect. *Melandriformes* (Boiss.) Chowdhuri: 244 (1957), superfluous name, *Silene* [unranked] *Melandriformes* Boiss., Fl. Or. 1: 568 (1867). Lectotype, designated by Pfeiffer: 1186 (1871–1875): *Silene noctiflora* L.**

Annuals, biennials and perennials, pubescent with eglandular and glandular hairs, monoecious or dioecious. *Leaves* ovate-lanceolate; bracts herbaceous. *Flowers* in few-flowered dichasia, bisexual or unisexual, spreading to ± erect, mostly vespertine; anthophore glabrous or pubescent. *Calyx* pubescent, clavate, 10-veined, with conspicuous reticulate venation. *Petals*: claw glabrous to ciliate, auriculate, limb bifid; coronal scales present. *Stamens*: filaments glabrous or pubescent. *Ovary* unilocular at maturity; styles 3 or 5. *Seeds* semi-circular-reniform, with convex flanks and back, radially colliculate-echinate.

± 20 spp., Eurasia and N Africa, tropical and S Africa.

The large-flowered southern African species were not treated by Chowdhuri (1957) in an inexplicable omission, but have traditionally been placed in sect. *Elisanthe* (Sonder 1860; Chater & Walters 1964), with which they accord in their dichasial inflorescence, reticulate calyx venation, completely unilocular ovaries, and colliculate-echinate seeds without peripheral wings.

2. ***Silene undulata* Aiton, Hortus kewensis 2: 96 (1789); Sond.: 126 (1860). *Silene tristis* Salisb.: 301**

(1796), nom. superfl. illegit. *Melandrium ornatum* var. *undulatum* (Aiton) Rohrb.: 234 (1869). *Melandrium undulatum* (Aiton) Rohrb.: 245 (1869–70). Type: South Africa, without precise locality, cultivated at Kew from seed introduced by Francis Masson, *Masson s.n. BM000593534* (BM, holo.!).

Tufted perennial, 0.5–2.0 m, producing new vegetative shoots from basal axils at end of flowering season, often developing a gnarled, softly woody crown; rootstock a carrot-like taproot. *Stems* erect to sprawling, rarely prostrate in exposed situations, simple to highly branched, 1.5–5.0(–8.0) mm diam., sparsely or densely pubescent with lower portions of stems bearing acute, eglandular hairs sometimes mixed with scattered, short, gland-tipped hairs, eglandular hairs either all longer or a mix of longer, spreading or shaggy hairs 1–2 mm long and shorter, decurved hairs, upper parts of stems usually with progressively more gland-tipped hairs, sometimes almost entirely glandular-haired. *Leaves* mostly basal, suberect or spreading, lower leaves oblanceolate-spathulate, sub-petiolate, up to 200 × 25 mm, sometimes dead or dying at flowering, cauline leaves elliptical to oblanceolate, mostly 50–80 × 10–20 mm, acute or acuminate, base tapering, margins plane or undulate, usually pubescent, either with mixture of erect, gland-tipped hairs and acute, eglandular hairs or entirely eglandular, sometimes subglabrous or rarely glabrous except on margins, margins always ciliate, with longer hairs to 1 mm long at extreme base, with evident side veins. *Inflorescence* a lax or more compact, symmetrically or asymmetrically branched cyme, axis 1–2 mm diam. below primary flower; bracts similar to upper leaves but smaller, subequal, suberect or spreading; primary pedicels 8–40 mm long, secondary pedicels 5–20 mm long. *Flowers* half-nodding, nocturnal, clove- or soapy-scented at night. *Calyx* cylindrical or narrowly urn-shaped in flower, (18–)20–35(–45) mm long, 10-ribbed, with 1–4 reticulate veins in distal half, densely or sparsely puberulous, hairs usually a mix of acute, eglandular and spreading, gland-tipped hairs but sometimes entirely glandular or entirely eglandular, lobes narrowly triangular to awl-shaped, (3–)5–10 mm long, densely ciliolate. *Petals* white to pink with yellowish reverse, limbs spreading, cuneate, not overlapping with adjacent petals, 9–15 × 8–15 mm, bifid ± halfway, claws strap-shaped, (12–)15–25 × 2.5–3.0 mm, glabrous or pubescent along abaxial midline and margins, exserted up to 10 mm beyond calyx, auriculate apically, auricles of adjacent tepals locking together, coronal scales spreading or suberect, 0.7–1.5 mm long, denticulate. *Stamen* filaments unequal, shorter series 11–25 mm long, longer series 16–30 mm long, reaching to top of claws or exserted; anthers ± 2 mm long, reaching top of claws and included or exserted up to 6 mm. *Ovary* narrowly pyriform, shortly stipitate, 5–7 mm long, stipe ± 1 mm long; styles ± 9–15 mm long at anthesis and included but usually elongating, ultimately reaching up to 25 mm long and exserted up to 10 mm. *Capsule* ovoid, (10–)15–25 × 5–8 mm, 1.5–6.0 × longer than carpophore, minutely granular; carpophore (2–)4–10(–15) mm long, glabrescent. *Seeds* 1.2–1.5 mm diam., reniform with hilum recessed, face flat, back flat, reddish brown, testal cells radial-concentric, colliculate-tuberculate. *Flowering time*: Aug.–Dec. in the winter rainfall region; Nov.–Mar. in the summer rainfall region

but as late as June along the subtropical coast. Figures 2A, B, 6, 7.

Vernacular names: Cape catchfly, wild tobacco, wildetabak.

Distribution and ecology: widely distributed through the more temperate parts of southwestern and eastern southern Africa northwards into eastern Zimbabwe (Figure 8), occurring in a variety of stony or rocky habitats, in coastal and inland scrub, often in ravines, along riverbanks and forest margins, and in moist grassland, from just above the high tide mark to well over 2 000 m. The species is absent from the more arid regions, notably Bushmanland and the Kalahari in Northern Cape and the Great Karoo in Western and Eastern Cape.

Growth and flowering of the species in vegetated communities such as thicket margins is stimulated by clearance of the overburden by fire. The flowers are strictly nocturnal and strongly scented at night but although they may remain open for several hours on overcast mornings, sometimes until midday, they are then often no longer scented. The species is clearly pal-

atable, being extensively browsed by both wild animals and livestock, but is also used traditionally as a medicine in many diseases, particularly fevers and delirium (Watt & Breyer-Brandwijk 1932).

Diagnosis and relationships: as circumscribed here, *Silene undulata* is a highly variable species with numerous local forms that have in common the development of relatively long, eglandular hairs, 1–2 mm long, on the lower portion of the stem, giving the base of the stems a characteristic, shaggy appearance (Figure 7C). In some instances the eglandular hairs are mixed with scattered, short, gland-tipped hairs, which typically predominate in the upper parts of the stems (Figure 7B), which are sometimes entirely glandular-haired. The vestiture of the calyx is similarly variable, usually including a mix of longer, eglandular hairs and short, gland-tipped hairs, but sometimes either entirely eglandular or entirely glandular. The lobes are, however, invariably fringed with eglandular hairs. Other sub-Saharan species in the section have a \pm entirely glandular pubescent calyx, including the margins of the lobes. Another characteristic of the species is the relatively long, narrowly triangular to

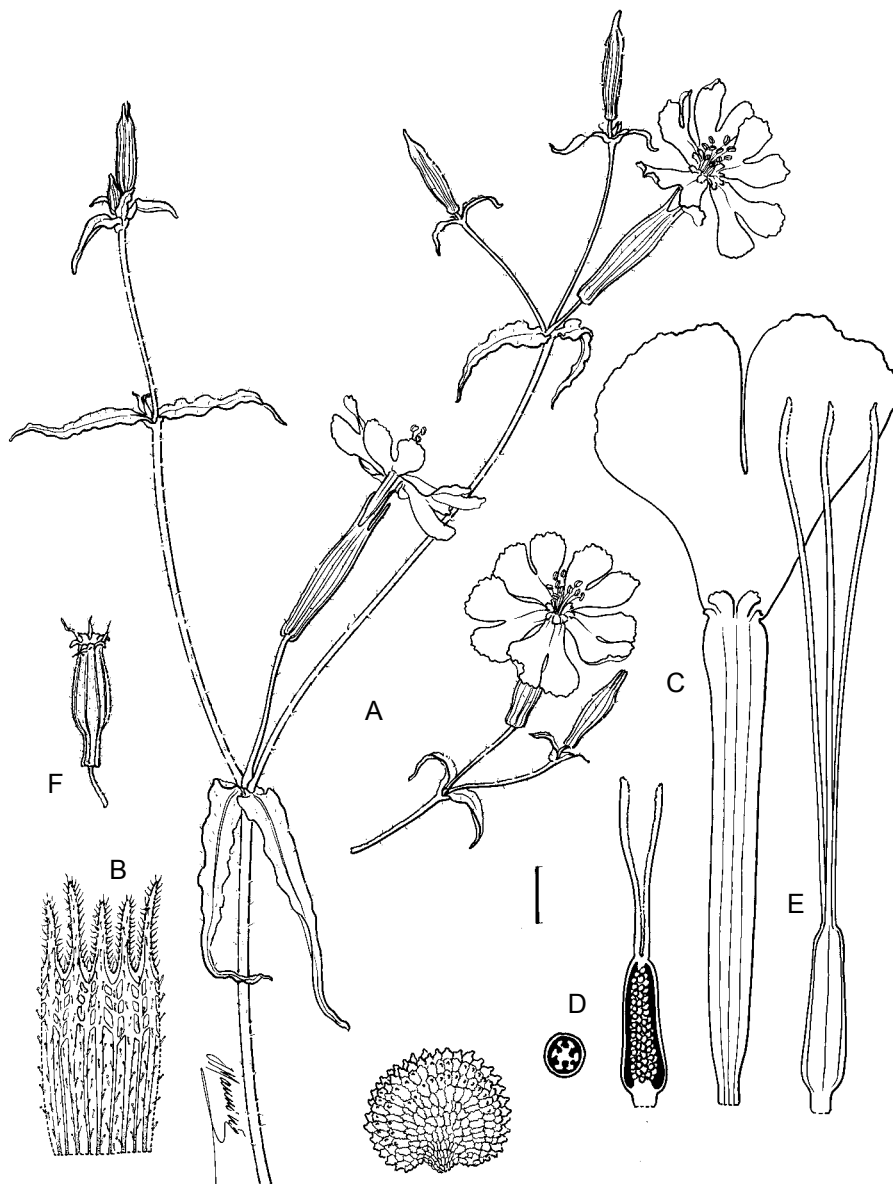


FIGURE 6.—*Silene undulata* subsp. *undulata*, Clanwilliam, Goldblatt & Porter 13523. A, flowering stem and flower; B, calyx laid out; C, petal; D, gynoecium before style elongation, l/s and t/s; E, gynoecium after style elongation; F, capsule after dehiscence; G, seed. Scale bar: A, F, 10 mm; B, 6 mm; C–E, 2.5 mm; G, 0.5. Artist: John Manning.

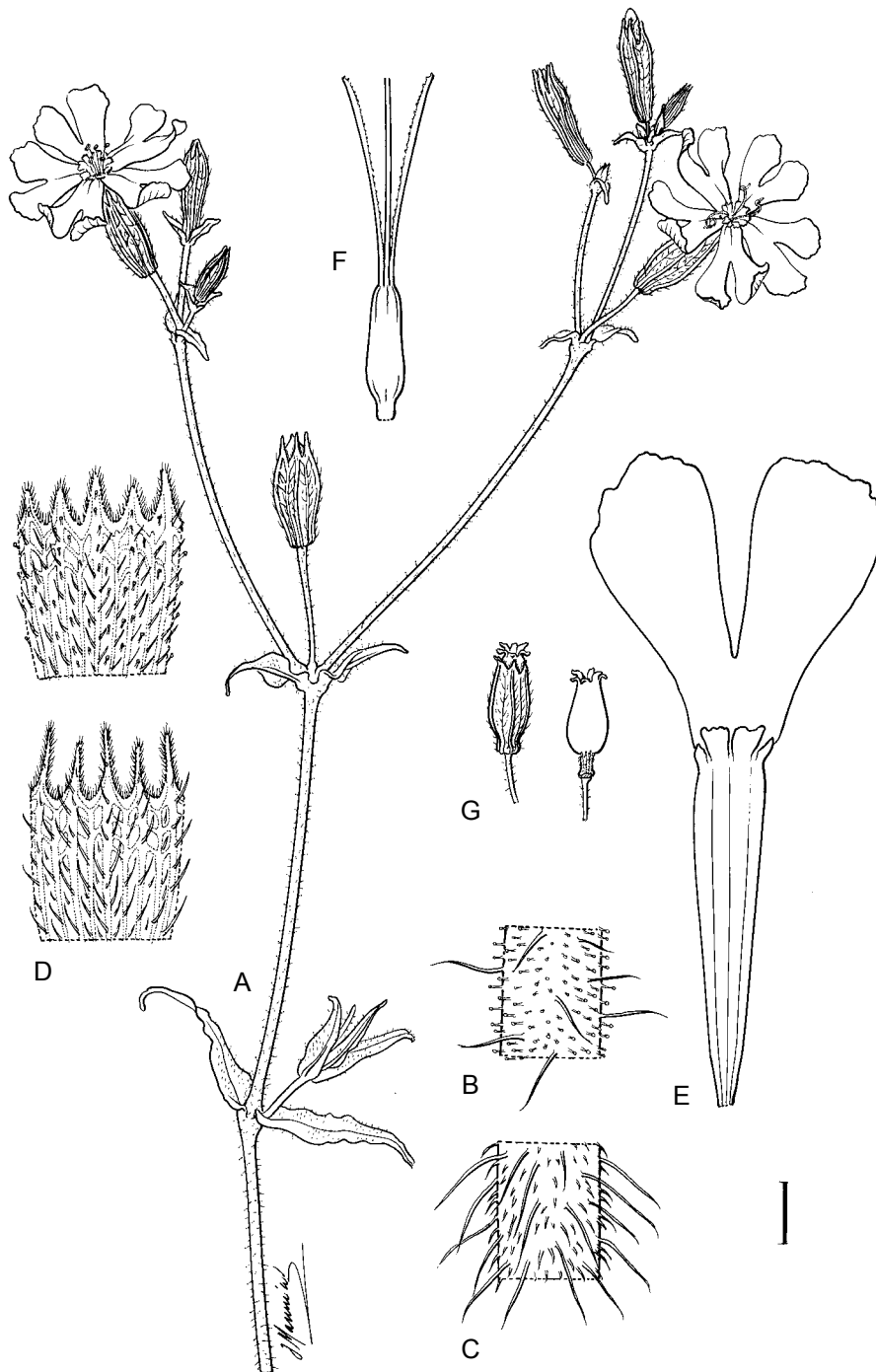


FIGURE 7.—*Silene undulata* subsp. *undulata*, Langebaan, without voucher. A, flowering stem; B, peduncle segment; C, lower stem segment; D, calyces laid out; E, petal; F, gynoecium before style elongation; G, capsules after dehiscence (left hand illustration with calyx removed). Scale bar: A, G, 10 mm; B, C, 1 mm; D, 5 mm; E, 2.5 mm. Artist: John Manning.

subulate calyx lobes, mostly 5–8 mm long (Figures 6B, 7D).

The species varies also in the length and exertion of the stamens and styles. Style length is dependent on the age of the flowers, and the styles are always included at anthesis. In many populations, however, the styles elongate markedly after anthesis, becoming well exerted by the second or third day.

Silene undulata was described from cultivated plants grown at Kew from seeds collected in the Western Cape by Francis Masson, who visited the region from 1772 to 1775 and again from 1786 to 1795. The earliest collection of the species, however, appears to be an unlocalised specimen at the British Museum collected in 1772

by Franz Oldenburg (*Oldenburg 1260*). Oldenburg, who visited the Cape in 1771–1773, accompanied both Masson and Carl Thunberg on collecting trips (Glen & Germishuizen 2010). His fragmentary specimen at the British Museum (*BM001010634*) was initially ignored, then mistakenly identified as the Sicilian species *Silene calycina* C.Presl., before finally being correctly determined as *S. undulata*. It represents the form with a proportionally longer carpophore that was initially recognized at species level under the name *S. capensis* Oth. An equally fragmentary collection of the same form made by Thunberg, possibly from the same population that yielded seeds to Masson since the two men certainly collected together on the Cape Peninsula and along the West Coast where *S. undulata* occurs, was mistaken by him for the Mediterranean *S. pendula* (Table 1).

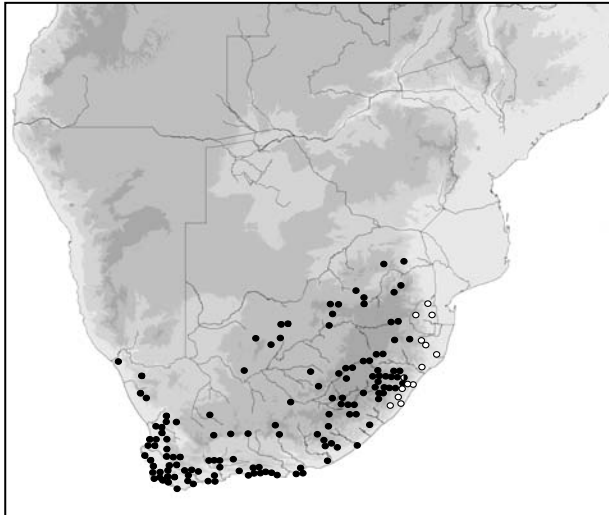


FIGURE 8.—Distribution of *Silene undulata* in southern Africa: subsp. *undulata*, ●; subsp. *polyantha*, ○.

Silene undulata exhibits numerous local forms, varying in habit, degree and nature of vestiture, length of calyx and carpophore, length and shape of calyx lobes, size of petals, degree of exertion of stamens and styles, and shape and size of the capsule. Some of these have formed the basis of separate species but we are unable to identify any of these character states or combination of states that is consistent with the recognition of more than a single, variable species. The relative length of carpophore and capsule, in particular, has been used to distinguish several species in the complex, viz. *S. bellidioides* (carpophore one quarter as long as capsule), *S. undulata* (carpophore one third as long as capsule), and *S. capensis* (carpophore at least half as long as capsule) (Sonder 1860). A further two species were recognized on the basis of their relatively hairless leaves, *S. eckloniana* from Cape Recife with eglandular stems, and leaves glabrous above but hairy on the margins and along the midrib beneath, and *S. caffra*, also from Eastern Cape, with subglabrous stems and leaves that are ciliolate along the margins but otherwise glabrous on both surfaces. With numerous collections now to hand, we are unable to correlate any of these differences with other character states, nor with geography, and conclude that they represent independent and local variants within a single species.

Some of these names were consolidated by Rohrbach (1869), who treated *S. caffra*, *S. capensis*, and *S. diurniflora* as synonyms of *S. undulata*. Of the remaining names, only *S. bellidioides* and *S. undulata* have been applied in recent years, always with a great deal of uncertainty reflecting the \pm continuous and often local variation in the relative lengths of carpophore and capsule.

There is, however, a distinctive morphotype characteristic of the populations from the coastal and near-inland parts of KwaZulu-Natal and Swaziland. Plants from this region consistently produce stiffly erect stems, with closely branched, flat-topped cymes of flowers with short calyces, mostly 12–15 mm long, and unusually small capsules, 10–15 mm long. Although all of these states are found elsewhere in the species, their consistent

association among these populations is unique and suggests some degree of genetic differentiation. We recognize these plants as subsp. *polyantha*.

Key to subspecies

- 1a Stems erect or sprawling; cymes mostly without tertiary branching; calyx (15–)20–35(–45) mm long; capsules (12–)15–25 mm long, 1.5–4.0 \times longer than carpophore; plants widespread but not from coastal KwaZulu-Natal or Swaziland 2a. subsp. *undulata*
 1b Stems erect; cymes with tertiary and often quarternary branching; calyx 12–15(–20) mm long; capsules 10–15 mm long, 4–6 \times longer than carpophore; plants from coastal KwaZulu-Natal or Swaziland 2b. subsp. *polyantha*

2a. subsp. *undulata*

Silene capensis Otth in DC.: 379 (1824); Sond.: 125 (1860). *Melandrium capense* (Otth.) Rohrb.: 232 (1869). *Melandrium undulatum* var. *capense* (Otth.) Rohrb.: 246 (1869–70). Type: South Africa, ‘ad cap. B.-Spei.’, without date or collector, *Prodr. 1 p. 379 no. 144* (G-DC, holo.–microfiche!).

Silene diurniflora Kunze: 578 (1844) [*vide* Sond. (1860)]. Type: South Africa, ‘Prom. b. sp.’, cultivated at University of Leipzig 1842–1843, *Guenzius s.n.* (LZ, holo.†).

Silene bellidioides Sond.: 125 (1860), syn. nov. *Melandrium bellidioides* (Sond.) Rohrb.: 247 (1869–70) [as ‘*bellidioides*’]. Type: South Africa, ‘fields near the Zwartkops River, Nov. without year, *Ecklon & Zeyher 1964 S-G-5677* (S, lecto.!, designated by Nordenstam: 279 (1980); SAM!, isolecto.).

Silene eckloniana Sond.: 126 (1860), syn. nov. *Melandrium ecklonianum* (Sond.) Rohrb.: 232 (1869). Type: South Africa, [Eastern Cape], ‘sea shore near Cape Recife, Feb. 1830/2’, *Ecklon s.n. S-G-8711* (S, holo.!).

Silene caffra Fenzl ex C.Muell. in Walp.: 276 (1868). *Melandrium caffrum* (Fenzl ex C.Muell.) Rohrb.: 232 (1869). *Melandrium undulatum* var. *caffrum* (Fenzl ex C.Muell.) Rohrb.: 246 (1869–70). Type: South Africa, [Eastern Cape], ‘Caffraria’, *Drège 5342* (W, holo.†).

Silene bellidifolia var. *stricta* Fenzl in Drège: 222 (1844), nom. nud.

Silene bellidifolia var. *foliosa* Fenzl in Drège: 222 (1844), nom. nud. [*vide* Sond. (1860)].

Silene caffra Fenzl in Drège: 222 (1844), nom. nud.

Silene capensis var. *flaccida* E.Mey. in Drège: 222 (1844), nom. nud.

Silene meyeri Fenzl in Drège: 222 (1844), nom. nud. [et herb. *Drège 730*, *vide* Rohrb.: 245 (1869–70)].

Silene ornata lus. *flaccida* Fenzl in Drège: 222 (1844), nom. nud. [*vide* Sond. (1860), as ‘*florida*’].

Silene thunbergii E.Mey. in Drège: 222 (1844), nom. nud., non *S. thunbergiana* Eckl. & Zeyh. ex Sond. (1860) [*vide* Sond. (1860)].

Melandrium capense var. *strictum* [as '*stricta*'] Fenzl ex Rohrb.: 232 (1869), nom. nud.

Silene noctiflora sensu Thunb., in part [excluding UPS-THUNB 10774 & 10775 = *S. rigens* J.C.Manning & Goldblatt]: 81 (1794), non. L. (1753).

Stems erect or sprawling. *Cymes* relatively few-flowered, mostly without quaternary branching, rounded. *Calyx* (15–)20–35(–45) mm long. *Capsules* ovoid to narrowly ovoid, (12–)15–25 mm long, 1.5–4.0 × longer than carpophore. *Carpophore* 4–10(–15) mm long. Figures 6, 7.

Distribution and ecology: throughout most of the range of the species but replaced along the eastern seaboard by subsp. *polyantha* (Figure 8).

Diagnosis and relationships: a variable taxon, typically with a lax, rounded inflorescence of relatively large flowers with calyx mostly 20–35 mm long, often with subulate lobes. The nature of the stem and calyx vesiture is very variable, with some plants entirely eglandular and others predominantly glandular, sometimes even within a single collection (e.g. *Taylor 5180*). Variation in the nature and degree of vesiture is especially evident among the populations along the southern Cape coast. Populations between Knysna and Plettenberg Bay often, but not always, have entirely eglandular stems and calyces.

Most populations have the anthers exerted beyond the mouth of the floral tube at anthesis, followed by the styles, which at anthesis are always included in the floral tube. This feature is thus evident only in older flowers. Also diagnostic of many populations are the long, subulate calyx lobes, 5–7 mm long but this can vary within populations. Plants with short calyces, ± 15 mm long, and carpophores ± 4 mm long, are typical of the West Coast, whereas specimens from western Lesotho (e.g. *Schmitz 8095*, *Hilliard & Burt 12065*) have among the longest calyces (35–45 mm long) and carpophores (± 15 mm long) recorded for the species.

Plants are very variable in habit, those from coastal and alpine habitats typically more compact and prostrate whereas individuals from sheltered or shaded situations are more lax. Some of this variation is certainly ecological and linked to the habitat but some may well be genetic, since plants from the cliffs at Hermanus evidently retain their compact habit in cultivation [*Davis s.n.* (BOL)].

Separation from subsp. *polyantha* is not always clear in the KwaZulu-Natal Midlands, especially around Pietermaritzburg, where plants have erect stems and well-branched, flat-topped inflorescences but calyces ± 20 mm long.

Additional specimens

LIMPOPO.—**2330** (Tzaneen): Woodbush, (–CC), Jan. 1923, *Wager s.n. TRV23094* (PRE). **2429** (Zebediela): Donkerkloof near Chuniespoort, 1 700 m, (–BA), 14 Mar. 1974, *Vahrmeijer 2414* (MO, PRE).

NORTH-WEST.—**2527** (Rustenburg): Rustenburg, (–CC), 5 Nov. 1940, *Lanham s.n.* (PRE). **2624** (Vryburg): Vryburg, Aarbosvlakte, (–DC), 25 Mar. 1921, *Mogg 8435* (PRE); Vryburg, (–DD), Apr. 1912, *Rogers s.n. BOL45405* (BOL).

GAUTENG.—**2527** (Rustenburg): Witwatersrand, Hekpoort, (–DC), 18 Apr. 1936, *Phillips 33* (PRE). **2528** (Pretoria): Pretoria, Arcadia, E of Union Buildings, (–AC), 12 Jul. 1955, *Smith 323* (PRE); Pretoria, (–CA), 21 Nov. 1904, *Leendertz 4148* (PRE); Waterkloof, (–CA), 25 Oct. 1920, *Verdoorn 131* (PRE); Wonderboom Poort, (–CA), 24 Nov. 1917, *Pole-Evans 230* (PRE); Fountains Valley, (–CA), 14 Mar. 1930, *Verdoorn 820* (PRE); Moreletta spruit, (–CA), 1 Mar. 1980, *Germishuizen 1260* (PRE); Irene, (–CC), Apr. 1924, *Smuts 1318* (PRE); Doornkloof, (–CC), 8 Nov. 1928, *Gillett s.n.* (NBG). **2627** (Potchefstroom): Klifdrif, E of Potchefstroom, (–AD), 8 Jan. 1935, *Theron 1208* (PRE); Parys, (–CC), Apr. 1907, *Grey College Herbarium 576* (BOL).

MPUMALANGA.—**2530** (Lydenburg): Verlorenvallei Nature Reserve, NE of Dullstroom, (–AC), 16 Dec. 1932, *Galpin s.n. BOL45397* (BOL); 10 Apr. 2000, *Van Slageren & Van Wyk 971* (PRE); Mokobulaan Plantation on Skurweberg, 2 100 m, (–BA), 3 Dec. 1985, *Kluge 2663* (PRE). **2629** (Bethal): Ermelo, Nootgedacht, (–DB), 5 Feb. 1927, *Henrici 1467* (PRE). **2630** (Carolina): Carolina, (–AA), Dec. 1905, *Bolus 11701* (BOL).

FREE STATE.—**2827** (Senekal): Gumtree, (–DD), 13 Jan. 1948, *Reardon 4* (NU). **2828** (Bethlehem): Golden Gate Highland Park, (–DA), Jan. 1966, *Liebenberg 7495B* (PRE); Qwa Qwa National Park, Qwa Qwaberg, (–DB), 2 Feb. 1995, *Zietsman 3112* (PRE). **2829** (Harrismith): Harrismith, Drakensberg Botanical Garden, (–AC), 16 Jan. 1974, *Jacobsz 2015* (MO, NBG, PRE, S); foot of Platberg, (–AC), 2 Feb. 1968, *Van der Zeyde 227* (NBG). **2926** (Bloemfontein): Bloemfontein, Gen. de Wet School, (–AA), 3 Jun. 1967, *Hanekom 910* (PRE); O.F.S. Botanic Garden, (–AA), 27 Mar. 1968, *Müller 236* (NBG); Mazelspoort, (–AA), 7 May 1949, *Steyn 50* (NBG); Dewetsdorp, (–DA), 15 Apr. 1950, *Steyn 942* (NBG). **2927** (Maseru): Ladybrand, (–AB), Nov. 1906, *Rogers 5241* (PRE). **3025** (Colesberg): 5 km from Colesberg on road to Steynsburg, (–CA), 1 Apr. 1981, *Herman 465* (PRE). **3027** (Lady Grey): Zastron campsite, (–AC), 27 Mar. 1980, *Reid 202* (PRE).

KWAZULU-NATAL.—**2730** (Vryheid): Utrecht Dist., Groenvlei, Balele Mountain Lodge, (–CA), 18 Nov. 1997, *Ngwenya 1617* (NH); Hlobane, (–DB), 5 Nov. 1950, *Johnstone 517* (MO, NU). **2828** (Bethlehem): Witzieshoek, (–DB), Dec. 1905, *Thode 5664* (NBG); Royal Natal National Park, near Basuto Gate, (–DB), 2 Feb. 1982, *Stewart & Manning 2254* (NU). **2829** (Harrismith): Van Reenen, (–AD), Jun. 1914, *Bews 965* (NU). **2929** (Underberg): Cathedral Peak Forest reserve, (–AB), 1 Jan. 1983, *Noel 2820* (NU); Giant's Castle Game Reserve, near Dinosaur footprints, (–AD), 27 Dec. 1967, *Trauseld 907* (NU); Lotheni Valley, vicinity of Ash Cave, (–AD), 7 Feb. 1985, *Hilliard & Burt 18188* (E, NU, PRE); Spring Grove Farm, (–BB/BD), 9 Dec. 1996, *Greene 906* (NH); Kamberg, (–BC), 28 Nov. 1974, *Wright 1985* (NU); 10 Jan. 1990, *Williams 687* (NH); Mpendle Dist., Mulangane Ridge, (–BC), 3 Feb. 1984, *Hilliard & Burt 17507* (E, K, NU, PRE, S); Chameleon Cave area, (–CB), 1 Dec. 1984, *Hilliard & Burt 17769* (E, K, NU, PRE, S); Sani Pass, (–CB), 18 Feb. 1973, *Hilliard 5339* (NU); 23 Mar. 1977, *Hilliard & Burt 9801* (E, K, MO, NU); 6 Jan. 1984, *Hilliard, Burt & Manning 17284* (E, NU); Jan. 2000, *Edwards 1749* (E, K, NU); Cobham State Forest, Polela River, (–CB), 2 Dec. 1987, *MacDevette 2036* (NH); Vergelegen Nature Reserve, (–CB), 2 Jan. 1978, *Hilliard & Burt 11182* (E, MO, NH); Underberg, Watermead farm, (–DC), 16 Dec. 1989, *Williams 645* (NH); Bulwer, Sunset farm, (–DC), 24 Feb. 1990, *Vos 31* (NU); Polela Dist., Hlabeni Mtn near Creighton, (–DC/DD), 21 Nov. 1994, *Wirringhaus 1310* (NH). **2930** (Pietermaritzburg): Mount West Dist., 3 km N of intersection, (–AA/AC), 13 Nov. 1988, *Greene 609* (NH); Kunhardt's Farm, 21 km from Merrivale on Boston Road, (–AC), Jan.–Apr. 1982, *Kunhardt 10* (NH); Karkloof Mtn Range, summit of Mt Gilboa, (–AD), 18 Nov. 2000, *Johnson & Neal 29* (NU); Pietermaritzburg, World's View, (–CB), 30 Oct. 1964, *Tunnington s.n.* (NU); Richmond/Ixopo area, Hella Hella, (–CC), 1 Nov. 1997, *Swanepoel & Porter 14* (NH). **3029** (Kokstad): Mzimkhulu Dist., Nsiken Nature reserve, (–AB), 19 Feb. 1992, *Williams 901* (NH); Newmarket, (–AD), 1 Feb. 1895, *Krook s.n. S10-9935* (S); Mt Currie, (–AD), 20 Jan. 1957, *Taylor 5483* (NBG); between Flagstaff and Kokstad, (–DA), 4 Dec. 1928, *Hutchinson 1798* (BOL, K); Ngele, (–DA), Mar. 1883, *Tyson 1286* (SAM); 2 Jan. 1966, *Strey 6365* (NU); 6 Jan. 1990, *Abbott 4838* (NH); 13 Jan. 1990, *Abbott 4925* (NH).

LESOTHO.—**2828** (Bethlehem): Leribe, (–CC), Dec. 1912, *Dieterlen 6791* (SAM). **2927** (Maseru): Maseru, (–BD), 25 Jan. 1951, *Compton 22536* (NBG); between Molimo Nthuse and Blue Mtn Pass, 2 250 m, (–BD), 15 Feb. 1978, *Schmitz 8095* (PRE); slopes behind Malimo Nthuse Hotel, (–BD), 12 Jan. 1979, *Hilliard & Burt 12065*

(NU). **2929** (Underberg): Mokhotlong, (-AC), 25 Feb. 1949, *Compton 21498* (NBG); 23 km from Mokhotlong on road to Sani Top, 2 250 m, (-AC), 12 Feb. 1987, *Killick 4578* (MO, NH); Sehlabaethebe Reserve, 8 900' [2 700 m], (-CC), 3 Feb. 1975, *Bayliss 1317* (PRE). **3028** (Matatiele): ridge between Orange River and Maqaba Peak, near Quachasnek, (-BA), 13 Mar. 1936, *Galpin s.n. BOL31667* (BOL).

NORTHERN CAPE.—**2723** (Kuruman): Carrington, (-CB), Apr. 1940, *Esterhuysen 2172* (BOL). **2724** (Taung): Klein Boetsap, (-CC), 1910, *Pagan s.n. PRE54332* (PRE); W of Harz River near Taung, (-DA), 12 Feb. 1948, *Rodin 3646* (BOL, MO, PRE). **2816** (Oranjemund): Richtersveld, Ploegberg S of Khubus, (-DB), 3 Sept. 1977, *Oliver, Tölkén & Venter 508* (MO, NBG, PRE). **2917** (Springbok): O'kiep, (-DB), Sept.–Oct. 1926, *Pillans 4983* (BOL). **2922** (Prieska): Niekershoop, (-BB), 26 Nov. 1935, *Bryant 1165* (BOL). **3017** (Hondeklipbaai): Bowesdorp, (-BB), Sept. 1941, *Stokoe s.n.* (MO, PRE, SAM); Brakwater on Arakooop, (-BB), 25 Aug. 1977, *Thompson & le Roux 48* (MO, NBG); Grootvlei Pass, (-BB), 3 Sept. 1980, *Le Roux 2786* (BOL, NBG); Kamiesberg Pass, (-BB), 7 Sept. 1981, *Van Berkel 430* (NBG); 12 Sept. 1993, *Strid & Strid 37769* (PRE); Skilpad Wild Flower Reserve, (-BB), 10 Aug. 1993, *Grobler 39* (PRE). **3018** (Kamiesberg): Kamiesberg, Leliefontein, (-AC), 16 Dec. 1936, *Adamson 1454* (PRE); Studer's Pass, (-AC), 11 Sept. 2007, *Snijman 2149* (NBG); Farm Damsland, (-AC), 29 Oct. 2007, *Snijman 2213* (NBG); Langkloof, N of Farm Doringkraal, (-AC), 23 Sept. 2010, *Goldblatt & Porter 13573* (MO, NBG). **3119** (Calvinia): Nieuwoudtville Waterfall, (-AC), Sept. 1930, *Lavis s.n. BOL19622* (BOL); Nieuwoudtville Reserve, (-AC), 7 Sept. 1983, *Perry & Snijman 2312* (NBG, PRE); 13 Sept. 2010, *Goldblatt & Porter 13526* (NBG); Oorlogskloof Nature reserve, (-AC), 20 Sept. 1995, *Pretorius 307* (NBG); between Oorlogskloof and Papkuilfontein, (-CA), Sept. 1939, *Leipoldt 3076* (BOL); Calvinia, Farm Driefontein, (-DA), 23 Sept. 2009, *Goldblatt, Manning & Porter 13431* (MO, NBG). **3121** (Fraserburg): Platkoppies Farm, 45 km N of Williston, (-AA), 29 Mar. 1993, *Germishuizen 6358* (PRE). **3122** (Loxton): 17 km from Loxton on road to Victoria West, Taaibosfontein, (-BC), 13 May 1976, *Thompson 3053* (NBG, PRE). **3124** (Hanover): Richmond Dist., Elandspoort, (-CB), Oct. 1935, *Thorne s.n. SAM51851* (SAM). **3221** (Merweville): Ezels Kom, (-BA), 12 Apr. 1986, *Shearing 1263* (PRE). **3222** (Beaufort West): Karoo National Park, (-AB), 3 Jan. 1985, *Shearing 866* (PRE). **3223** (Rietbron): Nelspoort, (-AA), without date, *Pearson 2049* (SAM).

WESTERN CAPE.—**3118** (Vanrhynsdorp): Gifberg, (-DC), 15 Oct. 1953, *Esterhuysen 22132* (BOL); Gifberg Pass, (-DD), 11 Sept. 2009, *Goldblatt & Porter 13319* (MO, NBG). **3217** (Vredenburg): Witteklip, (-DD), 8 Sept. 2009, *Goldblatt & Porter 13281* (MO, NBG, PRE). **3218** (Clanwilliam): between Leipoldtville and Eland's Bay, (-AC), Oct. 1947, *Zinn s.n. SAM63437* (SAM); Pakhuis Pass, (-BB), 4 Sept. 1948, *Morris 20922* (BOL); 4 Sept. 1948, *Compton 20922* (NBG); N7 S of Clanwilliam at Kransvlei turnoff, (-BB), 12 Sept. 2010, *Goldblatt & Porter 13523* (MO, NBG); ± 4 km NE of Redelinghuys, (-BC), 9 Sept. 2009, *Helme 6262* (NBG); Citrusdal, Modderfontein, (-CB), 27 Aug. 1968, *Hanekom 1163* (NBG, PRE). **3219** (Wuppertal): Brakfontein, (-AC), 20 Oct. 1983, *Viviers 1245* (NBG); Algeria Forest Station, (-AC), 20 Nov. 1996, *Van Rooyen, Steyn & de Villiers 253* (NBG); Matjiesrivier, (-AC), 6 Apr. 1944, *Wagener 359* (NBG); Dasklip Pass, (-CC), 30 Sept. 1972, *Thompson 1517* (NBG, PRE). **3318** (Cape Town): Langebaan, Lynch point, (-AA), 5 Sept. 1971, *Axelsson 478* (NBG); near Darling, (-AD), Sept. 1905, *Bolus s.n.* (BOL); hollow S of Strand Railway, Stickland, (-CD), Oct. 1932, *Acocks 959* (S); Camps Bay, (-CD), Oct. without year, *Ecklon & Zeyher s.n.* (SAM); Table Mtn, (-CD), 29 Jul. 1846, *Prior s.n.* (PRE); Sept. 1897, *Thode 5828* (NBG); Lion's Head, (-CD), 17 Oct. 1897, *Wolley Dod 3511* (BOL); Sept. 1913, *Kensit & Teague s.n. BOL45388* (BOL); Devil's Peak, (-CD), Oct. 1877, *Bolus 3844* (BOL); 31 Oct. 1915, *Pillans 2808* (BOL); Table Mtn, Kasteelpoort, (-CD), without date, *Marloth 8999* (PRE); Malmesbury Dist., Helderfontein Farm, (-DA), 11 Sept. 1979, *Boucher 4684* (NBG, PRE); Langverwacht above Kuil's River, (-DC), 1 Oct. 1973, *Oliver 4700* (NBG); Botlaryberg, Farm Koopmanskloof, (-DD), 20 Sept. 1980, *Beyers 86* (NBG); above Jonkershoek, Haekop, (-DD), 23 Oct. 1928, *Gillett 1784* (BOL, NBG); Jonkershoek, Bosboukloof, (-DD), May 1967, *Kerfoot 5795* (NBG, PRE); Jonkershoek State Forest, (-DD), 31 Oct. 1975, *Haynes 1113* (NBG, PRE). **3319** (Worcester): Witzenberg, Inkruij, (-AA), 1 Oct. 1954, *Esterhuysen 234219* (BOL); 5 km N of Tulbagh on way to Winterhoek State Forest, (-AA), 8 Oct. 1981, *Mauve & Hugo 59* (MO, NBG, PRE); Ceres Dist., Gydouw Pass, (-AB), 12 Aug. 1986, *Van Wyk 2530* (PRE); road from Hottentot's Kloof to karoopoort, (-BA), 29 Nov. 1908, *Pearson 4831* (BOL); Dal Josafat Forest Reserve, (-CA), 19 Oct. 1963, *Taylor 5446* (NBG); Du Toit's Peak, (-CA), 21

Dec. 1975, *Esterhuysen 34165* (BOL); Fonteijniesberg, (-CB), 1 Jan. 1976, *Esterhuysen 34171* (BOL); Wemmershoek, (-CC), Jan. 1921, *Andraee 778* (PRE); Robertson Dist., Vrolijkheid Nature Reserve, (-DD), 8 Apr. 1974, *Theron & Students 3152* (PRE). **3320** (Montagu): Montagu Div., Keurkloof, (-CC), 20 Sept. 1935, *Lewis s.n. BOL31666* (BOL); Montagu–Barrydale Road, (-CD), Sept. 1923, *Levyns 526* (BOL). **3321** (Ladimith): Swartberg, Towerkop, (-AC), 16 Dec. 1956, *Esterhuysen 26789* (BOL); Seweweekspoort, (-AD), 27 Dec. 1928, *Andraee 1225* (PRE); Huis River Pass, (-BC), 31 July 1955, *Van Niekerk 536* (BOL); Meiringspoort, (-BC), Feb. 1932, *Thorne s.n. SAM50187* (SAM); Rooiberg, (-DA), 1 Nov. 1931, *Compton 3827* (BOL). **3322** (Willowmore): Swartberg Pass, (-AC), Dec. 1904, *Bolus s.n.* (BOL); Dec. 1943, *Stokoe 9061* (BOL); Cango Valley, Bassonsrus, (-AC), 4 Nov. 1974, *Moffett 401* (PRE); Swartberg, Blouberg Peak, (-AC), 29 Nov. 1987, *Bean & Viviers 1987* (BOL); Wilderness, Fairy Knowe, seashore dunes, (-DC), 13 Dec. 1928, *Mogg 11896* (PRE); Wilderness, (-DC), 14 Nov. 1952, *Van Niekerk 196* (BOL); Ebb and Flow Nature Reserve, Touw River Valley, (-DC), 19 Oct. 1971, *Taylor 7996a* (NBG, PRE). **3323** (Willowmore): Louterwater, (-CC), 18 Dec. 1933, *Compton 4573* (BOL); Herold's Bay, (-CD), without date, *Hugo 2118* (NBG); 17 Sept. 2010, *Goldblatt & Porter 13546* (NBG). **3418** (Simonstown): Sandy Bay, (-AB), 26 Aug. 1978, *Van Jaarsveld 3464* (MO, NBG); Constantiaberg, (-AB), 17 Dec. 1939, *Compton 8209* (NBG); Hout Bay, (-AB), 16 Aug. 1928, *Gillett 411* (NBG); Chapman's Peak, (-AB), 7 Dec. 1943, *Van Niekerk 469* (NBG, PRE); Nov. 1944, *Levyns 57806* (SAM); Silvermine, (-AB), 4 Oct. 1967, *Bayliss 4006* (NBG); Kalk Bay Mtns, (-AB), 30 Oct. 1931, *Adamson 2230* (BOL); 22 Nov. 1943, *Levyns 3553* (BOL); cliffs beyond Simonstown, (-AB), 4 Oct. 1928, *Hutchinson 646* (BOL, PRE); S of Simonstown, above Froggy Pond, (-AB), 16 Nov. 1975, *Esterhuysen 34107* (BOL); Buffelsbaai, (-AD), 28 Nov. 1939, *Adamson 2710* (BOL); Somerset West, (-AB), 31 Oct. 1948, *Parker 4378* (BOL, MO, NBG, S); Kogel Bay, (-BD), 5 Sept. 1946, *Parker 4111* (BOL, NBG); Rooi Els, (-BD), 15 Oct. 1971, *Boucher 1670* (NBG); Pringle Bay, (-BD), 23 Dec. 1982, *O'Callaghan 481* (NBG); Betty's Bay, Jackass Penguin Colony, (-BD), 16 Feb. 1997, *Mucina 50359/1* (PRE). **3419** (Caledon): Houhoek, (-AA), Apr. 1892, *Guthrie 224* (NBG); Caledon, Warmbaths Hotel, (-AB), 5 Oct. 1928, *Gillett 1114* (NBG); 10 miles [16 km] from Caledon on Bot River Road, (-AB), 17 Sept. 1938, *Thorns s.n.* (NBG); Hermanus [cult. at Kirstenbosch], (-AC), Jan. 1932, *Davis s.n. NBG20/31* (BOL); Hermanus, cliffs opposite Marine Hotel, (-AC), 28 Aug. 2010, *Manning 3304* (NBG); Buffeljagsbaai, (-DA/DC), 7 Sept. 1995, *Paterson-Jones 617* (NBG). **3420** (Bredasdorp): Rietfontein, 20 km S Stormsvlei, (-AA), 23 Sept. 1982, *Bayer 3071* (NBG); ± 25 miles [40 km] from Swellendam on Bredasdorp Road, (-AC), 30 Aug. 1962, *Taylor 3847* (NBG); Windhoek, Potberg Nature Reserve, (-AD), Jul./Aug. 1968, *Van der Merwe 870* (PRE); 11 Oct. 1978, *Burgers 1243* (NBG). **3421** (Riversdale): near Kafir Kuils River, (-AB), 14 Oct. 1923, *Muir 2916* (PRE); Stillbay rubbish dumps, (-AC), 9 Sept. 1978, *Bohnen 4091* (NBG); Stillbay Rifle Range, (-AD), 2 Oct. 1978, *Bohnen 4292* (NBG). **3422** (Mossel Bay): Goukamma Nature Reserve, (-BB), 1969, *Heinecken 245* (PRE); Buffalo Bay, (-BB), 26 Nov. 1955, *Taylor 4908* (NBG). **3423** (Knysna): between Georgetown [George] and Swellendam, (-AA), Jul. 1856, *Castelnau 77* (BOL, PRE); Bitou Bridge, (-AA), 15 Dec. 1941, *Fourcade 5522B* (BOL, NBG); Knysna Heads, (-AA), 7 Nov. 1928, *Gillett 2171* (BOL, NBG); foot of Prince Alfred's Pass, (-AA), Oct. 1932, *Fourcade 4853* (BOL, NBG); Keurboomstrand, (-AB), 14 Nov. 1949, *Morris 433* (NBG); 25 Nov. 1955, *Taylor 4917* (NBG); 17 Sept. 1956, *Theron 2099* (PRE); Ratels Bosch, (-BA), Aug. 1905, *Fourcade 16* (BOL); Aug. 1908, *Fourcade 317* (BOL). **3424** (Humansdorp): Groot River, (-AA), Oct. 1942, *Fourcade 5784* (BOL).

EASTERN CAPE.—**3027** (Lady Grey): Witteberg, Joubert's Pass, (-BC), 18 Jan. 1979, *Hilliard & Burt 12206* (NU); Witteberg, Bedgelert, (-DA), 2 Dec. 1981, *Hilliard & Burt 14637* (E, NU); Ben McDhui, (-DB), 9 Feb. 1983, *Hilliard & Burt 16558* (E, K, NU). **3028** (Matatiele): Naude's Nek, (-CA), 27 Dec. 1977, *Bigalke 23* (NU); 13 Feb. 1983, *Hilliard & Burt 16601* (E, NU). **3126** (Queens-town): Jamestown, Vogelfontein Farm, (-BB), 16 Dec. 1942, *Barker 2246* (NBG); Dordrecht, (-DB), Apr. 1929, *Smuts s.n.* (NBG); 22 Mar. 1964, *Bayliss 2119* (NBG). **3127** (Lady Frere): Maclear, Bastervoetpad, Farm Snowy Side, (-BB), 17 Nov. 1993, *Bester 1713* (NH). **3128** (Umtata): Farm Comarty ± 18 km W of Ugie, (-AA), 19 Apr. 1994, *Bester 2712* (NH); Libode, Misty Mount, S of Port St. Johns, (-DB), 18 Nov. 1991, *Cloete 1344* (NH). **3224** (Graaf-Reinet): 'Waterfurrows' above Graaf-Reinet, (-BA), Nov. 1865, without collector *BOL74044* (BOL). **3226** (Fort Beaufort): Pluto's Vale, (-BA), 29 Oct. 1964, *Bayliss 2481* (NBG); Elandsberg, (-BD), 17 Jan. 1986, *Cadman, Edwards & Norris 3224* (NU); Hogsback, (-DB), May 1932, *Leighton*

s.n. BOL31669 (BOL); June 1961, *Bokelmann 6* (NBG), 3227 (Stutterheim): Kleinemonde, (–CA), ?Nov. 1953, *Taylor 4306* (NBG); King William's Town, (–CD), Jan. 1894, *Sim 1613* (NU), 3228 (Butterworth): Kei Mouth, (–CB), Aug. 1891, *Flanagan 880* (SAM), 3325 (Port Elizabeth): Walmer, (–DC), Sept. 1916, *Paterson 3321* (NBG, PRE); Redhouse, (–DC), Sept. 1914, *Paterson 272* (BOL); Baakens River Valley, Fern Glen, (–DC), 14 Nov. 1974, *Olivier 1241* (MO, NBG), 3326 (Grahamstown): Martindale, Kap River, (–BD), 23 Dec. 1956, *Taylor 5180* (NBG), 3425 (Skoenmakerskop): Sea View, (–AB), 18 Sept. 2010, *Goldblatt 13549* (NBG); Sardinia Bay, (–BA), 18 Sept. 2010, *Goldblatt 13552* (NBG); coast near Cape Recife, (–BA), 18 Sept. 2010, *Goldblatt & Porter 13553* (NBG).

2b. subsp. **polyantha** *J.C.Manning & Goldblatt*, subsp. nov.

TYPE.—KwaZulu-Natal 2930 (Pietermaritzburg): Krantzklouf, (–DD), Oct. 1921, *Haygarth 138* (NBG, holo.; NH, iso.).

Stems erect. *Cymes* relatively many-flowered, with tertiary and often quarternary branching, forming a flat-topped, corymbiform synflorescence. *Calyx* 12–15(–20) mm long. *Capsules* broadly ovoid, 10–15 mm long, 4–6 × longer than carpophore. *Carpophore* 2–4 mm long.

Distribution and ecology: restricted to the coastal and near-inland parts of KwaZulu-Natal and Swaziland between 550–1 000 m, with a single early record from Barberton (Figure 8), occurring along thicket and forest margins and in marshy places.

Diagnosis: distinguished from the typical form by the erect stems and closely branched, flat-topped inflorescence, with tertiary and often quarternary branching, short calyx, mostly 12–15(–20) mm long, and short, broadly ovoid capsules, 10–15 mm long with very short carpophore, 2–4 mm long. This form grades into the typical subspecies in the KwaZulu-Natal Midlands, between Pietermaritzburg and Vryheid.

Additional specimens

MPUMALANGA.—2531 (Komatipoort): Barberton, (–CC), Dec. 1916, *Pott 5467* (PRE).

SWAZILAND.—2631 (Mbabane): Mbabane, Forbes Reef, (–AC), 29 Nov. 1963, *Compton 31797* (NBG); Black Mbuluzi Valley, 3500' [1 060 m], 9 Dec. 1958, *Compton 28443* (NBG); 9 Dec. 1964, *Compton 32183* (NBG); Gobolo, (–AC), 23 Nov. 1962, *Dlamini s.n.* (PRE); Hlatikulu, (–CD), Dec. 1910, *Stewart s.n. SAM2523* (SAM); 23 Nov. 1959, *Compton 29502* (NBG).

KWAZULU-NATAL.—2731 (Louwsburg): Itala Nature Reserve, (–CB), 11 Dec. 1975, *Hilliard & Burt 8551* (E, K, NU, PRE, S); Non-goma, (–DC), 2 Dec. 1943, *Gerstner 4666* (NBG), 2831 (Nkandla): Eshowe, Reservoir March, (–CD), 9 Nov. 1949, *Lawn 1296* (NH), 2832 (Mtubatuba): Dukuduku, (–AC), 25 Nov. 1965, *Strey 6099* (NU, PRE), 2930 (Pietermaritzburg): ± 25 km NNE Howick, Twin Falls, (–AD), 19 Nov. 1987, *Grové 122* (NU); Baynesfield, Oldfield Farm, (–CD), Oct. 1989, *Edwards 602* (NU); Hammarsdale, 590 m, (–DA), 27 Jun. 1995, *Ward 13189* (NH, NU, PRE); Botha's Hill, (–DB), 10 Dec. 1913, *Medley Wood 12387* (NH, NU), 3029 (Kokstad): Harding, Rooi Vaal, (–DB), 4 Jan. 1957, *Taylor 5275* (NBG), 3030 (Port Shepstone): Alexandra Dist., Umgay [Umgai], (–AD), 9 Oct. 1909, *Rudatis 522* (NBG); *Rudatis 741* (PRE); Campbellton-Dumisa, (–AD), 13 Nov. 1913, *Rudatis 2030* (NBG); near Southport, (–DA), 13 Nov. 1974, *Nicholson 1506* (PRE).

3. ***Silene saldanhensis*** *J.C.Manning & Goldblatt*, sp. nov.

TYPE.—Western Cape 3317 (Saldanha): Saldanha harbour, SW-facing slopes on ridge at beginning of breakwater, (–BB), calcareous sand, 19 Sept. 2011,

Goldblatt & Manning 13646 (NBG, holo.; K, MO, PRE, S, iso.).

Compact or cushion-forming perennial, 30–60 cm, branching at base with multiple crowns; stems erect or decumbent, 2–4 mm diam., with shoots in lower axils, densely puberulous with gland-tipped hairs mixed with scattered, short, acute eglandular hairs 0.25–0.50 mm long, inflorescence axis often especially densely puberulous. *Leaves* fleshy, densely puberulous with mixture of erect, gland-tipped hairs and acute, eglandular hairs, ciliate at extreme base with longer hairs to 1 mm long, with evident side veins, basal leaves oblanceolate, up to 100 × 35 mm; stem leaves spreading, lanceolate, 35–50 × 12–18 mm, recurved apically, margins weakly revolute and sometimes undulate. *Inflorescence* a lax, few-flowered, asymmetrical, paniculate cyme, axis 1.5–2.5 mm diam. below primary flower; bracts similar to upper leaves but smaller, spreading-recurved; primary pedicels 10–20 mm long, elongating to 35 mm in fruit, secondary pedicels 10–20 mm long. *Flowers* half-nodding, nocturnal and faintly gardenia-scented at night. *Calyx* urn-shaped, 17–20 mm long, with ± prominent, thickened ribs, 10-ribbed, with 1–3 reticulate veins in distal half, densely puberulous with erect, gland-tipped hairs, lobes triangular, 3–4 mm long, densely glandular-ciliolate. *Petals* mauve, sometimes with darker corona, limb spreading, broadly cuneate, ± overlapping with adjacent petals, 13–18 × 10–19 mm, bifid ± one third to halfway, sometimes crenulate distally, one or both margins sometimes with small sub-basal tooth, claw strap-shaped, 15–20 × 3–4 mm, auriculate apically, glabrous or sparsely pubescent along abaxial midline and margins, coronal scales suberect, 1.5–2.0 mm. *Stamen* filaments subequal, 15–18 mm long, reaching to top of claws or shortly exerted but not exceeding corona; anthers ± 2 mm long, not exerted beyond corona. *Ovary* narrowly ellipsoid, 6 mm long, stipe ± 1 mm long; styles ultimately to 8 mm long, reaching top of corona. *Capsule* ovoid, 17 × 6.5–8.0 mm, ± 5 times longer than carpophore, minutely granular; carpophore 3 mm long, retro-sely scabridulous. *Seeds* 1.0–1.2 mm diam., subcircular, charcoal grey, with scattered whitish or translucent testal cells, face flat or concave, back flat, testal cells concentrically colliculate. *Flowering time*: Aug.–Oct. Figures 2C, D, 9.

Distribution and ecology: largely restricted to the entrance to Saldanha Bay, where it is known from the breakwater and from across the lagoon in Postberg Reserve (Figure 10), but also known from shortly inland on the Farm Waterboerskraal east of Hopefield. The species is restricted to calcareous sands and consolidated calcrete dunes.

Diagnosis: a compact or cushion-forming perennial with erect or decumbent stems, distinguished by the mauve flowers with broad, overlapping petal limbs. The stamens and styles are included or shortly exerted but never protrude beyond the corona. *Silene saldanhensis* is probably most closely allied to the carmine-flowered *S. ornata* (Figure 11), which it resembles in stem vestiture and in the presence of scattered translucent testal cells in the seeds, but is distinguished by its broader, mauve flowers, colliculate seeds (Figures 2C, D), and in its ecology. Both species have stems with a mix of glan-

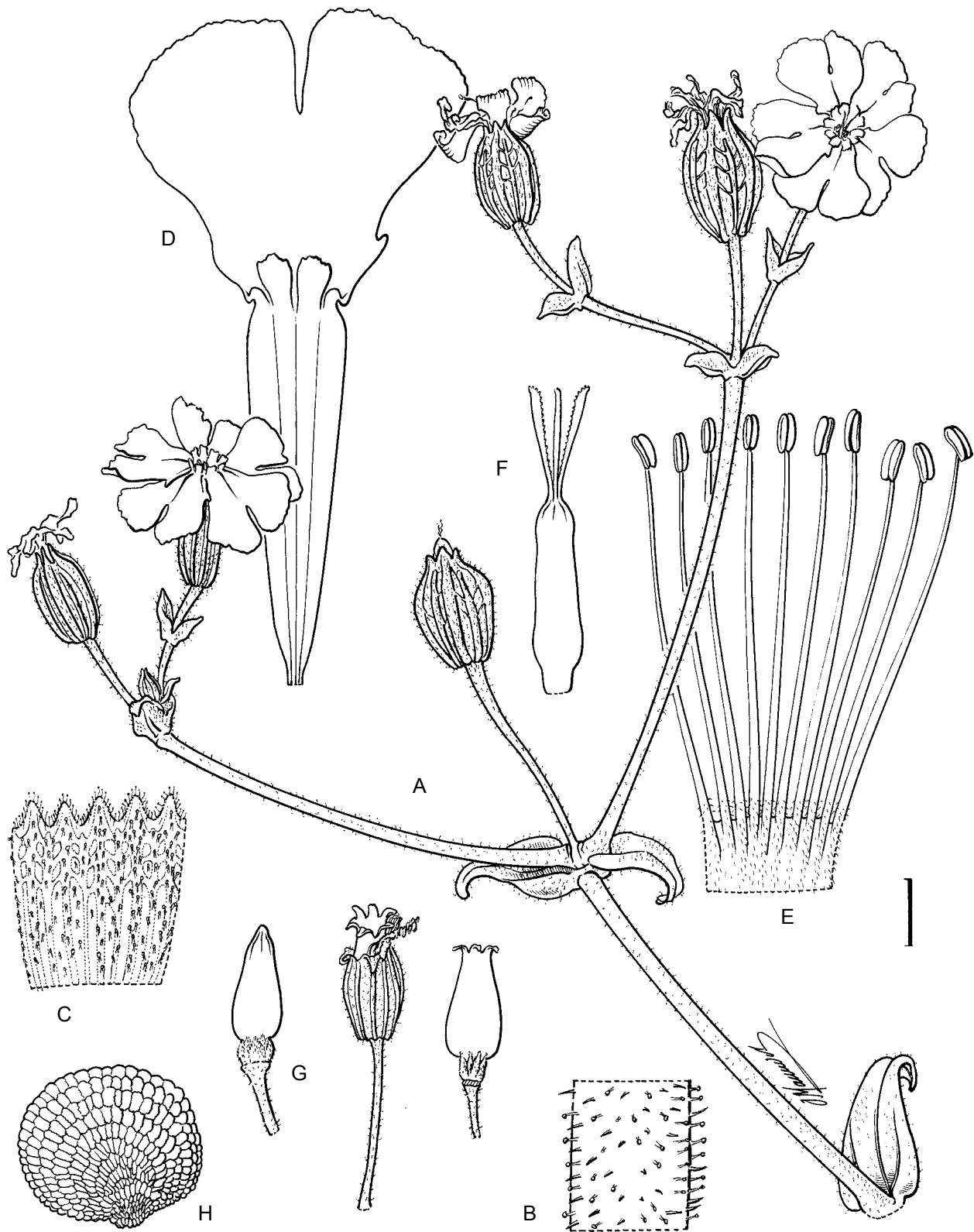


FIGURE 9.—*Silene saldanhensis*, Saldanha, Goldblatt & Manning 13646. A, flowering stem; B, stem segment; C, calyx laid out; D, petal; E, androecium laid out; F, gynoecium; G, capsules (left hand illustration before dehiscence with calyx removed; central after dehiscence, right hand after dehiscence with calyx removed); H, seed. Scale bar: A, G, 10 mm; B, 1 mm; C, 5 mm; D–F, 2.5 mm; H, 0.5. Artist: John Manning.

dular hairs and short, scattered eglandular hairs (Figures 9B, 11B) but *S. ornata* is restricted to rocky habitats, and typically has a straggling growth form, even in very exposed situations, with the stems sprawling among bushes or over the rock surface. It typically has slightly smaller flowers, with petal claws \pm 15 mm long and the

limbs not overlapping, and tuberculate seeds (Figures 2E, F). *Silene saldanhensis* favours deep, loose sands or compacted dunes, forming neat cushions with the stems either decumbent or erect. It has mostly larger flowers with the claws 15–20 mm long and broad, often overlapping petals, and colliculate seeds, which are distinctive

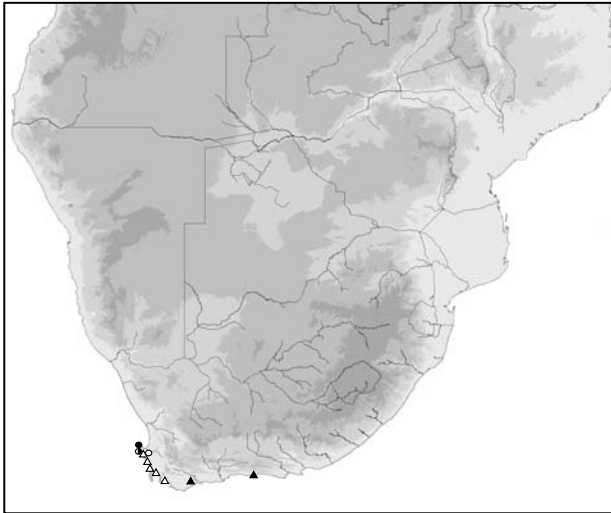


FIGURE 10.—Distribution of *Silene saldanhensis*, ○; *S. ornata*, ●; *S. rigens*, △; *S. mundiana*, ▲.

among the southern African members of sect. *Elisanthe* in lacking papillae or tubercles on the testal cells. The mix of glandular and short, eglandular hairs on the stems, and broad, overlapping petals, with included stamens and styles separate *S. saldanhensis* from coastal forms of *S. undulata* with a short calyx and carpophore.

Conservation note: the restricted occurrence of the species, the low number of plants and development at Saldanha render the species threatened. The Postberg population is protected as part of the West Coast National Park.

Additional specimens

WESTERN CAPE.—**3317** (Saldanha): West Coast National Park, Kraalbaai, (–BB), 13 Sept. 2011, *Manning & Goldblatt* 3339 (NBG). **3318** (Cape Town): Hopefield, Waterboerskraal Farm, (–AB), 3 Oct. 1974, *Hugo s.n.* (NBG).

4. *Silene ornata* Aiton, Hortus kewensis 2: 96 (1789); Sond.: 126 (1860). *Melandrium ornatum* (Ait.) Asch. ex Rohrb.: 233 (1869). Type: South Africa, without precise locality, cultivated at Kew in 1774 from seed introduced by Francis Masson, *Masson s.n.* (BM000573045, holo.!; BM000573046, iso.!). Illustrated in Curtis's Botanical Magazine 11: t. 382 (1797).

Silene bellidifolia sensu Thunb.: 81 (1794), non. Juss. ex Jacq. (1777).

Perennial to 1 m, well branched with branches ascending at ± 45 degrees, or plants compact and almost cushion-forming in exposed situations; stems sprawling among vegetation or on rock surface, 1.5–2.5 mm diam., densely puberulous with spreading, gland-tipped hairs mixed with equally short, acute hairs 0.25–0.50 mm long, inflorescence axis often especially densely puberulous. *Leaves* mostly \pm cauline, spreading, lower leaves oblanceolate-spathulate, sub-petiolate; stem leaves lanceolate to oblanceolate, mostly $50\text{--}80 \times 10\text{--}20$ mm, acute, base tapering or cuneate, margins plane or undulate, puberulous with mixture of erect, gland-tipped hairs and acute, eglandular hairs, ciliate at extreme base with longer hairs to 1 mm long, with evident side veins.

Inflorescence a lax, few-flowered, assymetrical, paniculate cyme, axis 1.0–1.5 mm diam. below primary flower; bracts similar to upper leaves but smaller, subequal, spreading-recurved; primary pedicels 10–40 mm long, secondary pedicels 6–18 mm long. *Flowers* \pm horizontally spreading on pedicels flexed sharply apically, \pm open day and night, unscented. *Calyx* narrowly urn-shaped in flower, 19–21 mm long, 10-ribbed, with 1–3 reticulate veins in distal half, densely puberulous with erect, gland-tipped hairs, lobes narrowly triangular, 3–5 mm long, densely glandular-ciliate. *Petals* deep carmine, limb spreading, cuneate, not overlapping with adjacent petals, (7–)10–15 \times (7–)12–15 mm, bifid halfway to two thirds, claw strap-shaped, $\pm 15 \times 3$ mm, auriculate apically, coronal scales suberect, 2.0–2.5 mm long. *Stamen* filaments subequal, 14–15 mm long, reaching to just below top of claws; anthers ± 2 mm long, reaching top of claws, not exerted beyond corona. *Ovary* narrowly pyriform, shortly stipitate, ± 7 mm long, stipe ± 1 mm long; styles 7–12 mm long, included or exerted up to 4 mm beyond petal claw. *Capsule* ovoid, 15–18 \times 6–7 mm, 4–5 \times longer than carpophore, minutely granular; carpophore ± 4 mm long, glabrescent. *Seeds* 1.0–1.2 mm diam., subcircular with hilum recessed, grey or reddish brown, with scattered translucent cells, face flat or concave, back flat, testal cells radial-concentric, tuberculate. *Flowering time:* (late Aug.) Sept.–Oct. Figures 2E, F, 11).

Distribution and ecology: a local endemic of the limestone hills flanking the mouth of Saldanha Bay (Figure 10), occurring on rocky slopes among coastal scrub. Plants mostly occur on the slopes or summit of hills, with the annual stems straggling through surrounding shrubs, but a population at Stony Head thrives on exposed limestone pavement directly facing the ocean. The plants here are very compact and almost cushion-forming, with the flowering stems sprawling along the rock sheets.

Diagnosis and relationships: *Silene ornata* is readily recognized by the unscented, deep carmine flowers that remain open throughout the day and night. The branching of the flowering stems is largely asymmetrical, and stems and branches are densely puberulous, with a mix of short, glandular hairs and non-glandular hairs. The stamens are always included and the styles mostly so but in some plants they are exerted up to 4 mm beyond the petal claws. This is the form that is illustrated in Curtis's Botanical Magazine 11: t. 382 (1797). Other species in sect. *Elisanthe* have nocturnal, white to pale pink or mauve flowers that are fragrant at night. *Silene ornata* is evidently most closely allied to *S. saldanhensis*, another local endemic of Saldanha Bay, which shares a similar stem vestiture but which is restricted to calcareous sands and consolidated dunes, has slightly larger, mauve flowers with broader tepals, a more tufted habit, and colliculate seeds.

The species, named by Aiton (1789) for its striking, dark red flowers, was introduced to Kew by Francis Masson in 1775. Although the exact provenance of Masson's material is not given, *Silene ornata* is a narrow endemic of Saldanha Bay, which Masson visited for five days in September 1773 in the company of Carl Thunberg (Glen & Germishuizen 2010), and it

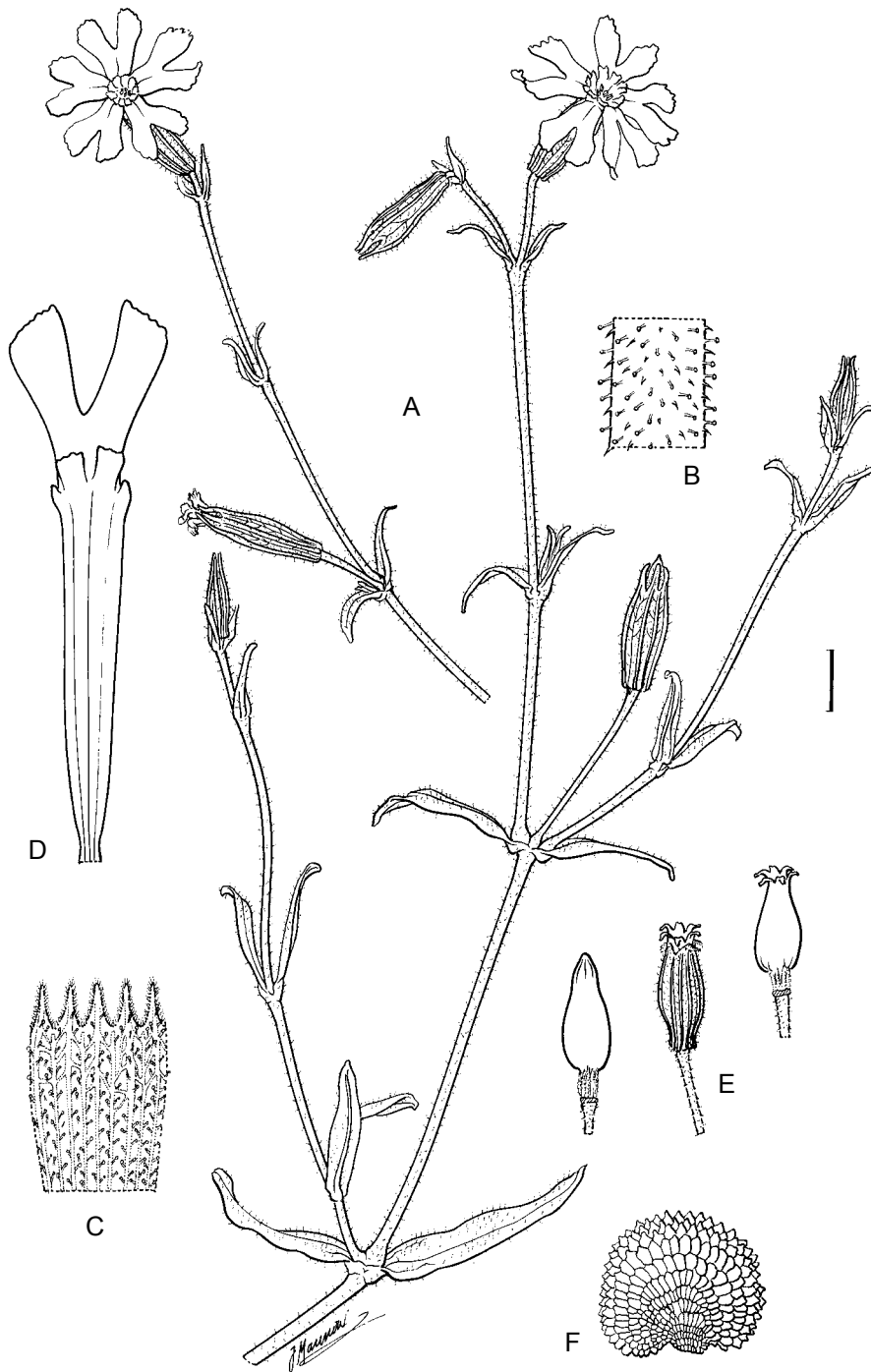


FIGURE 11.—*Silene ornata*, Saldanha, Goldblatt & Porter 13254. A, flowering stems; B, stem segment; C, calyx laid out; D, petal; E, capsules (left hand illustration before dehiscence with calyx removed; central after dehiscence, right hand after dehiscence with calyx removed); F, seed. Scale bar: A, E, 10 mm; B, 1 mm; C, 5 mm; D, 2.5 mm; F, 0.5. Artist: John Manning.

is probable that they collected the species at this time. Thunberg (1794) mistakenly associated his collection (UPS-THUNB 10705) with the bright pink-flowered Mediterranean *S. bellidifolia*, as correctly realized by Sonder (1860). Masson's brief on the trip was to collect seeds, cuttings and roots for cultivation at Kew and he certainly succeeded with *S. ornata*. Readily propagated by cuttings, the species was widely cultivated in England by 1797, when it was illustrated in Curtis's Botanical Magazine (Curtis 1797) but has since disappeared from cultivation.

Conservation note: the restricted occurrence of the species, the low number of plants and the encroaching urbanisation at Saldanha render the species threatened.

The Postberg population is protected as part of the West Coast National Park.

Additional specimens

WESTERN CAPE.—3217 (Vredenburg): limestone hill north of Saldanha, (–DD), 17 Sept. 1976, Goldblatt 4114 (MO); hill N of Saldanha, (–DD), 250' [76 m], 24 Sept. 2009, Goldblatt & Porter 13254 (K, MO, NBG, PRE). 3317 (Saldanha): Hoedjies Bay, (–BB), Sept. 1905, Bolus 12614 (BOL); Postberg, (–BB), 8 Sept. 1957, Lewis 5273 (NBG); 30 Aug. 1980, Bond 1715 (MO, NBG); hills between Postberg and Donkergat, (–BB), 9 Sept. 1966, Rourke 576 (NBG); Konstabelkop and Postberg hills, (–BB), 13 Sept. 2011, Manning & Goldblatt 3340 (NBG); SAS Saldanha, Bomgat, (–BB), 15 Sept. 2011, CR15241 (NBG). Without precise locality: hort. Kirstenbosch, Aug. 1937, without collector BOL31664 (BOL).

5. *Silene rigens* J.C.Manning & Goldblatt, sp. nov.

TYPE.—Western Cape 3218 (Clanwilliam): Langebaanweg, Fossil Park road, (–CC), 127' [38.4 m], 8 Sept. 2009, Goldblatt & Porter 13291 (NBG, holo.; MO, PRE, iso.).

Silene noctiflora sensu Thunb., in part [excluding references to Table Mtn and Swartland]: 81 (1794), non. L. (1753).

Tufted perennial, 0.5–1.5 m, producing one or two new vegetative shoots from basal axils at end of flowering season; rootstock a taproot; stems stiffly erect, unbranched except in inflorescence, 3–5 mm diam., densely puberulous with spreading, gland-tipped hairs 0.2–0.5 mm long. *Leaves* mostly basal, suberect or spreading, lower leaves oblanceolate-spathulate, subpetiolate, 100–140 × 15–25 mm, dead or dying at flowering, stem leaves elliptical to oblanceolate, mostly 60–100 × 10–20 mm, acute, base tapering, margins plane or undulate, pubescent with mixture of erect, gland-tipped hairs and acute, eglandular hairs when young but apparently entirely eglandular at maturity, ciliate at extreme base with longer hairs to 1 mm long, with evident side veins. *Inflorescence* a compact, symmetrically branched cyme with flowers in triads, axis 1.5–3.0 mm diam. below primary flower; bracts similar to upper leaves but smaller, subequal, suberect; primary pedicels 10–40 mm long, secondary pedicels 10–20 mm long. *Flowers* suberect or half-nodding, nocturnal, jasmine-scented or unscented. *Calyx* narrowly urn-shaped in flower, 18–22 mm long, 10-ribbed, with 1–4 reticulate veins in distal half, densely puberulous with erect, gland-tipped hairs, lobes narrowly triangular, 3–6 mm long, densely glandular-ciliolate, splitting almost to base to expose mature capsule. *Petals* whitish or pale dingy pink to mauve, limb spreading, cuneate, not overlapping with adjacent petals, 8–10 × 6–8 mm, bifid ± halfway, claw strap-shaped, 16–18 × 2.5 mm, auriculate apically, coronal scales suberect, ± 1 mm long. *Stamen* filaments unequal, shorter series 9–10 mm long, longer series 12–14 mm long, reaching to 4 mm below top of claws; anthers ± 2 mm long, not reaching top of claws, included. *Ovary* narrowly pyriform, shortly stipitate, 5–6 mm long, stipe ± 0.25 mm long; styles ± 5 mm long, included, ultimately barely exerted. *Capsule* broadly ovoid, 15–20 × 9–10 mm, ± 6 × longer than carpophore, minutely granular; carpophore 2.5–3.0 mm long, glabrescent. *Seeds* 1.2–1.5 mm diam., reniform with hilum recessed, face concave, back flat, reddish brown, testal cells radial-concentric, tuberculate on face but echinate along shoulders and back. *Flowering time*: Sept.–Oct. Figures 2G, H, 12.

Distribution and ecology: restricted to the coastal forelands of the southwestern Cape, from Saldanha Bay along the West Coast to the Cape Flats, and at Vermont near Hermanus (Figure 10), occurring in deep, calcareous sands in strandveld thicket.

Diagnosis and relationships: although overlooked as a distinct species until now, *Silene rigens* is readily distinguished in sect. *Elisanthe* by its characteristic growth form and stem vestiture, flowers, fruits, and seeds. The stems are tall, stiffly erect, and largely unbranched

except in the inflorescence, where the branching is symmetrical and the branches relatively short, resulting in distinctive, condensed triads of flowers and fruits. Flowering stems are strictly annual, dying off at the end of the season, to be replaced by axillary shoots from the base. The stem vestiture comprises only gland-tipped hairs, without an admixture of eglandular, acute hairs. Individual flowers are relatively small for the section, with white, dull pink or light mauve petals, the claws 8–10 mm long, and the anthers and styles ultimately barely exerted. The capsules, which are unusually broadly urn-shaped at maturity, 15–18 × 9–10 mm, and with a very short carpophore ± 2.5 mm long, cannot be fully accommodated within the calyx, which splits longitudinally at least midway but often to the base. The distinctly echinate seeds (Figures 2G, H) are unique among the southern African species of sect. *Elisanthe*, which are otherwise colliculate or tuberculate.

Although known for almost 260 years, since the first specimens were collected by Carl Thunberg during his visit to the West Coast in 1773–1774, *Silene rigens* has only now been recognized as a distinct species. Thunberg (1794) mistakenly associated his material (*UPS-THUNB10774 & 10775*) with the European species *S. noctiflora* L. and Sonder (1860) subsequently treated them under *S. undulata*. More recent collections of the species have been variously misidentified as *S. bellidioides*, *S. capensis*, and *S. ornata*.

Conservation note: the restricted occurrence of the species and its local extinction on the Cape Flats render it vulnerable, particularly as most populations occur in areas undergoing intensive development for housing, industry and recreational activity.

Additional specimens

WESTERN CAPE.—**3317** (Saldanha): Hoedjies Bay, (–BB), Sept. 1905, Bolus 12613 (BOL). **3318** (Cape Town): Langebaan Peninsula, Stofbergfontein, (–AA), 28 Nov. 1975 [sterile], Bucher 2963 (NBG); Elandsfontein West, (–AA), 5 Oct. 1977, 500' [150 m], Thompson 3525 (NBG); R27 to Langebaanweg, (–AB), 20 Sept. 2009, Goldblatt, Manning & Porter 13409B (MO, NBG); Vygevallei farm, (–AD), 24 Sept. 1996, Low 2801 (NBG); Duynefontein (Koeberg), (–CB), 31 Oct. 1986, Bosenberg & Rutherford 177 (NBG); Duynefontein, (–CB), 30 Sept. 2010 [fruiting], Goldblatt & Manning 13599 (MO, NBG); Melkbosstrand, (–CB), 8 Sept. 1940, Compton 9329 (NBG); Paarden Eliland, (–CD), 19 Sept. 1942, Compton 13720 (NBG); damp hollow near Strand Line, Stickland, (–CD), 23 Oct. 1932, Acocks 1049 (S); Belville, Cape Flats Nature Reserve, University of Western Cape, (–DC), 5 Aug. 1978, Low 578 (NBG); 31 Aug. 1978, Low 624 (NBG). **3418** (Simonstown): Cape Flats, Swartklip, along road to military hut in E portion, (–BA), 22 Sept. 1972, Taylor 8211 (NBG, PRE). **3419** (Caledon): Vermont, near the sea, deep sand, (–AC), 4 Sept. 1986, S. Williams 1163 (MO).

Silene sect. *Fruticulosae* (Willk.) Chowdhuri [as (Rohrb.) Chowdhuri], Notes from the Royal Botanic Garden, Edinburgh 22: 246 (1957). *Silene* [unranked] *Fruticulosae* Willk., Icon. Descr. Pl. Nov. 1: 73 (1854). *Silene* ser. *Fruticulosae* (Willk.) Rohrb., App. Alt. Ind. Sem. Hort. Bot. Berol. 1867: 2 (1867). Lectotype: *Silene ciliata* Pourr., designated by Greuter: 573 (1995b). [Chowdhuri's (1957) lectotypification of the section against *S. burchellii* Oth. is treated as an error by Greuter (1995b)].

Perennials or geophytes with woody or tuberous rootstock, eglandular pubescent. *Leaves* linear to oblanceo-

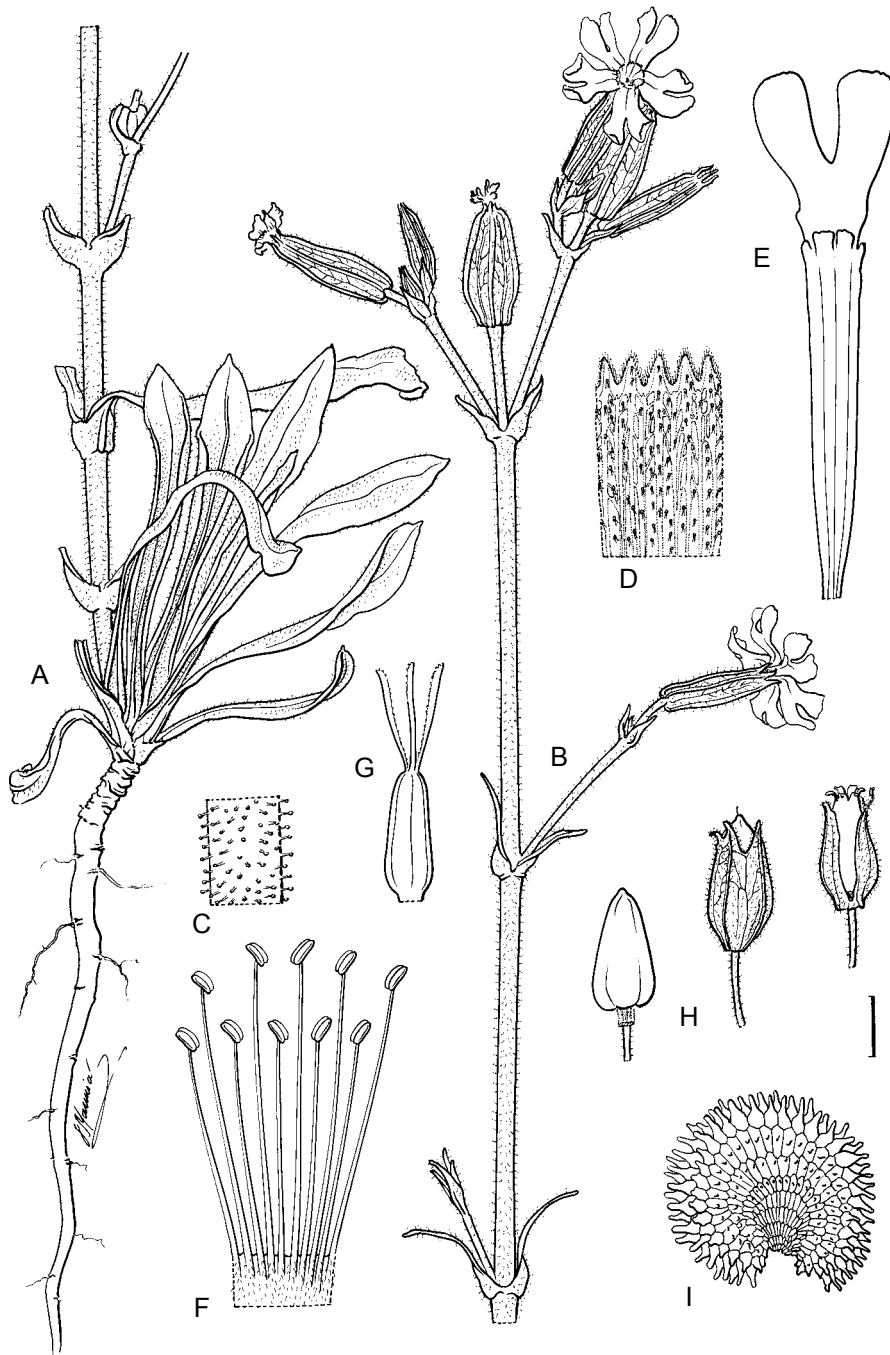


FIGURE 12.—*Silene rigens*, Langebaanweg, Goldblatt & Porter 13291. A, base of plant; B, flowering stem; C, stem segment; D, calyx laid out; E, petal; F, androecium laid out; G, gynoecium; H, capsules (left hand illustration before dehiscence with calyx removed; central before dehiscence, right hand after dehiscence); I, seed. Scale bar: A, B, H, 10 mm; C, 1 mm; D, 5 mm; E–G, 2.5 mm; I, 0.5. Artist: John Manning.

late, lacking apparent lateral veins; bracts herbaceous. *Flowers* in monochasia with axis simple or forked below, spreading or \pm erect, vespertine; anthophore well-developed, pubescent. *Calyx* pubescent, clavate, 10-veined, without conspicuous anatomosing venation, lobes ovate, obtuse. *Petals*: claw glabrous or pubescent along veins, weakly auriculate, limb bifid with linear lobes; coronal scales present. *Ovary* partially septate. *Seeds* reniform with deep hilar notch, flanks flat or somewhat concave and smooth or striate, back deeply and narrowly grooved between two undulate peripheral wings.

\pm 12 spp., S Europe, Africa.

6. *Silene burchellii* Otth in DC., *Prodromus systematis naturalis regni vegetabilis* 1: 374 (1824); Sond.:

128 (1860). Type: South Africa, [Western Cape], kloof between Lion's Head and Table Mt., on the ride towards Camps Bay, without date [probably 1810/1811], *Burchell* 271 (G-DC, holo.; K,!, PRE!, iso.). [Although authorship of the species has been attributed either to 'Otth ex DC.' or to 'DC.' alone, De Candolle's note (Candolle 1824: 367) at the foot of the generic treatment makes it clear that the author of the account is Adolphe Otth, and new names published there should thus be attributed to Otth alone.]

Geophytic perennial or suffrutex, mostly 10–50 cm tall; tuber parsnip-like or ovoid; *stems* decumbent or erect, \pm suffrutescent below, basal woody portion 1–2 mm diam. but 0.5–1.5 mm diam. at base of inflorescence, \pm densely puberulous-scabridulous with short, deflexed or spreading, acute hairs, rarely sub-glabrous.

Leaves cauline but concentrated in lower part of stem, \pm abruptly separated from inflorescence, lower sometimes dry or withered, linear to obovate, (10–)15–60 \times 1–15(–22) mm, obtuse, apiculate or weakly uncinata, base narrowed, \pm adpressed-puberulous, usually more densely so abaxially, rarely glabrous on adaxial or both surfaces, hairs acute, margins ciliate towards base with longer, straggling hairs to 1 mm long, without evident side veins. *Inflorescence* a lax or dense, (2)3–12-flowered monochasium terminating main stems, well separated from foliage, simple or with 1(2) branches from base, rachis 0.5–1.0 mm diam.; bracts smaller than leaves, unequal to subequal, oblong or lanceolate to subulate, puberulous with appressed, acute hairs, margins densely ciliate; pedicels 3–10(–15) mm long, rarely up to 20 mm long in fruit. *Calyx* clavate in flower, (10–)12–18(–25) \times 2.5–4 mm at anthesis, slightly upcurved distal to carpophore when $> \pm 15$ mm long, equally 10-veined, adpressed-puberulous, lobes ovate or triangular, ± 2 –4 mm long, densely ciliate. *Flowers* \pm patent or suberect at anthesis, nocturnal, coconut-scented or more medicinal and acrid. *Petals* white to pale yellowish, pale pink or mauve, with darker green or maroon reverse, claw 7–8(–10) mm long, rarely exerted up to 6 mm beyond calyx, narrowed below, without evident auricles, pubescent along midrib and veins on outer surface, limb bifid, 3–7 \times 2–5 mm, coronal scales 0.2–0.8 mm long. *Stamen* filaments slightly unequal, 6–10 mm long, shorter series shortly included, longer series reaching top of claw or exerted up to 2 mm. *Ovary* ellipsoid, ± 4 mm long; styles 4–6 mm long, exerted up to 3 mm. *Capsule* ovoid, 8–10 \times 5–7 mm, slightly longer than to slightly shorter than carpophore, smooth; carpophore 4–12 mm long, pubescent. *Seeds* 1.0–1.5 mm, reniform with deep hilar notch, flanks flat or somewhat concave, back deeply and narrowly grooved between two undulate wings, reddish brown, testa striate. *Flowering time*: Aug.–Nov. in the winter rainfall region; mainly Oct–May in the summer rainfall region but almost year-round along the coast. Figures 3A–C, 13.

Distribution and ecology: widely distributed through the more temperate parts of southern Africa but absent from the arid interior, through eastern Africa northwards to the highlands of Sudan and Ethiopia, and extending across the Red Sea to Arabia (Figure 13). *Silene burchellii* favours loamy or fine-grained clay soils, often in rocky or stony places, from near sea level up to over 4 000 m. In southern Africa it is mostly a grassland forb but in the winter rainfall region occurs in open, mostly drier, fynbos and succulent shrubland.

Diagnosis and relationships: *Silene burchellii* is distinguished from the other southern African members of sect. *Fruticulosae* by its mostly erect or suberect stems, 0.5–1.5 mm diam. at the base of the inflorescence, and mostly linear to oblanceolate, rarely obovate leaves, (10–)15–60 \times 1–16 mm. The leaves are \pm concentrated in the lower part of the stem and well separated from the inflorescence by a distinct, leafless upper part ± 100 –150 mm long bearing one or two pairs of bract-like leaves. The calyx is very variable in length, 10–25 mm long, and is often slightly upcurved. The carpophore ranges from 4–12 mm long, varying from slightly longer than to shorter than the urn-shaped capsule, 8–10 \times 5–7 mm.

Silene burchellii is sometimes confused with *S. aethiopica* in the Western Cape, but is distinguished from this annual species by its perennial, geophytic habit, and also never develops the highly branched growth form evident in well-grown plants of *S. aethiopica*. Although the tuber is seldom present on herbarium specimens, the relatively thick stem, terminating abruptly where it has been broken from the tuber, is characteristic. The two species are also ecologically separated, with *S. aethiopica* mainly coastal in deep sandy soils and *S. burchellii* essentially an inland species on finer-grained clay soils. Along the eastern seaboard, especially the Wild Coast and KwaZulu-Natal, broad-leaved *S. burchellii* subsp. *multiflora* can be confused with *S. crassifolia* subsp. *primuliflora*. The latter can usually be identified by its prostrate or decumbent, often branching stems, mostly 1.5–2.0 mm diam. at the base of the inflorescence, leathery or thick-textured leaves, somewhat expanded and strongly pleated calyx, mostly larger coronal scales, 0.8–1.0 mm long, and broadly urn-shaped to subglobose capsules, (8–)10–12 \times 7–10 mm. Its strictly coastal distribution, on sandy foredunes, is also diagnostic.

As currently circumscribed, *Silene burchellii* is the most widely distributed of the African species, ranging through the length of the continent, from Arabia and the uplands of Sudan and Ethiopia southwards though East Africa to the Cape Peninsula (Wickens 1976). Although highly variable in leaf shape and width, development of indumentum, number of flowers, and in calyx length, the species has resisted all attempts at segregation into more finely circumscribed taxa. The variation is often broadly correlated with geography and/or ecology but morphological patterns are confounded by the existence of numerous intermediates. The situation was summarised several decades ago by Turrill (1954), who concluded that it was reasonable to assume that the variation in *S. burchellii* is associated both with genetic and with environmental differences. This opinion has not altered since then, and Hedberg (1954, 1957) was unable to maintain any afro-alpine infraspecific taxa on the morphological evidence without supporting evidence from further breeding experiments.

Despite the intractability of the species to satisfactory subdivision, workers on the tropical Africa material have consistently commented on the evident differences between the narrow-leaved tropical plants and the type of the species from the southwestern Cape, which is characterized by \pm prostrate or decumbent stems and broad, oblanceolate to obovate leaves (Turrill 1954, 1956a; Wild 1961; Gilbert 2000). There is a general feeling that the tropical African representatives should be distinguished at some level from all or at least some of the southern African material, and Wild (1961) accordingly treated all collections from the *Flora zambesiana* area as var. *angustifolia* Sond. (1860) to separate it from typical var. *burchellii* from South Africa. With this signal exception, Sonder's (1860) early attempt at segregating the South African material of the species into four varieties, based largely on leaf shape and growth form, has not been implemented. The recent treatment of the species in Ethiopia and Eritrea by Gilbert (2000) avoided all recognition of formal varieties in favour of five informal 'forms'.



FIGURE 13.—*Silene burchellii*: A, subsp. *burchellii*, Signal Hill, no voucher; B, subsp. *pilosellifolia*, Kamiesberg, Goldblatt & Porter 13574. Scale bar: 10 mm. Artist: John Manning.

The southern African collections display extensive variation in vegetative and floral morphology but, as with the tropical African material, this is \pm continuous, with no clear separation between the extremes, and we are unable to recognize more than a single species. There are, however, some general correlations between morphology and geography that we interpret as demonstrating some level of genetic differentiation within the species. Subsuming all of this variation under a single name obscures its existence and we therefore propose the recognition of four subspecies to highlight the most distinctive variants. The occurrence of intermediates between the subspecies makes the assignment of some specimens difficult, but a combination of morphology and geography is adequate for most material. Although not perfect, this classification provides a basis from which to work.

The type and other collections of *Silene burchellii* from the Cape Peninsula and adjacent coastal regions in the extreme southwestern parts of the Western Cape have a distinctive facies that sets them apart, notably the \pm prostrate or decumbent stems and often broad leaves, and we treat these plants as comprising a narrowly circumscribed subsp. *burchellii* that is geographically isolated from other Western Cape populations by the coastal Cape Fold Mountains. A second set of populations from the coastal and near inland parts of the northern Eastern Cape and KwaZulu-Natal and extending into Swaziland is distinctive in its broad leaves and multiflowered inflorescences of nodding or half-pendent flowers with very short calyces, mostly 10–12 mm long. We treat these plants as subsp. *multiflora*. A third set of populations with relatively long calyces, typically 20–25 mm long, is characteristic of the western, southern and central parts of the subcontinent, occurring along the western and southern Escarpment and the mountains of the southwestern Western Cape, inland onto the interior plateau. These populations are treated as subsp. *pilosellifolia*. The remaining southern African plants have moderate-sized flowers, the calyx (12)15–18(–20) mm long, and are treated as subsp. *modesta*. As accepted here, this subspecies is widely distributed, from the Mpumalanga Escarpment southwards into the KwaZulu-Natal Midlands and through the foothills of Eastern Cape and KwaZulu-Natal Drakensberg, and northwards into tropical and North Africa.

Although Carl Thunberg seems to have been the first to collect the species, during his visit to the Western Cape in 1772–1775, he mistakenly associated his collection (*UPS-THUNB* 10780) with the European species *S. nutans* L. (Table 1). Inexplicably, however, this name was omitted from his *Flora capensis* (Thunberg 1794), and the species was only recognized as distinct several decades later (Otth 1824) from material collected on Lion's Head by William Burchell during his visit to the region during 1810–1815.

Key to subspecies

- 1a Stems prostrate or decumbent, extensively divaricately branched with numerous axillary shoots, not strongly suffrutescent; leaves obovate-spathulate to oblanceolate, \pm densely puberulous; calyx 15–20 mm long; coastal regions of the extreme southwestern Western Cape (? also Port Elizabeth) 6a. subsp. *burchellii*

- 1b Stems suberect or shortly decumbent, branching angle acute, \pm suffrutescent; leaves variable, upper usually narrower, linear to narrowly oblanceolate, puberulous to subglabrous; calyx 10–25 mm long:
 2a Leaves obovate to narrowly oblanceolate, lower 7–20 mm wide; inflorescence mostly (5–)7–12-flowered, usually with well-developed branch, lower internodes 15–20 mm long; flowers patent or slightly deflexed at anthesis; calyx 10–12(–15) mm long; coastal and near inland from E Cape to S Mozambique and Swaziland ... 6d. subsp. *multiflora*
 2b Leaves narrowly oblanceolate to linear-lanceolate or linear (rarely lower leaves oblanceolate), mostly 2–5(–13) mm wide; inflorescence mostly 5–8-flowered, lax or dense, simple or branched, lower internodes 15–40 mm long; flowers mostly suberect, rarely patent; calyx (12–)15–25 mm long, usually arcuate:
 3a Calyx (18–)20–25 mm long; western and southwestern coastal and interior southern Africa ... 6b. subsp. *pilosellifolia*
 3b Calyx (12–)15–18(–20) mm long; southeastern, eastern and northern southern Africa to N Africa and Arabia 6c. subsp. *modesta*

6a. subsp. *burchellii*

Silene thunbergiana Eckl. & Zeyh. ex Sond.: 128 (1860), syn. nov. Type: South Africa, [Western Cape], 'steinige stellen der höhe am Tagelberge und Löwenberge', Sept. [?1832], *Ecklon & Zeyher* 253 (SAM, lecto.!, designated by Bocquet & Kiefer: 8 (1978); SAM [2 sheets]!, S!, isolecto.).

Stems decumbent and extensively divaricately branched with numerous axillary shoots, not strongly suffrutescent. *Leaves* obovate-spathulate to oblanceolate, 10–50 \times (3–)6–22 mm, \pm densely puberulous. *Inflorescence* mostly 5–7-flowered, lax, lower internodes 20–30 mm long. *Flowers* suberect. *Calyx* 15–20 mm long. *Carpophore* 6–10 mm long. Figure 13A.

Distribution: coastal regions of the Western Cape between Darling and Agulhas, and possibly at Port Elizabeth in the Eastern Cape, occurring mainly on shale or loamy soils in renosterveld but also in fynbos, on sandstone or limestone (Figure 14). On the Cape Peninsula, subsp. *burchellii* is found only on Signal Hill and Table Mountain, and is replaced by subsp. *pilosellifolia* on the southern peninsula.

We include *Paterson 2543* (PRE) from Port Elizabeth here although it represents the only collection of subsp. *burchellii* from the Eastern Cape. The plants have prostrate, well-branched stems, oblanceolate leaves, and moderately sized flowers with calyx \pm 15 mm long. These features are anomalous for subsp. *pilosellifolia*, the local form from the Port Elizabeth region.

Diagnosis: distinguished by the decumbent, divaricately branching stems with densely pubescent, obovate to oblanceolate leaves rarely more than 4 \times as long as wide; and moderately long calyx, 15–20 mm long. Plants from Gansbaai and Agulhas are more compact and densely leafy than usual, possibly in response to their proximity to the ocean.

Silene thunbergiana, based on plants collected essentially in the same place as *S. burchellii*, was thought to differ in its broader leaves but this apparent distinction has no merit.

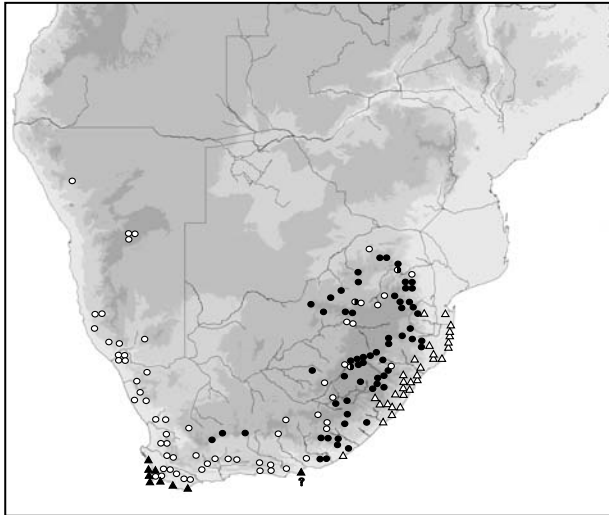


FIGURE 14.—Distribution of *Silene burchellii* in southern Africa: subsp. *burchellii*, ▲; subsp. *pilosellifolia*, ○; subsp. *modesta*, ●; subsp. *multiflora*, △.

Additional specimens

WESTERN CAPE.—**3318** (Cape Town): near Darling, (–AD), Sept. 1905, *Bolus 12615* (BOL); Tygerberg Nature Reserve, 200–400 m, (–DC), 13 July 1975, *Loubser 3320* (NBG); ‘steinige lehmige stellen am Löwenstaart [Lion’s Rump]’, (–DC), July without year, *Ecklon & Zeyher 4748* (BOL, SAM); E slopes of Lion’s Head, (–DC), Sept. 1913, *Kensit s.n.* (BOL); Signal Hill, (–DC), Sept. 1897, *Thode STE5830, 5831* (NBG); 28 Aug. 1938, *Penfold 115* (NBG); Signal Hill, Schottische Kloof, (–DC), Aug. 1938, *Penfold 111* (NBG); above Groote Schuur, (–DC), 12 Sept. 1895, *Wolley Dod 93* (BOL); path to Blockhouse, (–DC), 29 Sept. 1892, *Guthrie 1182* (BOL); Nursery Gorge, (–DC), 24 Oct. 1923, *Compton s.n.* (BOL); E slopes of Table Mtn, (–DC), Sept. 1879, *Bolus 4709* (BOL, PRE); sandy places on Cape Flats, (–DC), without date or collector (NBG). **3418** (Simonstown): Constantiaberg, (–AA), 15 Dec. 1895, *Wolley Dod 472* (BOL); N slope of Orange Kloof, (–AA), 6 June 1897, *Wolley Dod 2616* (BOL); Hangklip, Skilpadsvlei, (–BD, 30’ [9 m], 21 Oct. 1969, *Boucher 737* (NBG). **3419** (Caledon): Gansbaai, (–CB), Aug. 1940, *Stokoe 7600* (BOL). **3420** (Bredasdop); Cape Agulhas, (–CC), 27 Oct. 1940, *Esterhuysen 4411* (BOL).

?EASTERN CAPE.—**3325** (Port Elizabeth): Port Elizabeth, (–DC), Sept. 1914, *Paterson 2543* (PRE).

6b. subsp. ***pilosellifolia*** (*Cham. & Schtdl.*) *J.C.Manning & Goldblatt*, stat. nov. *Silene pilosellifolia* Cham. & Schtdl. [as ‘*pilosellaefolia*’], *Linnaea* 1: 41 (1862). *Silene burchellii* var. *pilosellifolia* (*Cham. & Schtdl.*) *Sond.* [as ‘*pilosellaefolia*’]: 128 (1860). Type: South Africa, [Western Cape], ‘prope Plettenbergsbay ad Doukamma [Goukamma]’, Jul. 1821, *Mund & Maire s.n.* (B, holo.† [fide Boucquet & Kiefer (1978)]). Neotype: South Africa, Eastern Cape, Uitenhage Dist., sand-hills near the Zwartkopsrivier, Sept. [without year], *Zeyher 240* (NBG, neo.!, designated here; NBG!, SAM [5 sheets]!, iso.). [The holotype appears to have been destroyed (Boucquet & Kiefer 1978) and we accordingly designate a neotype from the same geographical area as the type and that matches both the protologue and the current application of the name. Another collection that has been identified as type material by the Stockholm herbarium, *Mund & Maire s.n. S-G-8699* (S), was collected at Voormansbosch near Swellendam and thus has no direct link to the protologue at all.]

Silene burchellii var. *angustifolia* *Sond.*: 128 (1860). Type: South Africa, [Western Cape], Caledon Zwartberg,

Dec. [without year], *Ecklon & Zeyher 1959* (S, lecto.!, designated here; PRE!, SAM!, isolecto.).

Silene burchellii var. *cernua* *Rohrb.*: 121 (1869), nom. illegit. superfl. Type: as for *S. burchellii* var. *angustifolia*.

Silene dinteri *Engl.*: 383 (1912). Type: [Namibia], ‘auf der Granitkuppe bei Aus’, 11 Jan. 1910, *Dinter 1141* (SAM, syn.!), 13 Apr. 1911, *Dinter 2235* (SAM, syn.!).

Silene cernua sensu *Bartl.*: 623 (1832), non *Thunb.* (1794) (= *S. aethiopica* *Burm.*).

Silene cernua var. *denudata* *Fenzl.* in *Drège*: 222 (1844), nom. nud. [fide *Rohrb.*: 121 (1869)]

Silene cernua var. *hirta* lus. *linifolia* *Fenzl.* in *Drège*: 222 (1844), nom. nud. [Specimen: South Africa, ‘ad fl. Sondag’s River, pr. Nieweweld et in rupestribus as Dutoitskloof, *Drège 550a* [fide *Rohrb.*: 121 (1869)]

Stems ± erect or shortly decumbent, ± tufted with branches subbasal and at an acute angle, ± suffrutescent. *Leaves* oblanceolate to linear-lanceolate or linear but lower leaves sometimes broader, 20–55 × 2–5(–13) mm, puberulous or subglabrous. *Inflorescence* mostly 3–8-flowered, lax or dense, lower internodes 15–40 mm long. *Flowers* mostly suberect, rarely patent. *Calyx* (18–)20–25 mm long, usually flexed slightly upwards. *Carophore* 9–11 mm long. Figure 13B.

Distribution and ecology: widely distributed through western, southern and the eastern interior of southern Africa, from central Namibia southwards along the western escarpment, through the Cape Fold Mountains into Eastern Cape as far as Zuurberg and inland onto the eastern interior plateau through Free State and Gauteng as far north as Limpopo (Figure 14), occurring in a wide range of open shrubby or grassy habitats, mostly among rocks.

Diagnosis: distinguished from other subspecies by its ± suberect, mostly longer flowers, the calyx (18–)20–25 mm long and curved slightly upwards at the junction between anthophore and ovary. This slight curvature is lost in fruit. Plants are suffrutescent and variable in foliage, usually with oblanceolate to linear-lanceolate or linear leaves although the lower leaves are sometimes broader. Populations from the western edge of the Escarpment in Namibia and Northern Cape southwards into the Cedarberg in Western Cape have sub-glabrous leaves.

The distinction between subsp. *pilosellifolia*, with calyx (18–)20–25 mm long and subsp. *modesta*, with calyx (12–)15–18(–20) mm long is not always a very easy one to draw and even somewhat arbitrary in some cases.

Two collections from the mountains above Simonstown in the southern Cape Peninsula (*Adamson 2333 & Esterhuysen 34106*) are included here on account of their suberect stems and caespitose habit, narrowly oblanceolate leaves, and long calyx, ± 22 mm long. They appear to represent isolated outliers and are the

only records of subsp. *pilosellifolia* from the Peninsula—other populations from north of Constantiaberg represent subsp. *burchellii*.

Populations from the summit of Mariepskop [*Van der Schijff 4882* (PRE), *Van der Schijff 5594* (PRE), *Hardy 7000* (PRE)] and from the Wolkberg along the north-eastern escarpment [*Müller & Scheepers 128* (PRE)] appear to represent a distinctive ecotype with prostrate or sprawling, highly branching stems, forming tangled mounds, and broad, spatulate leaves. The Mariepskop population was to have formed the basis of the unpublished manuscript name *S. junodii* D.Masson ms. At this stage, however, it is unclear how much of this morphological differentiation is phenotypic since these plants invariably occupy sheltered, mostly shaded situations among rocks, where they avoid fires. They are provisionally included in subsp. *pilosellifolia* on account of their calyx length, 20–23 mm long.

Additional specimens

NAMIBIA.—**2014** (Welwitschia): Spitskop, (–BA), 25 Sept. 1981, *Müller 1601* (WIND). **2217** (Windhoek): Grossherzog Friedrichsberg, Farm Regenstein, (–CA), 2 336 m, 19 Mar. 1972, *Giess 11681* (NBG, PRE, WIND); 18 km from Windhoek, (–CB), 27 May 2000, *Zimmermann 239* (WIND). **2616** (Aus): Aus, mountain on Farm Klein Aus, (–CA), 18 Aug. 1963, *Merxmüller 2956* (WIND); Aus, (–CB), 9 Jul. 1922, *Dinter 3579* (BOL, PRE, WIND); 4 Mar. 1929, *Dinter 6109* (BOL, NBG); on road P705, 26 Oct. 1987, *Kolberg 240* (WIND). **2715** (Bogenfels): NW of beacon, (–BD), 9 Sept. 1992, *Oliver 10198* (WIND). **2716** (Bethanie): Karas, E of summit, (–CD), 21 Sept. 1977, *Merxmüller 32193* (WIND); slope of mountain, (–DD), 24 Sept. 1972, *Merxmüller 28811* (WIND). **2718** (Grünau): Klein Karas, (–CA), 9 Apr. 1931, *Örtendahl 50* (PRE, WIND).

LIMPOPO.—**2328** (Baltimore): Blouberg, (–BB), 1 June 1953, *Esterhuysen 21437* (BOL); 20 Feb. 1990, *Stirton, Venter & Edwards 12680* (NU). **2430** (Pilgrim's Rest): Wolkberg, Serala Peak, (–AA), 23 Apr. 1971, *Müller & Scheepers 128* (PRE).

GAUTENG.—**2528** (Pretoria): top of hill behind Louis Botha's home, (–CA), 12 Oct. 1925, *Smuts 870* (PRE); 9 miles [14.4 km], E of Pretoria, The Willows Farm, (–CA), 10 Nov. 1946, *Codd 2139* (PRE); Willowglen, (–CA), Jan. 1951, *Forssman 6* (PRE); Botanical Research Institute, (–CB), 10 Dec. 1975, *Scott 3* (PRE). **2628** (Johannesburg): Doornkloof, (–CC), 25 Nov. 1928, *Gillett 2555* (BOL); 3 Dec. 1928, *Gillett 207* (NBG); 28 Dec. 1928, *Gillett 3246* (BOL).

MPUMALANGA.—**2430** (Pilgrim's Rest): Mariepskop summit, (–DB), 5 Jan. 1960, *Van der Schijff 4882* (PRE); 6 Jul. 1961, *Van der Schijff 5594* (PRE); 3 Sept. 2000, *Burrows 7013* (NU); Mariepskop Radar Station, (–DB), 16 Feb. 1990, *Hardy 7000* (PRE). **2529** (Witbank): Middelberg Dist., Buffelsvlei, (–BC), 1 Dec. 1933, *Rudatis 6* (NBG); Middelberg, (–CD), without date, *Guthrie 4064* (NBG).

FREE STATE.—**2627** (Potchefstroom): 11 miles [17.6 km] from Parys to Potchefstroom, (–DD), 8 Apr. 1967, *Vahrmeijer 1568* (PRE). **2827** (Senekal): Ficksburg, (–DD), 26 Oct. 1934, *Galpin 13874* (BOL); Strathcona, (–DD), 7 Nov. 1936, *Fawkes 12* (NBG). **2926** (Bloemfontein): Dewetsdorp, (–DA), 15 Apr. 1950, *Steyn 904, 945* (NBG). **3027** (Lady Grey): Zastron Dist., (–AC), Nov. 1926, *Maree 57* (PRE).

KWAZULU-NATAL.—**2829** (Harrismith): foot of Griffin's Hill, (–DD), 2 Apr. 1945, *Acocks 11387* (PRE). **2830** (Dundee): Mpate Mt., (–AA), 26 Nov. 1964, *Shirley s.n.* (NU).

LESOTHO.—**2828** (Bethlehem): Leribe, (–CC), without date, *Dieterlen 362* (PRE, SAM); *Dieterlen 610* (PRE).

NORTHERN CAPE.—**2816** (Oranjemund): Richtersveld, Remhoogte, (–BD), 13 Sept. 1929, *Herre 11778* (NBG); Numees Camping Site, (–BD), 26 Sept. 1981, *Hugo 2787* (NBG, PRE); W side of ridge N of Numees Camp, (–BD), 19 Sept. 1981, *McDonald 688* (NBG); Numees Mountain, (–DB), Sept. 1995, *Williamson & Williamson 5816* (NBG). **2817** (Vioolsdrif): Koeboes [Khubus], (–AC), 17 Sept. 1929, *Herre 11779* (NBG); Rosyntjieberg, neck N of Lelieshoek, (–AC),

1 060 m, 30 Aug. 1977, *Oliver, Tölken & Venter 300* (NBG, PRE); Koeskop, (–AC), Sept. 1995, *Williamson & Williamson 5779* (NBG); Zebrakloof, NE of Rosyntjieberg, (–AC), 9 Oct. 1991, *Germishuizen 5560* (PRE); Ploegberg S of Khubus, (–CA), 600 m, 3 Sept. 1977, *Oliver, Tölken & Venter 509* (NBG, PRE); Ploegberg, (–CA), 25 Sept. 1991, *Van Jaarsveld 11931* (PRE). **2917** (Springbok): Spektakel, (–DA), 26 Aug. 1941, *Compton 11534* (NBG). **2918** (Gamoep): 15 miles [24 km] NE of Springbok, (–AA), 8 Sept. 1950, *Maguire 351* (NBG). **3017** (Hondeklipbaai): Farm 477 Taaibosduin, 20 Aug. 2009, *Bester 9611* (NBG, PRE); Grootvlei, (–BB), 7 Sept. 1945, *Compton 17280* (BOL, NBG); Skilpad Flower Reserve, (–BB), 3 Oct. 1995, *Cruz 132* (NBG). **3018** (Kamiesberg): Langkloof, N of Farm Doringkraal, (–CA), 23 Sept. 2010, *Goldblatt & Porter 13574* (NBG). **3120** (Williston): N of Farm De Hoop, (–CC), 7 Jan. 1986, *Snijman 991* (NBG).

WESTERN CAPE.—**3118** (Vanrhynsdorp): Knersvlakte, ± 30 km N of Vanrhynsdorp, Farm Ratelgat, limestone ridge ± 400 m SE of Matjieshuisse, (–BC), 7 Aug. 2011, *Koopman s.n.* (NBG). **3119** (Calvinia): upper part of Vanrhyn's Pass, (–AC), 800 m, 13 Sept. 1993, *Strid & Strid 37844* (NBG); parking near top of Vanrhyn's Pass, (–AC), 13 Sept. 2010, *Goldblatt & Porter 13527* (MO, NBG). **3218** (Clanwilliam): Piketberg, Zebra Kop, (–DB), 16 Dec. 1979, *Esterhuysen 35331* (BOL). **3219** (Wuppertal): Kliphuis Gully leading up to Pakhuis Peak, (–AA), 22 Oct. 1987, *Taylor 11863* (NBG); Sneeuat, (–AA), 15 Jan. 1923, *Andrae 922* (PRE); Elandsdorp, (–CA), 30 Sept. 1936, *Leipoldt s.n. BOL31661* (BOL); Middelberg Plateau, (–CA), 14 Dec. 1941, *Bond 1351* (NBG). **3318** (Cape Town): Jonkershoek, Guardian Peak, (–DD), [month illegible] 1946, *Adamson 3654* (BOL); Jonkershoek, (–DD), 18 Sept. 1936, *Borchardt 440* (PRE). **3319** (Worcester): Groot Winterhoek, (–AA), 14 Feb. 1934, *Compton 4628* (BOL); Mostertshoek Twins, (–AD), Jan. 1944, *Esterhuysen 9842* (BOL); Hex River Mtns, Sentinel Peak, (–AD), 16 Feb. 1958, *Esterhuysen 27572* (BOL); Groot Drakenstein Mtns, Duiwelskloof, (–CC), 12 Dec. 1943, *Wasserfall 742* (NBG); Haelhoeksneukop, (–CC), 16 Dec. 1975, *Esterhuysen 34161* (BOL). **3320** (Montagu): Laingsburg Dist., Whitehill Ridge, (–BA), 10 Nov. 1935, *Compton 5900* (BOL, NBG); Cabidu, (–BB), 28 Oct. 1950, *Compton 22213* (NBG); Grootvadersbos State Forest, Boosmansbos Wilderness Area, (–DD), 30 Nov. 1988, *Van der Merwe 284* (PRE). **3321** (Ladismith): Gamka Mtn Reserve, (–BC), 25 Nov. 1975, *Boshoff P275* (NBG); Touwsberg, Farm Rietfontein, (–CA), 7 Oct. 1993, *Smook 8705* (PRE). **3322** (Oudtshoorn): Swartberg Pass, (–AC), 7 Aug. 1949, *Steyn 267* (NBG); 6 Dec. 1987, *Vlok 1895* (PRE); near top of Swartberg Pass, (–AC), 21 Mar. 1976, *Thompson 2762* (NBG, PRE); upper Congo valley, Bassonsrus, (–AC), 4 November 1974, *Moffett 433* (NBG); Meiringspoort, (–BC), 12 Nov. 1941, *Thorne s.n.* (NBG). **3418** (Simonstown): hills above Simonstown, edge of swamp, (–AA), 11 Dec. 1938, *Adamson 2333* (BOL); Swartkops Peak S of Simonstown, on firebelt above Froggy Pond, (–AA), 16 Nov. 1975, *Esterhuysen 34106* (BOL); Harold Porter Botanic Garden, above Disa Kloof, (–BD), 17 Oct. 1991, *Forrester 974* (NBG). **3419** (Caledon): Caledon Baths, (–AB), July 1892, *Guthrie 2469* (NBG); between Caledon and Napier, (–BD), 3 Aug. 1940, *Esterhuysen 3051* (BOL); ±12 km NW of Napier, Fairfield Farm, (–BD), 6 Oct. 1994, *Kemper IPC632* (NBG). **3420** (Bredasdorp): Adamskop, (–AC), 200 m, 15 Oct. 1982, *Bayer 3199* (NBG).

EASTERN CAPE.—**3125** (Steynsburg): Middelburg Dist., Bangor Farm, (–AC), Oct. 1917, *Bolus 14040* (BOL). **3126** (Queenstown): Broughton near Molteno, (–AD), Dec. 1892, *Flanagan 1567* (NBG, PRE, SAM); Queenstown, (–DD), Feb. 1896, *Galpin 1988* (PRE); Jan. 1962, *Bokelmann 1* (NBG); 15 km from Dordrecht on road to Queenstown, (–DB), 13 Jan. 1997, *Germishuizen 8891* (PRE). **3323** (Willowmore): between Willowmore and Patensie, Nuweveld Pass, (–BC), 15 Sept. 1982, *Balkwill 451* (NU); Langkloof, near Misgund, (–DC), Oct. 1921, *Fourcade 1718* (BOL). **3224** (Graaf-Reinet): Schimper's Hill near Graaf-Reinet, (–BA), 4 July 1865, without collector *BOL74032* (BOL). **3324** (Steytlerville): 51.1 miles [82 km] from Humansdorp on road to Willowmore, (–CA), Oct. 1934, *Fourcade 5169* (NBG); Zuur Anys Hills [Suuranyserge], (–CC), Dec. 1932, *Fourcade 4945* (BOL); kloof on road to Hankey, (–DD), 12 Sept. 1942, *Fourcade 5746* (BOL, NBG). **3325** (Port Elizabeth): Zuurburg, (–BD), 27 May 1965, *Bayliss 2686* (NBG); 8 Jan. 1986, *Van Wyk & Van Wyk 1183* (PRE).

6c. subsp. *modesta* J.C.Manning & Goldblatt, subsp. nov.

TYPE.—Eastern Cape, 3227 (Stutterheim): Mount Kemp, (–CB), 13 Jan. 1947, *Compton 19196* (NBG, holo.).

Silene burchellii var. *latifolia* Sond.: 128 (1860), syn nov. Type: South Africa, [Gauteng], shady places at the Crocodile River, *Zeyher s.n. S11-24323* (S, holo.!).

Silene acuta E.Mey. in Drège: 222 (1844), nom. nud. [Specimen: South Africa, [Eastern Cape], between Omtendo [Mtentu] and Omsamculo [uMzimkhulu], Drège 5340 [fide Sond.: 128 (1860)].

Silene cernua var. *hirta* lus. *lanceolata* Fenzl. in Drège: 222 (1844), nom. nud. [Specimen: South Africa, [Eastern Cape], 'iter Gekan et Busche', Drège 550h [fide Rohrb.: 121 (1869)].

[For synonyms from tropical and North Africa see Turrill (1956a), Wild (1961), Wickens (1976) and Gilbert (2000)].

Stems ± erect or very shortly decumbent, ± tufted with branches subbasal and at an acute angle, ± suffrutescent. *Leaves* oblanceolate to linear-lanceolate or linear but lower leaves sometimes broader, 20–55 × 2–5(–13) mm, puberulous or subglabrous. *Inflorescence* mostly 3–8-flowered, lax or dense, lower internodes 15–40 mm long. *Flowers* mostly suberect, rarely patent. *Calyx* (12–)15–18(–20) mm long, usually flexed slightly upwards. *Carpophore* 6–9(–10) mm long.

Distribution and ecology: widely distributed through eastern southern Africa, Lesotho and Swaziland northwards into tropical and North Africa and Arabia (Figure 14), essentially in temperate or subtropical grassland and savanna, often in rock outcrops.

Diagnosis: subsp. *modesta* constitutes the core of this variable species after the more extreme forms have been segregated and includes ± suffrutescent, tufted plants with mostly oblanceolate to linear leaves and suberect, moderately-sized flowers with calyx (12–)15–18(–20) mm long. This taxon seems to have included the bulk of the collections that were to have been recognized as a new species under the unpublished manuscript name *Silene australis* D.Masson ms.

Subsp. *modesta* is replaced in southern Mozambique and coastal KwaZulu-Natal and Eastern Cape by subsp. *multiflorus*, mostly with broader leaves and with generally shorter flowers, the calyx mostly 12–15 mm long, and in the western, southern and eastern interior of the subregion by subsp. *pilosellifolia* with mostly longer flowers, the calyx 18–25 mm long. Subsp. *burchellii*, with procumbent or decumbent stems, is restricted to the extreme southwestern coastal regions.

The tropical African material, all with a calyx length of 12–20 mm, is comfortably included in subsp. *modesta*. Previously aberrant populations from northern Kenya, eastern Uganda, and Ethiopia with exceptionally long calyces, 26–35 mm long, treated as var. *gillettii* Turrill (1954, 1956a), have since been segregated as the distinct species *Silene gillettii* (Turrill) M.G.Gilbert, also distinguished by its broader leaves with broadly cuneate or subcordate bases (Gilbert 2000).

Additional southern African specimens

LIMPOPO.—**2329** (Pietersburg): Farm Duvenhageskraal, (–CD/DC), 3 Dec. 1985, *Venter 11283* (NU). **2330** (Tzaneen): Woodbush

Forestry Station, (–CC), Jan. 1923, *Wager 23094* (PRE); 23 Dec. 1928, *Gillett 3205* (NBG). **2428** (Nylstroom): Geelhoutkop, (–AD), Jan. 1918, *Breijer 18089* (PRE); Warmbaths, (–CD), 30 Sept. 1908, *Leendertz 1352* (PRE).

NORTH-WEST.—**2526** (Zeerust): Lichtenburg Dist., Grasfontein, (–CC), 16 Dec. 1929, *Sutton 343* (PRE). **2527** (Rustenburg): Rustenburg Dist., (–BA), without date, *Mudd s.n.* (BOL); Rustenburg Nature Reserve, (–CA), 8 Oct. 1970, *Jacobsen 1067* (PRE). **2626** (Klerksdorp): Ventersdorp, (–BD), Feb. 1932, *Wilman NBG252/30* (BOL).

GAUTENG.—**2528** (Pretoria): Fountains Valley, (–CA), 14 Nov. 1928, *Repton 118* (PRE); Wonderboom Reserve, (–CA), 20 Oct. 1944, *Repton 1887* (PRE); 14 miles [22.4 km] SE of Pretoria on road to Delmas, (–CA), 21 Dec. 1950, *Codd 6302* (PRE). **2627** (Potchefstroom): Northcliffe, (BB), 26 Oct. 1984, *Behr 785* (PRE). **2628** (Johannesburg): ridge above Jeppestown, (–AA), Feb./Mar. 1894, *Galpin 1376* (PRE); Kensington Ridge, (–AA), 31 Oct. 1932, *Burt Davy 57* (NBG); Melville Koppies, (–AA), 3 Oct. 1960, *Macnae 1265* (BOL); Mondeor, (–AA), 9 Nov. 1961, *Lucas 35146* (PRE); Aasvogels Kop, (–AA), 24 Apr. 1927, *Young 26444* (PRE).

MPUMALANGA.—**2430** (Pilgrim's Rest): Lekgalameetse Nature Reserve, The Downs, (–AA), 21 Jan. 1986, *Stalmans 1005* (PRE); 19 Dec. 1988, *Stalmans 1811* (PRE); Mt Saheba Nature reserve, (–DC), Jan. 1976, *Forrester & Gooyer 46* (PRE); Graskop, (–DD), 3 Dec. 1887, *Galpin s.n.* (BOL); Stanley Bush Kop, (–DD), 9 Dec. 1986, *Raal & Raal 1016* (PRE). **2530** (Lydenburg): Dullstroom, (–AC), 30 Jan. 1959, *Werderman & Oberdieck 2045* (PRE); 24 Feb. 1982, *Cameron 151* (PRE); Mt. Anderson, (–BA), 25 Dec. 1932, *Smuts & Gillett 2468* (BOL, PRE); Farm de Kuilen, (–BA), 13 Mar. 1985, *Krynauw 313* (PRE); Mac Mac Nature Reserve, (–BB), 7 Mar. 1979, *kluge 1789* (PRE); Belfast, (–CA), 31 Jan. 1929, *Hutchinson 2765* (BOL); 16 Feb. 1964, *Bayliss 2022* (NBG); Dullstroom Dist., Farm Macduff, (–CB), 24 Feb. 1989, *Burgoyne 1053* (PRE); Farm Uitkomst, 18 km from Machadodorp on road to Badplaas, (–CD), 5 Mar. 1986, *Germishuizen 3811* (PRE); Kaapsehoop Asbestos Mine, (–DB), 1 Mar. 1987, *Morrey & Cadman 3679* (NU). **2531** (Komatipoort): Barberton Dist., Lomati Valley, (–CC), Feb. 1922, *Thornicroft 1123* (PRE); summit of Saddleback Mtn, Farm Dycedale, (–CC), 18 Apr. 1987, *Brusse 5053* (PRE). **2630** (Carolina): Carolina Dist., (–AA), 18 Nov. 1909, *Rademacher 8195* (PRE); Ermelo Dist., Farm Nooitgedacht, (–AC), 9 Mar. 1937, *Henrici 1601* (PRE); Songimvelo Game Reserve, between Hoogenoeg and Lochiel, (–BB), 11 Dec. 1992, *Jordaan 2520* (PRE). **2729** (Bethal): Amersfoort, Welverdacht Farm, (–DB), 15 Mar. 1985, *Turner 692* (PRE); Ermelo, (–DB), 1906, *Burt Davy, 5453* (PRE); Feb. 1910, *Leendertz 7807* (PRE). **2730** (Vryheid): E of Wakkerstroom, (–AD), 13 Jan. 1986, *Glen 1589* (PRE); near Piet Retief, (–BB), 13 Jan. 1951, *Compton 22339* (NBG).

FREE STATE.—**2828** (Bethlehem): Clarens, (–CB), Nov. 1917, *Van Hoepen 18185* (PRE); Golden Gate, (–DA), 15 Jan. 1976, *Fenn 6* (NU); Golden Gate National Park, Mt Pierre, (–DA), 8 Jan. 1989, *Groenewald 8711* (PRE); Golden Gate Highland Park, (–DA), Jan. 1966, *Liebenberg 7495A* (PRE); Witzieshoek, (–DB), Dec. 1905, *Thode STE5663* (NBG). **2829** (Harrismith): Van Reenen, (–AB), Jan. 1914, *Bews 962* (NU); Harrismith, Queen's Hill, (–AC), 22 Feb. 1969, *Jacobsz 1073* (PRE); Harrismith, Botanic Garden, 5 500' [1 667 m], (–AC), 18 Jan. 1970, *Van der Zeyde s.n.* (NBG); Drakensberg Botanic Garden, (–AC), 23 Jan. 1975, *Jacobsz 2093* (NBG, PRE); Swinburne, Farm Grootvlei, (–AC), 30 Jan. 1961, *Jacobsz 9* (PRE); Sterkfontein Dam, (–AC), 28 Nov. 1974, *Jacobsz 1858* (PRE); 11 Dec. 1985, *Blom 333* (PRE). **2926** (Bloemfontein): Wintervally, N of Bloemfontein, (–AA), 6 Dec. 1968, *Muller 386* (PRE); Bloemfontein, O.F.S. Botanic Garden, (–AA), 6 Dec. 1968, *Müller 386* (NBG); Grant's Hill near Oranje School, (–AA), 23 Oct. 1925, *Potts 3526* (PRE).

SWAZILAND.—**2631** (Mbabane): hilltop near Mbabane, (–AC), 20 Feb. 1961, *Dlamini s.n.* (NBG, PRE).

KWAZULU-NATAL.—**2729** (Volksrust): Newcastle Dist., Blue Ridge, (–DD), 25 Nov. 1989, *Smit 1315* (PRE). **2730** (Vryheid): Hlobane, (–DB), 5 Mar. 1950, *Johnstone 389* (NU). **2731** (Louwsburg): Itala Game Reserve, (–CB), 17 Jan. 1978, *McDonald 475* (NU); 19 Oct. 1982, *Germishuizen 2235* (PRE); Ngome, (–CD), 3 Apr. 1977, *Hilliard & Burt 9961* (NU); Ngome, Ntendeka Wilderness area, (–CD), 4 Dec. 1985, *Jordaan 580* (PRE). **2828** (Bethlehem): Royal Natal National Park, 200 m along path from Basuto Gate to Tendele, (–DB), 5 Feb. 1982, *Manning 87* (NU); Mont aux Sources, (–DD), Apr. 1920, *Allsop 34* (PRE). **2829** (Harrismith): Little Switzerland, (–CB), 21 Apr. 1969, *Anderson 227* (PRE). **2929** (Underburg): Giant's Castle Game

Reserve, (–AD), 26 Jan. 1966, *Trauseld 542* (NU); Mooi River, (–BB), Dec. 1942, *Fisher 419* (NU); Mooi River Dist., Hidcote, (–BB), 15 Jan. 2003, *Potgieter 876* (NU); Kamberg, (–BC), 31 Dec. 1974, *Wright 2090* (NU); Mpendle Dist., Mulangane Ridge above Carter's Nek, (–BC), 3 Feb. 1984, *Hilliard & Burt 17523A* (NU, PRE); Loteni Nature Reserve, (–BC), 13 Dec. 1978, *Phelan 223* (NU); Sani Pass, (–CB), 21 Mar. 1977, *Hilliard & Burt 9743* (NU); headwaters of Mhlahlangubo River, (–CB), 23 Jan. 1982, *Hilliard & Burt 15343* (E, NU); Bulwer Dist., Mahwaqa Mt., (–DC), 11 Jan. 1992, *Feltham 124* (NU); Polela Dist., Farm Sunset, (–DC), 30 Dec. 1973, *Rennie 445* (NU); 8 Feb. 1985, *Rennie 1616* (NU). **2930** (Pietermaritzburg): Karkloof, Mt. Gilboa, (–AD), 17 Dec. 2000, *Johnson & Neal 33* (NU); Noodsberg, Lager Farm, (–BD), 14 Oct. 1989, *Williams 558* (PRE); Table Mt., (–CB), 7 Jan. 1949, *Killick 220* (NU); Byrne Valley, (–CC), 31 Oct. 2002, *Potgieter 841* (NU); Hella Hella, 3 800' [1 160 m], (–CC), 1 Nov. 1997, Ingomankulu Hill, (–CD), 15 Dec. 2004, *Young 208* (NU).

LESOTHO.—**2927** (Maseru): Molimo-Nthuse on way to Pass, (–BC), 20 Oct. 1975, *Schmitz 6239* (PRE). **2828** (Bethlehem): Butha Buthe, (–CC), 9 500' [2 878 m], 2 Feb. 1954, *Coetzee 409* (NBG, PRE); Malibamatzo Valley, (–DC), Dec. 1971, *Schmitz 1545* (PRE); New Oxbow Lodge, (–DC), 13 Jan. 2003, *bester 3937* (PRE). **2928** (Marakabei): from Ha Lephoi Village along Lesobeng River, (–CB), 5 Mar. 1990, *Smook 7271* (PRE). **2929** (Underberg): Sehlabathebe National Park, (–CC), 7 Jan. 1979, *Hoener 2121* (PRE).

WESTERN CAPE.—**3221** (Merwille): Roggeveld, Farm Uitkyk, (–AD), Oct. 1920, *Marloth 9704* (PRE); Beaufort West Dist., Layton, (–BB), 24 Nov. 1983, *Shearing 400* (PRE). **3222** (Beaufort West): Beaufort West Dist., Nieuweveld Mtns, (–BD), July 1895, *Marloth 2136* (PRE); Nieuweveld Mtns, Mountain View Farm, (–BD), 18 Apr. 1978, *Gibbs Russel, Robinson & Herman 482C* (PRE).

EASTERN CAPE.—**3027** (Lady Grey): Witteberg, (–CB), 11 Mar. 1904, *Galpin 6583* (PRE); Rhodes, Carlisle's Hoek, (–DB), 27 Dec. 1977, *Bigalke 22* (NU). **3127** (Lady Frere): 25 km from Cala at turnoff to Engcobo, (–DB), 12 Jan. 1997, *Germishuizen 8819* (PRE). **3128** (Umtata): Ugie Dist., Pomona, (–AA), Feb. 1928, *Gill 178* (NBG); Elandslaagte, (–AA), Mar. 2000, *Edwards & Potgieter 1922* (NU); Umtata, (–DB), 18 Jan. 1895, *Schlechter 6326* (PRE). **3226** (Fort Beaufort): top of Katberg Pass at Devil's Bellows, (–BC), 24 Apr. 1995, *Victor 1183* (PRE); ± 5 km above Nico Malan Pass, (–BD), 7 Feb. 1995, *Victor & Hoare 324* (PRE). **3227** (Stutterheim): Thomas River, (–AD), 15 Jan. 1947, *Compton 19309* (NBG); *Leighton 2797* (BOL); King William's Town, (–CB), Nov. 1892, *Sim 966, 967* (NU); East London Dist., Amalinda Nature Reserve, (–DD), 22 Oct. 1984, *Currie 9* (PRE). **3326** (Grahamstown): Grahamstown, (–BC), Oct. 1888, *Galpin 224* (PRE); Martindale, (–BD), 30 Nov. 1955, *Taylor 4962* (NBG); 7 Jan. 1965, *Bayliss 2600* (NBG).

6d. subsp. **multiflora** *J.C.Manning & Goldblatt*, subsp. nov.

TYPE.—KwaZulu-Natal, 2930 (Pietermaritzburg): Krantzklouf, (–DD), Nov. 1921, *Haygarth 9437* (NBG, holo.; NH, PRE, iso.).

Stems ± erect or very shortly decumbent, ± tufted with branches sub-basal and at an acute angle, ± suffrutescent. *Leaves* obovate to narrowly oblanceolate, 20–55 × (2–)7–15(–20) mm, upper leaves usually narrower, puberulous or subglabrous adaxially. *Inflorescence* mostly (5–)7–12-flowered, dense, lower internodes 15–20 mm long (exceptionally lowermost 40 mm long). *Flowers* nodding or slightly deflexed at anthesis. *Calyx* 10–12(–15) mm long. *Carpophore* 3–6 mm long.

Distribution: coastal and near inland from the Fish River Mouth in Eastern Cape northwards through KwaZulu-Natal into southern Mozambique and inland to near Mbabane in Swaziland, occurring mainly in subtropical grasslands on loamy or sandy soils (Figure 14).

Diagnosis: distinguished by the shortly decumbent or ± tufted habit with relatively broad, oblanceolate to obovate lower leaves, and the dense, multi-flowered

inflorescence (typically with a well-developed branch), of small, nodding or slightly pendent flowers with short calyces, 10–12(–15) mm long.

The distinction between subsp. *multiflora* and subsp. *modesta* is blurred in the KwaZulu-Natal midlands, where the transition between subsp. *multiflora* with broad-leaves and subsp. *modesta* with narrowly oblanceolate leaves, mostly less than 5 mm wide, lies along the Drakensberg foothills at an altitude of ± 1 500 m.

Coastal forms of subsp. *multiflora* with more decumbent branches may be difficult to separate from *Silene crassifolia* subsp. *primuliflora* in southern KwaZulu-Natal and Eastern Cape where the distribution of the two taxa overlaps. Introgression between the two species is one possible cause. An alternative hypothesis is that *S. crassifolia* is a coastal dune derivative of *S. burchellii*, with the two forms becoming progressively more distinct to the south as ecological and geographical isolation between them increases. Plants with the following combination of characters are treated as subsp. *multiflora*: stems not strongly prostrate, branching angles acute; inflorescence branched and multi-flowered with more than five flowers, well separated from foliage by leafless stem ±100–150 mm long bearing one or two pairs of bract-leaves; calyx 10–12(–15 mm) long; capsules ovoid, 8–10 × 5–7 mm.

South African material of this taxon has traditionally been identified as var. *latifolia* Sond. but this name is typified by a specimen from Gauteng and correctly applies to broad-leaved forms of subsp. *pilosellifolia*. It was to have been recognized at species level by Daniel Masson, and several herbarium specimens bear the unpublished name *Silene natalensis* D.Masson *ms.*

Additional specimens

SWAZILAND.—**2631** (Mbabane): Mbabane, (–AC), 20 Dec. 1952, *Compton 23795* (NBG); Ukutula, (–AC), 29 Oct. 1954, *Compton 24597* (NBG); 13 Nov. 1955, *Compton 25249* (NBG).

MOZAMBIQUE.—**2632** (Bela Vista): road from Ponta Molangane to Ponta Do Puro, (–BC), 25 Nov. 2001, *Govender 72* (NH); Maputo Elephant Park, (–BC), 29 Nov. 2001, *Govender 90* (NH).

KWAZULU-NATAL.—**2632** (Bela Vista): Kosi Bay, (–DD), 28 Sept. 1961, *Meyer s.n.* (NU); road from Kosi Estuary to Kosi Lake Campsite, 50 m, (–DD), 18 Nov. 1982, *Balkwill 571* (NH, NU); Kosi Bay, Natal Parks Board Camp, (–DD), 27 Nov. 1967, *Strey & Moll 3939* (PRE); Kosi Mouth, (–DD), 24 Apr. 1995, *Lubbe 646* (NU). **2731** (Louwsburg): Nhoenkulu Mission Station, (–DC), July 1927, *Markotter s.n. STE8682* (NBG). **2732** (Ubombo): NW of Sibaya, (–BC), 21 Sept. 1995, *Lubbe 717* (NU); Lake Sibaya, (–BC), 16 Sept. 1965, *Vahrmeijer 1122* (PRE); Mazengwenya, ± 6 km W of Mabibi, (–BC), 17 Sept. 1994, *Lubbe 273* (NH); Mazengwenya, E of Vazi Swamp, (–BC), 27 Nov. 1969, *Moll 4725* (NH); Mbazwane/Sodwana Rd., (–DA), 28 Nov. 1971, *Pooley 1516* (NU); Mbazwana, (–DA), 27 Sept. 1977, *Balsinhas 3270* (PRE); St. Lucia Bay, (–DC), 26 Jul. 1939, *Schweickerdt 1371* (NH, PRE); 1 km N of Lake St. Lucia, (–DC), 24 Sept. 1987, *MacDevette 1892* (NH). **2831** (Nkandla): Melmoth, Mooiplaas, (–CA), ± 930 m, 10 Oct. 1995, *Huchings & Williams 3554* (NH). **2832** (Mtubatuba): Hluhluwe Game Reserve, (–AA), 5 Oct. 1953, *Ward 1519* (NU); W of Charter's Creek, (–AC), 5 Dec. 1955, *Ward 2840* (NH, NU, PRE); Hlabisa, Mfolozi flood plain, (–AC), 20 Oct. 1985, *Steyn 11* (NH); Dukuduku, (–AC), 25 Nov. 1965, *Strey 6098* (NH, NU, PRE); 24 Jul. 1986, *Steyn 55* (NH); Lake St Lucia, East Shores, (–BA), 11 Oct. 1974, *Taylor 238* (NU); Richard's Bay, (–BD), 14 Jul. 1929, *Rump s.n.* (NH, NU); 6 July 1974, *Ward 8670* (NU, PRE); 16 Jul. 1974, *Ward 2490* (NU). **2930** (Pietermaritzburg): Greytown, Blinkwater Trails area, (–BA), 1 Dec. 2001, *Potgieter 560* (NU); Pietermaritzburg, (–CB), Nov. 1939, *Thomas 14* (NBG); Pie-

termaritzburg, Town Hill, (–CB), Oct. 1942, *Fisher 362* (NU); Nov. 1944, *Fisher 741* (NH); 30 Oct. 1952, *Compton 23738* (NBG); Thornville, (–CB), 7 Nov. 1964, *Shirley s.n.* (NU); Drummond, (–CC), Oct. 1929, *Rump s.n.* (NU); Mid Illovo, (–CC), 10 Dec. 2008, *Young 863* (NU); Inanda, (–DA), Nov. 1884, *Medley Wood 393* (NBG, NH); Aug. without year, *Medley Wood 158* (NH); Hammarsdale, (–DA), 4 May 1995, *Ward 13088* (NH, NU), Assagay, (–DC), 2 Nov. 2003, *Wragg 375* (NU); Sept. 1921, *Rogers 24423* (NU); Westville, (–DD), 22 Sept. 1965, *Moll 2340* (NU, PRE). **2931** (Stanger): Tugela Beach, (–AB), 17 Jan. 1952, *Johnson 385* (NBG); Groutville, (–AC), 14 Oct. 1965, *Moll 2559* (NU); The Bluff, Treasure Beach, (–CC), 6 Nov. 1982, *Ellery 3* (NU); Durban, (–CC), Oct. 1883, *Medley Wood 122* (PRE); 25 Oct. 1889, *Medley Wood 4765* (NH); Isipingo, (–CD), May 1948, *Ward 363* (NH, NU); 9 Feb. 1967, *Ward 6054* (NU). **3029** (Kokstad): Kokstad, (–AD), Dec. 1881, *Tyson 1816* (SAM); Mt Currie, (–AD), 25 Nov. 1930, *Goossens 341* (PRE); Weza, Ingeli slopes, (–DA), 2 Jan. 1966, *Strey 6366* (NH, PRE); Weza State Forest, (–DA), 20 Nov. 1986, *Jordaan 857* (NH); Harding, Rooi Vaal, (–DB), 7 Jan. 1957, *Taylor 5359* (NBG). **3030** (Port Shepstone): Alexandra Dist., Umgay [Umgai], (–AD), 7 Nov. 1908, *Rudatis 461* (NBG, PRE); Dumisa, Fairfield, (–AD), 21 Oct. 1997, *Arnell 324* (NH); 22 Oct. 1997, *Ngwenya 1573* (NH); 10 km to Highflats from Umtentweni, (–AD), 6 Jan. 1981, *Schrire 573* (NH); 10 km from Highflats on road to Umzinto, (–AD), 7 Jan. 1981, *Germishuizen 1812* (PRE); Dududu, The Cedars, (–BA), 5 Nov. 1992, *Williams 956* (NH, PRE); Amanzimtoti, (–BB), 27 Sept. 1959, *Wilson 29* (NU); Scottburgh, (–BC), May 1954, *Garbutt 15* (NU); Pennington, (–BC), Apr. 1950, *Gower 17* (NU); 20 Dec. 1960, *Mauve 4098* (PRE); Ifafa, (–BC), 12 Jan. 1943, *Hardley 73* (NU); Park Rynie, (–BC), 8 Apr. 1967, *Bajjnath 381* (NU, PRE); Vernon-Crookes Nature Reserve, (–BC), 11 Nov. 2001, *Styles 116* (NU); Umtamvuna Nature Reserve, (–CC), 27 Feb. 1983, *Abbott 874, 875* (NH); Oribi Gorge, (–CD), 11 Jan. 1971, *Glen 328* (NU); Margate, (–CD), Feb. 1931, *Rump s.n.* (NH). **3130** (Port Edward): Port Edward, Farm Blencathra, (–AA), 26 Nov. 2003, *Singh & Bajjnath 847* (NH).

EASTERN CAPE.—**3129** (Port St. Johns): Lusikisiki, (–BC), 24 Nov. 1964, *Bayliss 2519* (NBG). **3130** (Port Edward): Mzamba, (–AA/AB), 19 Oct. 1993, *Arnell & Abbott 151* (NH). **3327** (Peddie): Fish River Mouth, (–AC), 22 Oct. 1964, *Bayliss 2458* (NBG).

7. *Silene crassifolia* L., *Species plantarum*, ed. 2, 1: 597 (1762); *Sond.*: 129 (1860). Type: South Africa, [Western Cape], Strandfontein, 21 Dec. 1941, *Compton 12781* [NBG, neo.!, designated by Cupido in Cafferty & Jarvis: 1053 (2004)].

Geophytic perennial 7–30 cm tall, forming loose or more compact mats; tuber cylindrical or ovoid; *stems* prostrate or straggling, decumbent, basal woody portion 2–5 mm diam. but (1.0–)1.5–2.0 mm diam. at base of inflorescence, ± densely puberulous-scabridulous with short, deflexed or spreading, acute hairs, rarely subglabrous. *Leaves* cauline, lower mostly dry or withered, oblanceolate to obovate or suborbicular, (10–)15–50 × 5–18 mm, obtuse, apiculate or weakly uncinately, base narrowed in lower leaves, leathery to sub-succulent, ± densely adpressed-puberulous to thickly felted, rarely glabrous on adaxial or both surfaces, hairs acute, margins ciliate towards base with longer, straggling hairs to 1 mm long, without evident side veins. *Inflorescence* a lax or dense, (2)3–8(–10)-flowered monochasium terminating main stems and branches, not evidently separated from leafy stem, rachis 1.0–1.5 mm diam.; bracts smaller than leaves, unequal to subequal, ovate or obovate to oblong or linear-lanceolate, puberulous to thickly felted with appressed or erect, acute hairs, margins densely ciliate; pedicels 3–10(–15) mm long, rarely up to 20 mm long in fruit. *Calyx* clavate or loosely funnel-shaped in flower, (10–)12–18(–20) × 3–5 mm at anthesis, strongly plicate, equally 10-veined, densely adpressed-puberulous/felted, lobes ovate or triangular, ± 2–3 mm long, densely ciliate. *Flowers* patent at anthesis, nocturnal. *Petals* white to pale yellowish or

pale pink, claw ± 7(–10) mm long, rarely exerted up to 4 mm beyond calyx, narrowed below, without evident auricles, pubescent along midrib and veins on outer surface, limb bifid, 4–6 × 4–6 mm, coronal scales 0.8–1.0 mm long. *Stamen* filaments slightly unequal, 6–7 mm long, shorter series shortly included, longer series reaching top of claw or exerted up to 1.5 mm. *Ovary* ellipsoid, ± 4 mm long; styles 4–5 mm long, exerted up to 2 mm. *Capsule* broadly ovoid or subglobose, (8–)10–12 × 7–10 mm, subequal to slightly longer than carpophore, smooth; carpophore 4–8 mm long, pubescent. *Seeds* 1.0–1.5 mm, reniform with deep hilar notch, flanks flat or somewhat concave, back deeply and narrowly grooved between two undulate wings, reddish brown, testa striate. *Chromosome number* (subsp. *primuliflora*): $2n = 24$ (Masson 1989). *Flowering time*: mainly Sept.–Mar. but ± throughout the year along the east coast. Figures 3D–G, 15.

Distribution and ecology: distributed along the southwestern, southern, and southeastern coast of South Africa, from Saldanha Bay in the Western Cape to Park Rynie in southern KwaZulu-Natal (Figure 16). The species is strictly coastal, growing in deep sandy soils, often just above the high level waterline but up to 20 m a.s.l., typically on stabilized or partially stabilized foredunes at the edge of coastal scrub or grassland, rarely on cliffs but evidently never on limestone or other calcareous outcrops.

Diagnosis and relationships: *Silene crassifolia* is usually readily identified by its prostrate or decumbent, relatively robust, perennial and often branching stems, mostly 1.5–2.0 mm diam. at the base of the inflorescence, that are leafy almost to the base of the inflorescence, oblanceolate to obovate or sub-orbicular leaves, somewhat inflated and strongly pleated calyx 3–5 mm diam., and broadly urn-shaped to subglobose capsules, (8–)10–12 × 7–10 mm. The strictly coastal distribution, on sandy foredunes, is also diagnostic.

Collections of subsp. *primuliflora* from the eastern coast, especially the Wild Coast and KwaZulu-Natal, may be confused with broad-leaved *Silene burchellii* subsp. *multiflora* and have sometimes been identified as a coastal form of this species. *S. burchellii*, which generally occurs on finer-grained soils inland of the coast, is a more slender plant, with essentially annual, mostly ± erect stems 0.5–1.5 mm diam. at the base of the inflorescence, with the foliage leaves concentrated towards the base of the stem and well separated from the inflorescence by an upper portion of leafless stem, and smaller capsules, 8–10 × 5–7 mm. This is the only region where both species occur, and the possibility of introgression in the coastal grasslands here cannot be discounted.

The two subspecies of *Silene crassifolia* recognized here have traditionally been regarded as distinct species but the greatly increased collections now available have led us to reconsider this interpretation. When Sonder (1860) last monographed the genus, he knew *S. crassifolia* only from the Cape Flats (Blouberg and Riet Valley [Gordon's Bay]), and *S. primuliflora* from a few collections east of Knysna (Tsitsikamma, Port Elizabeth, and southern KwaZulu-Natal). The distinction between the two taxa was quite clear from this sparse material:

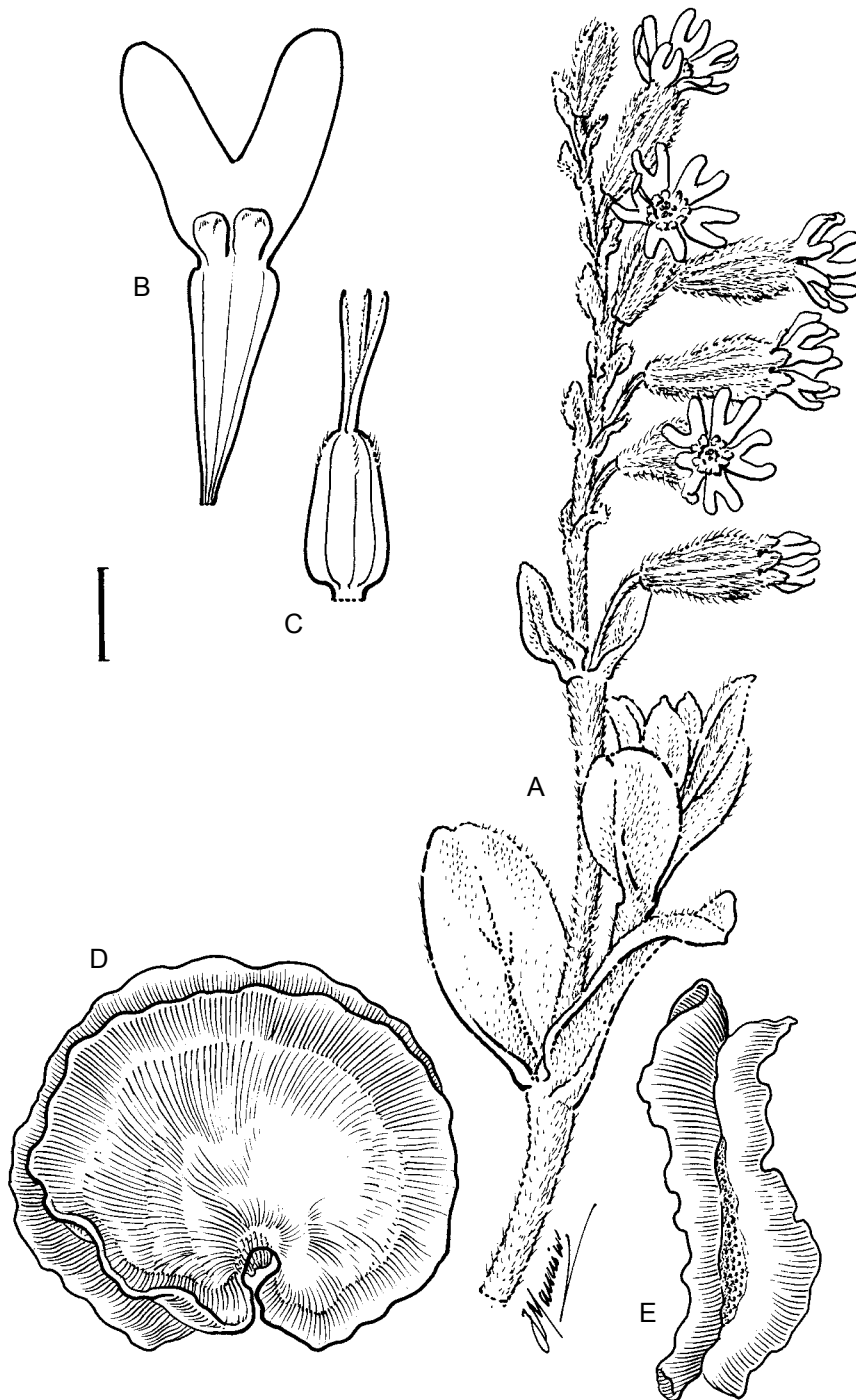


FIGURE 15.—*Silene crassifolia* subsp. *crassifolia*, Saldanha, Goldblatt & Porter 13568. A, flowering stem; B, petal; C, gynoecium; D, seed side view; E, seed dorsal view. Scale bar: A, 10 mm; B, C, 2.5 mm; D, E, 0.5 mm. Artist: John Manning.

S. crassifolia was readily diagnosed by its suborbicular or obovate, hairy leaves, ovate bracts, hirsute calyx and relatively shorter carpophore half as long as the capsule, and *S. primuliflora* by its narrower, spatulate, scabrid leaves, ovate-lanceolate bracts, pubescent calyx, and relatively longer carpophore \pm as long as the calyx. Later workers (Bocquet & Kiefer 1878; Masson 1989) have maintained these distinctions but the additional collections, especially those from the intervening southern Cape coast, show that these differences are not consistently maintained and that the two extremes grade into one another, especially between Knysna and Mossel Bay, where plants with the broad leaves and short carpophore of *S. crassifolia* develop the short pubescence characteristic of *S. primuliflora*. Further west, at Betty's

Bay, plants have the narrow leaves of *S. primuliflora* but the woolly stem and calyx of *S. crassifolia*, while at Blouberg Strand some collections have the broad leaves and bracts of *S. crassifolia* but the short pubescence of *S. primuliflora*. Other purported differences between the taxa, in calyx length and capsule shape, are similarly variable across the range, with no clear discontinuity between them. This general but incomplete association of morphology with geography is consistent with the rank of subspecies (Stuessy 1990).

Key to subspecies

- 1a Plants mostly \pm thickly felted on stems and leaves, hairs on stem usually spreading; leaves mostly obovate to suborbicular; calyx 12–15 mm long; carpophore 4–5 mm

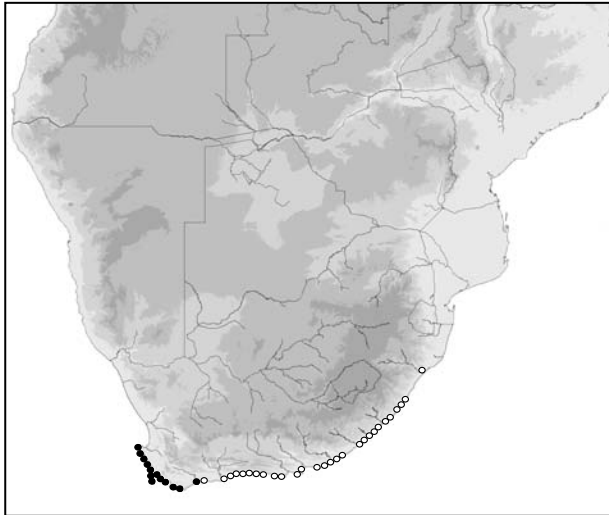


FIGURE 16.—Distribution of *Silene crassifolia*: subsp. *crassifolia*, ●, subsp. *primuliflora*, ○.

- long, ± half as long as capsule; west of Breede River mouth 7a. subsp. *crassifolia*
 1b Plants mostly puberulous on stems and leaves, hairs on stem ± deflexed; leaves oblanceolate to obovate; calyx mostly (10–)15–18(–20) mm long; carpophore 5–8 mm long, usually more than half as long as capsule; east of Breede River Mouth 7b. subsp. *primuliflora*

7a. subsp. *crassifolia*

Plants mostly ± thickly felted with hairs on stem deflexed or spreading. *Leaves* obovate to sub-orbicular, rarely oblanceolate, ± densely pubescent adaxially and thickly felted abaxially, rarely subglabrous adaxially and pubescent abaxially, often sub-succulent. *Calyx* 12–15 mm long. *Carpophore* 4–5 mm long, ± half as long as capsule. Figures 3D–F, 15.

Diagnosis: distinguished by its mostly longer, shaggy or felted pubescence, broader leaves, and often slightly shorter calyx, 12–15 mm long

Distribution: restricted to the southwestern and southern coasts of Western Cape, from the coast near Saldanha to Struisbaai (Figure 16). Plants from the Cape Peninsula exhibit the most extreme phenotypic adaptations to a maritime environment, with obovate to sub-orbicular leaves that are densely felted, especially on the lower surface.

Additional specimens

WESTERN CAPE.—**3217** (Vredenburg): Jacobsbaai, (–DD), 25 Sept. 2009, *Goldblatt, Manning & Porter 13447* (MO, NBG); Saldanha, Tabacbaai, (–DD), 25 Sept. 2009, *Goldblatt & Porter 13568* (MO, NBG). **3318** (Cape Town): Langebaan Peninsula, Schrywershoek, ± 20 m, (–AA), 26 Nov. 1975, *Boucher 2954* (NBG); Yzerfontein, (–AC), 1 Nov. 1953, *Levyns 10024* (BOL); Blouberg Strand, (–AD), Oct. 1832, *Zeyher 12* (SAM); 5 June 1940, *Bond 415* (NBG); 3 Oct. 2010, *Goldblatt & Manning 13600* (MO, NBG); Rietvalley [Rietvlei], (–AD), Nov. without year, *Ecklon & Zeyher 255* (SAM). **3418** (Simonstown): Fish Hoek, (–AB), Sept. 1882, *Bolus 4763* (BOL); Kalk Bay, (–AB), Jan. 1880, *Bolus 4763* (BOL); Muizenberg, (–AB), 16 May 1903, *Pearson 35* (NBG); 2 Dec. 1938, *Adamson 2320* (BOL); Strandfontein, (–AB), 18 Sept. 1942, *Compton 13706* (NBG); 22 Oct. 1962, *Taylor 4189* (NBG, PRE); Nov. without year, *Lamb 1951* (SAM); Cape Peninsula, Platboom, (–AD), 6 Nov. 1941, *Compton 12297* (NBG); Seekoe River Mouth, (–BA), 16 Sept. 1980, *Parsons 5* (PRE); Somerset West, Swartklip, (–BA), 15 Aug. 1953, *Leistner*

1113 (NBG); Macassar, dunes, (–BA), 23 Nov. 1955, *Van der Merwe 42* (NBG); N of Shuster River, foredunes, 15 m, (–BA), 12 Nov. 1986, *O’Callaghan 1365* (NBG); Betty’s Bay, (–BD), 21 Nov. 1952, *Parker 4833* (BOL, NBG); 28 Jan. 1970, *Boucher 1099* (NBG, PRE); 25 Sept. 1996, *Forrester 1143* (NBG); Rooiels, (–BD), 27 Jan. 1962, *Walsh s.n.* (NBG, PRE). **3419** (Caledon): Kleinmond, (–AC), without date, *De Vos 255* (NBG); Bot River Vlei, sandy dunes, 20 m, (–AC), 12 Aug. 1982, *O’Callaghan 206* (NBG); Pearly Beach, (–DA), 4 Nov. 1969, *Taylor 7425* (NBG); 9 March 1980, *Raitt 447* (NBG); Agulhas, beyond lighthouse, (–DD), 16 Nov. 1979, *Taylor 10157* (NBG, PRE). **3420** (Bredasdorp): Lekkerwater, Farm Hamerkop, (–BC), 28 Nov. 1978, *Taylor 9903* (NBG, PRE).

7b. subsp. *primuliflora* (*Eckl. & Zeyh.*) *J.C.Manning & Goldblatt*, comb. et stat. nov. *Silene primuliflora* *Eckl. & Zeyh.* [as ‘*primulaeflora*’]: 32 (1834); *Sond.*: 129 (1860). Type: South Africa, [Eastern Cape], ‘campo marino arenoso sinus Algoabay prope Port Elisabeth osque fluvii Zwartkopsrivier’, Oct. [without year], *Ecklon & Zeyher 618* (SAM, lecto.!, designated by Bocquet & Keifer: 8 (1978); SAM, isolecto.!).

Silene primuliflora var. *ciliata* *Fenzl. ex Sond.*: 129 (1860), syn. nov. Type: not designated.

Silene vlokii *D.Masson*: 485 (1989). Type: South Africa, [Western Cape], 22 Oct. 1987, *D. Masson 1225* (G, holo.!, iso.!).

Silene colorata var. *ciliata* *Fenzl. in Drège*: 222 (1844), nom. nud.

Plants mostly puberulous with hairs on stem ± deflexed. *Leaves* oblanceolate to obovate, ± puberulous, more densely so abaxially, rarely glabrous on adaxial or both surfaces except along margins. *Calyx* (10–)15–18(–20) mm long. *Carpophore* 5–8 mm long, mostly more than half as long as capsule. Figure 3G.

Diagnosis: distinguished by its shorter pubescence, generally narrower leaves and often slightly longer calyx, (10–)15–18(–20) mm long.

Distribution: distributed along the southern and eastern coast of South Africa, from Vermaaklikheid just east of the Breede River Mouth along the southern and southeastern coast into KwaZulu-Natal where it is mainly recorded south of Durban, with one collection from Shaka’s Rock on the North Coast northeast of Durban (Figure 16). Populations between East London and Mazeppa Bay tend to have ± glabrous leaf blades and were distinguished as var. *ciliata* by Sonder (1860) but this is not consistent, e.g. *Maguire 3675* from Kei River Bridge and *Wisura 2655* from Mazeppa Bay, which include individuals that are either glabrous or variously puberulous on one or both leaf surfaces. Plants from the cliffs at Herold’s Bay near George described as *S. vlokii* (*Masson 1989*) represent a dwarf form differing only in their more compact habit, typical of plants from exposed situations such as this, and were synonymized under *S. primuliflora* by *Goldblatt & Manning* (2000).

Additional specimens

KWAZULU-NATAL.—**2931** (Stanger): Chaka’s [Shaka’s] Rock, (–CA), without date, *Hillary 156* (NU). **3030** (Port Shepstone): Ifafa, (–BC), 12 Jul. 1974, *Huntley 206* (NU); Park Rynie, (–BC), May 1906, *Thode 5513* (NBG); Uvongo Beach, (–CB), 4 Aug. 1967, *Strey 7602* (NU, PRE); Ramsgate, (–CB), 7 July 1989, *Vos & Gormley s.n.* (NU); 16 Sept. 2003, *Styles 1590* (NU). **3130** (Port Edward): Port Edward, (–AA), 16 Nov. 1963, *Lennox s.n.* (NU).

WESTERN CAPE.—**3421** (Riversdale): Farm Koensrus near Vermaaklikheid, (–AC), 3 Mar. 2000, *Goldblatt & Nänni 11292A* (MO, NBG). **3422** (Mossel Bay): Great Brak River Mouth, (–AA), 13 Nov. 1981, *Parsons 375* (NBG); Herold's Bay, (–AB), 7 Jan. 1995, *Victor 864* (PRE); Kleinkrans just outside Wilderness, (–BA), 19 Jan. 1943, *Compton 14333* (NBG); 6 Feb. 1944, *Compton 15573* (NBG); 7 Nov. 1979, *Hugo 1915* (NBG, PRE); Wilderness, beach near river mouth, (–BA), 23 Dec. 1987, *Vlok 1900* (PRE); Wilderness, dunes E of river bridge, (–BA), 19 Sept. 2010, *Goldblatt & Porter 13548* (NBG); Sedgfield, dunes at mouth of vleis, (–BB), 1 Dec. 1959, *Middlemost 2046* (NBG). **3423** (Knysna): Knysna Heads, (–AA), 7 Nov. 1928, *Gillett 2168* (NBG); *Fourcade 4144* (NBG); Buffalo Bay, (–AA), 4 Dec. 1962, *Taylor 4442* (PRE); sand dunes E of Robberg, (–AB), 1 Dec. 1943, *Fourcade 6311* (NBG); Keurbooms River, (–AB), 9 Feb. 1936, *Gillett 1417* (BOL); 28 Feb. 1948, *Price s.n. BOL24957* (BOL); 8 Mar. 1983, *O'Callaghan 847* (NBG).

EASTERN CAPE.—**3129** (Port St Johns): Mkambati Nature Reserve, between Daza and Msikaba Rivers, (–BD), 11 Dec. 1986, *Jordaan 986* (NH); Msikaba, (–BD), 5 Aug. 1972, *Coleman 598* (NH); Umgazi River Mouth, (–CB), 9 Dec. 1975, *Taylor 8991* (PRE); Port St Johns, (–DA), Dec. 1943, *Brueckner & Allsopp 200* (NU); 1 Oct. 1962, *Strey 4325* (NH, PRE); Coffee Bay, (–CC), Mar. 1947, *Lewis s.n. SAM63435* (SAM); Dec. 1960, *Van der Shiff 5448* (PRE). **3228** (Butterworth): Bashee River Mouth, The Haven, (–BB), 17 Oct. 1966, *Gordon-Gray 58977* (NH, NU); Mendwana River Mouth, (–BC), 26 July 1965, *Wood 81* (NU); Mazeppa Bay, (–BC), 15 Jun. 1973, *Wisura 2655* (NBG); Kei River, (–CB), 19 Oct. 1951, *Taylor 3675* (NBG); Kei Mouth, (–CB), Jul. 1889, *Flanagan 204b* (PRE); 29 Mar. 1973, *Strey 11237* (MO, NU); Morgan's Bay, (–CB), 15 Jan. 1951, *Wilman 1057* (BOL); Morgan's Bay, Double Mouth, (–CB), 19 Jan. 1979, *Hilliard & Burt 12453* (NU); Kentani Dist., coast along edge of scrub in sea sand, (–CB), 4 Dec. 1905 & Jul. 1906, *Pegler 1311* (BOL); N side of Nxaco [River] Mouth, landward side of dune, (–CB), 12 July 1966, *Ward 5732* (NH, NU, PRE). **3323** (Willowmore): Nature's Valley, (–DC), 22 Jan. 1978, *Taylor 476/2* (NBG). **3325** (Port Elizabeth): Port Elizabeth, Swartkops River Mouth, (–DC), 23 Jan. 1973 [fruiting], *Dahlstrand 3004* (PRE); Markhan Industrial Area, (–DC), 29 May 1973, *Dahlstrand 3050* (MO, NBG, PRE). **3326** (Grahamstown): Boknes, (–DA), Jan. 1949, *Leighton 3097* (BOL, PRE); 20 Oct. 1979, *Botha 2630* (PRE); Kenton-on-Sea, (–DA), Dec. 1949, *Leighton 3096* (BOL, PRE); 27 Jun. 1955, *Acocks 18325* (PRE); Kasouga [Kasuka] River Mouth, (–DA), 21 Sept. 1920, *Britten 2304* (PRE); 22 Sept. 1920, *Britten 2343* (PRE); Kariega River Mouth, (–DA), 6 Dec. 1977, *Hilliard & Burt 10872* (E, K, MO, NU); Kowie, (–DB), 8 Feb. 1921, *Britten 2689* (PRE); 8 Jul. 1931, *Levyns 3778* (BOL); Port Alfred, (–DB), 25 Nov. 1888, *Galpin 343a* (PRE); Jan. 1907, *Potts 187* (BOL); Jan. 1916, *Tyson s.n. PRE12592* (PRE). **3327** (Peddie): Hamburg, (–AB), 28 Dec. 1931, *Gemmell s.n.* (PRE); [Great] Fish River Mouth, (–AC), Nov. [without year], *MacOwan 737* (BOL); East London, (–BB), Feb. 1888, *Thode STE6598* (NBG); Jan. 1914, *Potts 1783* (BOL); Feb. 1920, *Page s.n. BOL16978* (BOL); Apr.–Jun. 1961, *Bokelmann 2* (NBG); Gonubie Beach, (–BB), Jan. 1953, *Peacock s.n. SAM67466* (SAM); Gonubie Mouth, (–BB), 4 Oct. 1942, *Acocks 9137* (PRE); Shelly Beach, (–BB), Dec. 1952, *Peacock s.n. SAM67467* (SAM); 27 Jan. 1979, *Hilliard & Burt 12408* (NU). **3424** (Humansdorp): Groot River Mouth, (–AA), Mar. 1910, *Fourcade 6676* (BOL); 29 Dec. 1926, *Phillips 1204* (BOL); Jan. 1927, *Duthie 547* (NBG, SAM); 8 Apr. 1981, *Parsons 195* (NBG); Jeffrey's Bay, (–BA), 17 Dec. 1956, *Taylor 5147* (NBG). **3425** (Skoenmakerskop): Skoenmakerskop, (–BA), 7 Sept. 2002, *Steyn 92* (PRE); Cape Recife, (–BA), 1987, *D.Masson 1230* (PRE).

8. *Silene mundiana* Eckl. & Zeyh., Enumeratio plantarum africae australis extratropicae: 32 (1834); Sond.: 127 (1860) [as '*mundiana*']. Type: South Africa, [Eastern Cape], 'iter frutices ad Paardekop prope sinum Plettenbergsbay [Plettenberg Bay]', without date, *Mund s.n.* (SAM, lecto!), designated by Bocquet & Kiefer: 8 (1978); S, isolecto.).

Geophytic perennial 7–30 cm tall, forming loose, tangled mounds or more compact mats; stems sprawling or straggling, decumbent, highly and often closely branched, slender, basal woody portion 1–2 mm diam. but 0.5–1.0 mm diam. at base of inflorescence, closely puberulous-scabridulous with very short, deflexed, acute

hairs. *Leaves* cauline, lower mostly dry or withered, oblanceolate to linear-oblanceolate, 7–15 × 1–3 mm, apiculate or weakly uncinata, base narrowed in lower leaves, puberulous along lower midline and margins, and sometimes also basally, hairs acute, margins ciliate towards base with longer, straggling hairs to 1 mm long, without evident side veins. *Inflorescence* a (1)2-flowered monochasium terminating main stems and branches, rachis filiform, 0.2–0.5 mm diam., not extending much beyond vegetative growth; bracts smaller than leaves, subequal, linear, thinly puberulous with appressed, acute hairs, margins densely ciliate; pedicels filiform, 3–10(–15) mm long. *Calyx* clavate in flower, 9–11 × 2.5–3.0 mm at anthesis, equally 10-veined, densely adpressed-puberulous/scabridulous, lobes ovate or triangular, ± 1.5 mm long, densely ciliate. *Flowers* patent at anthesis, ?nocturnal. *Petals* white (?or pale pink), claw ± 6 mm long, narrowed below, without evident auricles, pubescent along midrib and veins on outer surface, limb bifid, 4–5 × 3–4 mm, coronal scales 0.5–0.8 mm long. *Stamen* filaments slightly unequal, 6–7 mm long, shorter series shortly included, longer series shortly exerted. *Ovary* ellipsoid, ± 3 mm long; styles 4–5 mm long, exerted up to 1 mm. *Capsule* broadly ovoid, 6 × 4 mm, slightly longer than carpophore, smooth; carpophore ± 4 mm long, pubescent. *Seeds* 0.8–1.0 mm, reniform with deep hilar notch, flanks flat or somewhat concave, back deeply and narrowly grooved between two undulate wings, reddish brown, testa striate. *Flowering time*: Sept.–Oct.(–Nov.). Figure 3H, I.

Ecology and distribution: originally described from Plettenberg Bay, where it is still known only from the type and thus possibly extinct locally, the species is now also known to occur near Bredasdorp, more than 200 km to the west, in the De Hoop Nature Reserve immediately west of Potberg (Figure 10). Here it is restricted to limestone outcrops near the coast, either fringing seasonal vleis or directly facing the sea. Plants growing on exposed cliffs display the typical maritime adaptations of a more compact habit, forming ± prostrate closely leafy mats, and with smaller, thicker leaves than those sheltered in potholes, which are more diffuse, forming loose cushions in the crevices. The species appears to be locally common where it occurs at De Hoop.

Diagnosis and relationships: one of the least known of the South African species, represented in herbaria by just a handful of specimens.

The highly reduced inflorescences of *Silene mundiana*, not immediately identifiable as monochasia, led Sonder (1860) to place the species provisionally ['doubtfully'] in sect. *Elisanthe* but its geophytic habit, eglandular vestiture, ovate calyx lobes, and especially the winged seeds place it correctly in sect. *Fruticulosae*. Here it is distinguished by its densely and closely branched habit, small leaves 7–15 × 1–3 mm, and ± filiform branches with just 1 or 2 flowers per inflorescence. Plants form small mats or low tangled mounds, with the numerous inflorescences extending only shortly above the vegetative growth.

Conservation note: the restricted occurrence of the species and its possible extinction around Plettenberg Bay render it vulnerable.

Additional specimens

WESTERN CAPE.—3420 (Bredasdorp): De Hoop farm in mud of dried up vlei, (–AC), 1971 [without month], *Van der Merwe 1871* (NBG); De Hoop, Potberg Nature reserve, limestone cliffs along vlei 2 km NW of De Hoop residence, (–AD), 16 Oct. 1978, *Burgers 1358* (NBG); De Hoop Nature Reserve near Rest Camp, in exposed rock crevices facing coastal winds, (–AD), 22 Oct. 1980, *Mauve, Reid & Wikner 30* (NBG).

Silene sect. **Dipterospermae** (*Rohrb.*) *Chowdhuri*, Notes from the Royal Botanic Garden, Edinburgh 22: 248 (1957). *Silene* [unranked] *Dipterospermae* *Rohrb.*: 69 (1869). Lectotype: *Silene colorata* Poir., designated by Chowdhuri: 248 (1957).

Annuals, eglandular pubescent. *Leaves* linear to obovate, lacking apparent lateral veins; bracts herbaceous. *Flowers* in monochasia with axis simple or forked below, ± erect, diurnal, vespertine or cleistogamous; anthophore well-developed, pubescent. *Calyx* pubescent, clavate, 10-veined, without conspicuous anastomosing venation, lobes ovate, obtuse. *Petals*: claw scabrid along midvein above, not auriculate, limb bifid with linear lobes; coronal scales present. *Ovary* partially septate. *Seeds* reniform with deep hilar notch, flanks flat or somewhat concave and smooth or striate, back deeply and narrowly grooved between two undulate peripheral wings.

± 9 spp., circum-Mediterranean to Arabia and W Pakistan, South Africa.

Although Chowdhuri (1957) placed *Silene aethiopica* [as *S. clandestina*] in sect. *Scorpioideae*, it is highly anomalous there in its peripherally winged seeds (Figure 3J–M). These, together with the annual habit, locate it firmly in sect. *Dipterospermae*. Seeds of this type are otherwise characteristic of sect. *Fruticulosae* (Figure 3A–I) and both groups also share a clavate calyx with ovate calyx lobes. The two sections are essentially separated on the basis of an annual vs. a perennial habit, and their exact relationship requires further study. It is especially suggestive that Gilbert (2000) notes that forms of the usually perennial *S. burchellii* (sect. *Fruticulosae*) from the drier parts of Ethiopia are often ephemerals with an evident similarity to the annual *S. colorata* (sect. *Dipterospermae*).

9. ***Silene aethiopica*** *Burm.*, Flora indica: cui accedit series zoophytorum indicorum, nec non Prodromus flo-rae capensis: 13 (1768). Type: South Africa, without precise locality or collector, *Burman s.n. Herb. Burm. G00301755* (G, lecto.—digital image!, designated here). [Of the two available syntypes, *G00301754* and *G00301755*, the latter is selected as lectotype as it is a closer match to the protologue in its much branched stem and oblanceolate leaves].

Annual, 7–30(–35) cm tall; stems erect or decumbent, mostly branching from near base, 0.75 mm diam. at base but 0.5–1.5 mm diam. at inflorescence, closely puberulous with very short, deflexed hairs, rarely glabrescent. *Leaves* linear or narrowly oblanceolate to spatulate-oblanceolate, becoming narrower distally, 15–60 × 2–5(–10) mm, apiculate or obtuse, base narrowed in lower leaves, ± pubescent with spreading or ± appressed hairs, rarely glabrescent or glabrous apart

from margins, margins towards base ciliate with hairs to 1 mm long, without evident side veins. *Inflorescence* a second, spike-like monochasium terminating main stems and branches, 2–8-flowered; bracts smaller than leaves, unequal, fertile bract linear to awl-shaped, densely appressed-puberulous with acute, eglandular hairs; pedicels up to 25 mm long in lower flowers and elongating to 35 mm long in fruit, (2–)6–10 mm long in upper flowers, erect in fruit. *Calyx* clavate in flower, 10–15(–18) × 2–5 mm at anthesis, equally 10-veined, densely adpressed-puberulous, lobes ovate to lanceolate, ± 2 mm long, densely cilio-late. *Flowers* suberect at anthesis, unscented or sweetly scented of coconut-vanilla, nocturnal. *Petals* white to pink with maroon reverse, claw 6–8 mm long, narrowly oblanceolate, without auricles, limb bifid or emarginate, (1–)3–8 mm × 2–6 mm, coronal scales 0.5–1.0 mm long. *Stamen* filaments slightly unequal, 4.5–7.0 mm long, shorter series included up to 2 mm, longer series ± reaching top of claw. *Ovary* ellipsoid, ± 3 mm long; styles 3–5 mm long, ± reaching top of claw. *Capsule* ovoid, (6–)8–9 × 3–4 mm, ± as long as to 2× as long as carpophore; carpophore (3–)4–9 mm long, pubescent. *Seeds* 0.8–1.5 mm, reniform with deep hilar notch, flanks flat or somewhat concave, back deeply and narrowly grooved between two undulate wings, reddish brown, testa striate. *Chromosome number* (subsp. *maritima*): $n = 12$ (Bocquet 1977). *Flowering time*: (Jul.)Aug.–Oct.(–Nov.). Figures 3J–M, 17.

Distribution and ecology: widely distributed through the southern African winter rainfall region, mainly on the coastal lowlands, from the southern Richtersveld southwards to Stilbaai and inland to the Tankwa Karoo and Laingsburg, with a disjunction to Port Elizabeth in the east but evidently absent from the Little Karoo (Figure 18). The species is mostly encountered in well-drained, coarse-grained soils of a wide variety of types, ranging from acidic sands and gravels derived from sandstone and granite to basic limestones and calcareous sands, very rarely in fine-grained clays, occurring on sandy flats, in dry river courses, around salt pans and on limestone, or rarely dolerite, ridges.

Diagnosis and relationships: the only annual species of *Silene* native to southern Africa, *S. aethiopica* is distinguished from the introduced annual species, *S. gallica* and *S. nocturna*, by its wholly eglandular pubescence—the stems with short, deflexed hairs and the clavate calyx covered with short, appressed hairs—and by its discoid, peripherally winged seeds. Above ground it is superficially similar to the perennial *S. burchellii* (sect. *Fruticulosae*), with similar vestiture, calyx, and seeds and the two species can be confused in the southwestern parts of the Western Cape where their ranges overlap. Well-grown specimens of *S. aethiopica* with branched stems are unmistakable but unbranched specimens without roots may pose problems. Calyx length is a useful discriminating feature in the region of overlap, with the calyx of *S. aethiopica* typically 10–15 mm long, except in subsp. *longiflora* from the Cold Bokkeveld, where it is 15–18 mm long. In contrast, the more common forms of *S. burchellii* in the region, subsp. *pilosellifolia*, have a calyx 18–25 mm long, although calyx length is shorter, 15–20 mm long, in subsp. *burchellii* in the extreme southwestern coastal areas. Ecologically, *S. aethiopica*

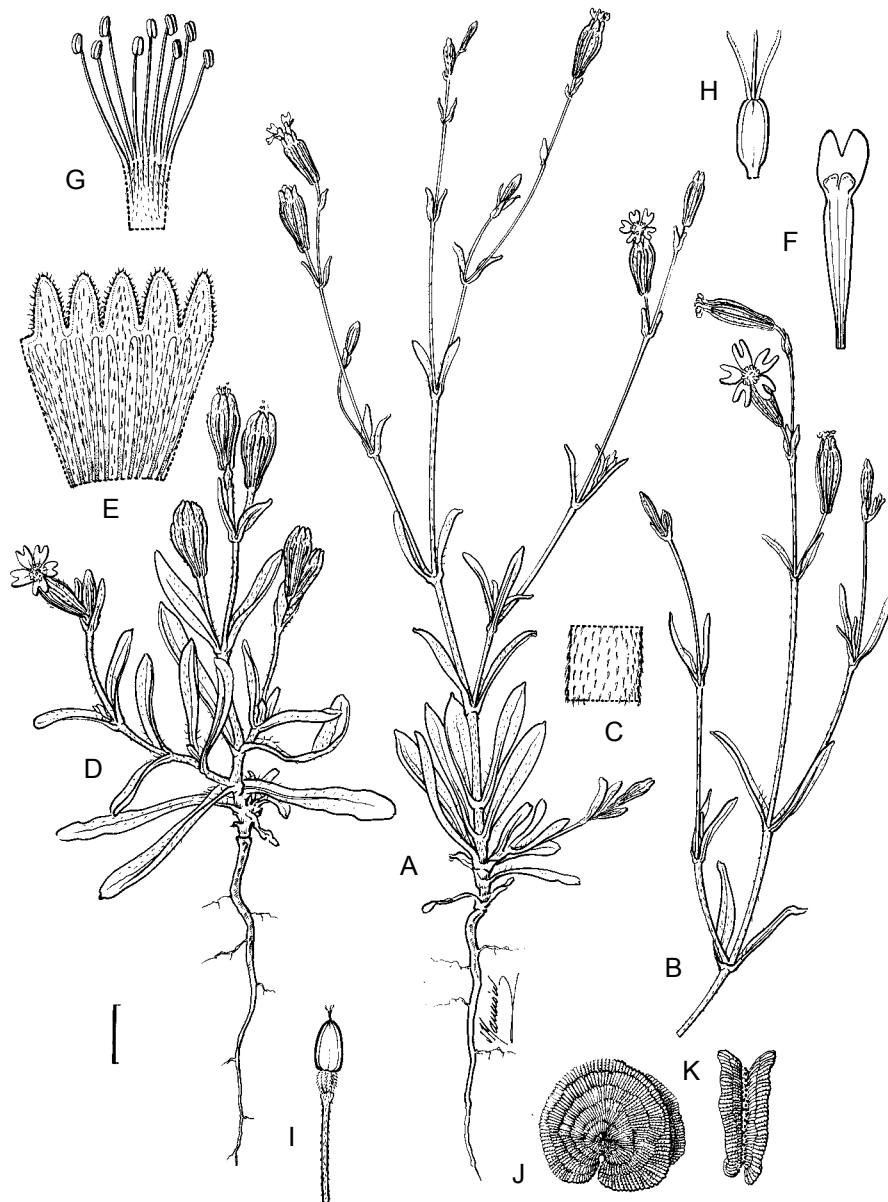


FIGURE 17.—*Silene aethiopica* subsp. *aethiopica*: A, typical form from Tulbagh, no voucher; B, typical form from Gordon's Bay, no voucher; C–K, maritime form from Blouberg Strand, Goldblatt & Manning 13601. A, D, flowering plants; B, flowering stem; C, stem segment; E, calyx laid out; F, petal; G, androecium laid out; H, gynoecium; I, capsule before dehiscence with calyx removed; J, seed side view; K, seed dorsal view. Scale bar: A, B, D, I, 10 mm; C, 1 mm; E, 5 mm; F–H, 2.5 mm; J, K, 0.5. Artist: John Manning.

prefers well-drained, sandy soils, whereas *S. burchellii* is mostly found in stony places or in finer-grained clays. The two taxa are, however, best separated by habit. *S. aethiopica* is an annual species with a slender taproot that is invariably present in herbarium specimens, which are always pulled from the ground with the main root intact. *S. burchellii*, in contrast, is a perennial with annual flowering stems but a persistent, woody stem base, developing a persistent, short or long rootstock that is swollen and tuber-like distally, although the swollen terminal portion is very rarely present in herbarium specimens.

As in other species of *Silene*, *S. aethiopica* is variable in stature, leaf morphology and flower size, notably in the length of petal limbs, carpophore and calyx. Much of the variation is either ecological or recurrent through the range of the species but populations from the southern Knersvlakte and the Olifants River valley are consistently less pubescent than usual, with the leaf blades either glabrous, apart from the margins, or glabrescent, and the stems often glabrescent as well. Large- and

small-flowered forms occur throughout the range of the species, sometimes within single populations.

Strand forms of *Silene aethiopica* from the southwestern coast (Figure 17D), distinguished from more inland plants (Figure 17A, B) by the typical maritime adaptations of a more spreading habit, broader and more fleshy leaves, and fleshy calyx with distinctly bulging nerves, were described as a separate species under the name *S. dewinteri* (Bocquet 1977). The distinction between the two forms is not absolute, however, and some collections comprise material that could be assigned to both taxa (eg. Goldblatt & Porter 13509). We visited the type locality of *S. dewinteri* at Table View and confirm Bocquet's observations regarding the texture of the leaves and calyx but not of the habit—all of the plants that we encountered were erect, possibly because our visit to the site was earlier in the season than Bocquet's. More significantly, however, our transect across the dunes passed through a gradation from typical *S. aethiopica* on the landward side to *S. dewinteri* on the seaward side. We encountered similar

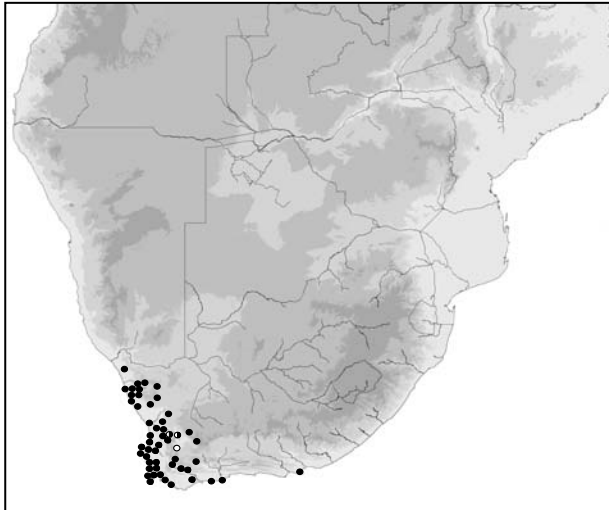


FIGURE 18.—Distribution of *Silene aethiopica*: subsp. *aethiopica*, ●; subsp. *longiflora*, ○.

morphological clines at Jacobsbaai and at Elands Bay. Although plants at the two extremes of the ecological spectrum are certainly very different in appearance, they grade into one another in the ecotone, leading us to conclude that *S. dewinteri* represents a \pm distinct ecotype rather than a separate species. This interpretation is also implicit in Bocquet's (1978) subsequent description of *S. dewinteri* as a 'sand-dune ecotype'.

That there is some genetic basis for the maritime form seems to be borne out by Bocquet's (1977) observation that the greater fleshiness of the plants was retained in cultivated plants grown from seed. It is not clear, however, whether this variant represents recurrent selection for a maritime genotype, a situation that is readily envisaged in a self-fertile species. In any event, we do not recognize this maritime form at any taxonomic rank. An investigation of the population genetics of the species is necessary before the taxonomic and evolutionary status of these variants can be accurately assessed.

A more clear-cut morphological disjunction is evident in populations from the Cold Bokkeveld and adjacent Cedarberg–Bidouw Mtns, which have markedly longer calyces (and carpophores) than usual. We describe this variant as subsp. *longiflora*.

Nomenclatural note: The identity of *Silene aethiopica* Burm. (1768) has remained uncertain until now. Based on unlocalised material from the 'Cape of Good Hope' and one of the earliest names published in African silenes, the published diagnosis *caule ramoso, floribus subspicatus, petalis bifidis obtusis, foliis lanceolatis viscidis* includes two characteristics not combined in any southern African species, viz. 'viscid leaves' and a 'subspicate' inflorescence. Thunberg (1823) treated the species as a synonym of what he called *S. noctiflora* (a European species) but his application of this name in the southern African context actually encompasses the newly described *S. rigens*, a cymose-flowered species in sect. *Elisanthe*, and the basis for his interpretation of *S. aethiopica* is unclear. Others dealing with *Silene* ignored the name, including Otth (1824), Ecklon & Zeyher (1834), and Sonder (1860) in his account of the

genus for *Flora capensis*. Williams (1896), however, in his revision of *Silene*, cited *S. aethiopica* as an uncertain synonym of the later *S. burchellii*, and the African Plants Database (2011 version) follows this lead. This tentative identification of Burman's species is clearly based on the 'subspicate' nature of the inflorescence. It is most fortunate, therefore, that Nicolas Fumeaux at the Burman Herbarium has succeeded in locating two sheets bearing the name *S. aethiopica*, which clearly constitute original material of the species and are thus syntypes of the name. One of the sheets (*G00301754*) also bears the inscription *Lychnoides aethiopica angustifolia fl. incarnatis, petalis acutis* from John Ray's (1704) *Historie plantarum*, and the other (*G00301754*) bears an additional manuscript name and diagnosis for *Lychnis monomotapensis*. Both collections represent the species known until now as *Silene clandestina*, and *G0030175* was in fact identified under this name by Daniel Masson in 1991. The name *S. aethiopica* Burm. (1768) thus takes priority over *S. clandestina* Jacq. (1791), which becomes a later synonym. Burman's description of the leaves of this species as viscid must be assumed to be an error as the type material does not show this feature. Curiously, the same specimen had earlier been determined as *S. dewinteri* Bocquet (1977) by Daniel Bocquet in 1976, who should therefore have taken up the epithet *aethiopica* for this taxon were it to be recognized at species level, which we do not. In any event, we regard the Burman specimen to represent a slightly luxuriant individual (possibly cultivated) of typical *S. aethiopica* and not the maritime 'dewinteri' form.

Although the source of Burman's specimens is not given, other collections of South African material in the Burman herbarium are known to have been made by [Heinrich] Oldenland, who was employed by the Dutch East India Company at the Company Gardens in Cape Town in the late seventeenth century. Ray (1704) certainly used material collected by Oldenland in the preparation of his *Historia plantarum*, and his mention of the species is a clear indication that it had reached Europe by the early eighteenth century.

Key to subspecies

- 1a Calyx 10–15 mm long; carpophore 3–8 mm long, shorter than to as long as capsule 9a. subsp. *aethiopica*
 1b Calyx 15–18 mm long; carpophore \pm 10 mm long, slightly longer than capsule; Cold Bokkeveld 9b. subsp. *longiflora*

9a. subsp. **aethiopica**

Silene clandestina Jacq.: 111 (1791 [as '1789']), syn. nov.; Sond.: 127 (1860). Type: South Africa, without precise locality, illustration in Jacq., *Collectanea* pl. 3, fig. 3 (1791 [as '1789']) (lecto., designated here).

Silene cernua Thunb.: 81 (1794), syn. nov. *Silene burchellii* var. *cernua* (Thunb.) Williams: 76 (1896). Type: South Africa, [Western Cape], without precise locality or date, *Thunberg s.n.*, Herb. Thunb. 10714 (UPS-THUNB—microfiche!, lecto., designated here). [This specimen is selected as the most complete of the three under this name in the Thunberg Herbarium (UPS-THUNB10713, 10714 & 10715), clearly showing the annual habit of the species]

Silene linifolia Willd.: 473 (1809) [*fide* Sond. (1860)], syn. nov. Type: not designated and identity uncertain.

Silene recta Bartl.: 623 (1832) [*fide* Sond. (1860)], syn. nov. Type: South Africa, [Western Cape], 'auf dem Tafelberge auf dem zweiten Höhe', without date, *Ecklon & Zeyher s.n.* (not located).

Silene crassifolia var. *angustifolia* Bartl.: 623 (1832), syn. nov. Type: South Africa, [Western Cape], 'beim obersten Blockhause am Teufelsberge', without date, *Ecklon & Zeyher s.n.* (not located).

Silene constantia Eckl. & Zeyh.: 32 (1834), syn. nov. Type: South Africa, [Western Cape], 'collium capensium prope Constantiam et Hottentotsholland', *Ecklon & Zeyher 251* (SAM, lecto!, designated here). [Bocquet's (1977) contention that Ecklon & Zeyher (1834) automatically rendered this name illegitimate and superfluous by citing *S. crassifolia* var. *angustifolia* Bartl. in synonymy is incorrect as names have priority only at their rank: *S. constantia* is therefore a legitimate name at species rank, with its own type (McNeill *et al.* 2006: Art. 11.2)].

Silene clandestina var. *minor* Sond.: 128 (1860), syn. nov. Type: not designated.

Silene clandestina var. *major* Sond.: 128 (1860), syn. nov. Type: not designated.

Silene dewinteri Bocquet, *Bothalia* 12: 309 (1977), syn. nov. Type: South Africa, [Western Cape], Table View, 9 Nov. 1975, *Bocquet 17774* (ZT, holo!).

Plants ± lax or compact. *Stems* erect or decumbent. *Leaves* linear to oblanceolate, 2–5 mm wide. *Calyx* 10–15 mm long. *Carpophore* (3–)4–8 mm long, half as long to as long as capsule. Figure 17.

Diagnosis: distinguished from subsp. *longiflora* by the shorter calyx, 10–15 mm long.

Distribution: throughout the range of the species but replaced on the Cold Bokkeveld and Cedarberg–Bidouw Mtns by subsp. *longiflora* (Figure 18). The maritime ecotype, characterized by a compact habit, sub-succulent leaves 3–10 mm wide, ± fleshy calyx, and consistently short carpophore, 4–5 mm long, is restricted to the seaward side of coastal dunes above the high-tide mark in the extreme southwestern Western Cape between Saldanha Bay and Onrus River Mouth, in stabilized or semi-stabilized, calcareous sands. The absence of this variant along the coast to the north and east may be due to the lack of suitable sandy beaches there.

Additional specimens

NORTHERN CAPE.—**2917** (Springbok): between Kwarass and Lekkersing, 250 m, (–AA), 4 Sept. 1925, *Marloth 12437* (NBG); turn-off to Komaggas on Koingnaas-Kleinsee Road, (–CC), 11 Aug. 2007, *Bester 7895* (PRE); Farm Zonnekwa, 200 m, (–CD), 7 Oct. 1986, *Le Roux & Lloyd 519* (NBG); Spektakel, (–DA), Sept. 1883, *Bolus 6667* (BOL); Hester Malan Reserve, (–DB), 3 Oct. 1974, *Rösch & Le Roux 836* (PRE); 26 Aug. 1985, *Struck 145* (NBG); Farm De Draay, (–DB), 29 Aug. 1990, *Le Roux 4122b* (NBG); Groot Vlei, (–DC), 7 Sept. 1945, *Compton 17296* (NBG). **2918** (Gamoep): between Gamoep and Aggenys close to Vaalheuwel Farm, (–DC), 19 Sept. 2002, *Steyn 271* (PRE). **3017** (Hondekliipbaai): Farm Koingaas, 50 m, (–AB), 27 Aug. 1986, *Le Roux & Lloyd 354* (NBG); Hondekliip Bay, (–AD), Oct. 1924, *Pillans 17942* (BOL); 11 miles [17.6 km] E of Hondekliipbaai on road

to Garies, (–AD), 11 Sept. 1970, *Thompson 1089* (NBG); Kookfontein, (–BA), Aug. 1883, *Bolus 31659* (BOL); ± 2 km W of Sarisam homestead, (–DA), 2 Aug. 2006, *Bester 7029* (PRE). **3018** (Kamiesberg): Platbakkies, (–BC), 10 Sept. 1976, *Thompson 2866* (PRE); Langkloof, N of Doringkraal, (–CA), 23 Sept. 2010, *Goldblatt 13573A* (MO, NBG). **3119** (Calvinia): Nieuwoudtville Waterfall, (–AC), Sept. 1930, *Lavis s.n. BOL19818* (BOL); Nieuwoudtville Reserve, (–AC), 7 Sept. 1983, *Perry & Snijman 2279* (NBG). **3220** (Sutherland): Farm Bergsig, (–DA), 7 Sept. 1988, *Crosby 965* (PRE).

WESTERN CAPE.—**3118** (Vanrhynsdorp): Draaihoek Farm, 4 km SW of Vredendal, 70 m, (–CB), 27 Aug. 1986, *Hilton-Taylor 1152* (NBG); Troe-troe Farm, 3 km from Vanrhynsdorp on Nieuwoudtville road, (–DB), 3 Aug. 1977, *Le Roux 2007* (NBG); Widow Farm, 15 km S of Van Rhynsdorp, 500' [150 m], (–DB), 9 Sept. 1976, *Thompson 2826* (NBG, PRE); 22 Sept. 1985, *Zietsman & Zietsman 1157* (PRE); Windhoek Farm at foot of Gifberg, (–DC), 22 Sept. 191, *Pearson 6760* (BOL); Doorn River Mouth, (–DC), 22 Jul. 1941, *Compton 11037* (BOL, NBG); Brandewyn River, (–DD), 26 Aug. 1950, *Barker 6588* (NBG); Nardouw Mtns S of Bulshoek Barrage, (–DD), 2 Sept. 1977, *Goldblatt & Manning 10719* (MO, NBG). **3217** (Vredenburg): limestone hill N of Saldanha, (–DD), 30 Sept. 2009, *Goldblatt, Manning & Porter 13469* (MO, NBG); dunes N of Jacobsbaai, (–DD), 9 Sept. 2010, *Goldblatt & Porter 13509* (MO, NBG); Saldanha Peninsula, Tabacbaai, dunes along coast, (–DD), 22 Sept. 2010, *Goldblatt & Porter 13569* (MO, NBG, PRE). **3218** (Clanwilliam): Wadrif Soutpan, (–AB), 14 Sept. 1984, *O'Callaghan & Van Wyk 96* (NBG, PRE); 9–10 km S of Lambert's Bay, (–AB), 14 Sept. 2010, *Goldblatt & Porter 13533, 13534* (MO, NBG); between Leipoldville and Elands Bay, (–AD), Oct. 1947, *Zinn s.n. SAM63443* (SAM); Elands Bay, sandy coast below bushman cave, (–AD), 14 Sept. 2010, *Goldblatt & Porter 13535* (MO, NBG); hills around Clanwilliam, (–BB), Jul. 1897, *Leipoldt 594* (NBG, SAM); Olifants River Dam, (–BB), 10 Sept. 1949, *Barker 5736* (NBG); near Paleisheuwel, (–BD), 5 Sept. 1954, *Levyns 10162* (BOL); Kriedouwkrantz on road to Algeria Forest Station, (–BD), 7 Sept. 1976, *Hugo 429* (NBG); N of Velddrift, 10 m, (–CC), 15 Oct. 1986, *O'Callaghan 1220* (NBG); Salt pans near Zoutkloff, (–CD), 10 Sept. 1949, *Barker 5803* (BOL, NBG); Piketberg Dist., Het Kruis, (–DA), 22 Sept. 1940, *Compton 9519* (NBG). **3219** (Wuppertal): Driefontein Farm, 4 km SW of Doringbos, 200 m, (–AA), 2 Oct. 1986, *Hilton-Taylor 1858* (NBG); Boontjieskloof Farm E of Pakhuis Pass, ± 1 500' [450 m], (–AA), 4 Sept. 1976, *Taylor 9319* (NBG, PRE); Heuningvlei, Groot Koupoort, ± 3150' [945 m], (–AA), 11 Oct. 1975, *Kruger 1696* (NBG); Alpha Farm, (–AA), 20 Jul. 1941, *Compton 10934* (NBG); Algeria Forest Station, (–AC), 8 Sept. 1997, *Van Rooyen, Steyn & de Villiers 710* (NBG); Cedarberg Forest reserve, Langrug, 1 000' [300 m], (–AC), 12 Sept. 1982, *Viviers 581* (NBG); Tankwa Karoo National Park, W end, (–BA), 2 Aug. 2007, *Bester 7682* (NBG). **3220** (Sutherland): Syferwater Farm, 1 212 m, (–AA), 18 Sept. 2006, *Rosch 558* (NBG). **3318** (Cape Town): Langebaan, (–AA), 5 Sept. 1971, *Axelsson 486* (NBG); around pan SE of Jakkalsfontein, 60 m, (–AD), 24 Sept. 1996, *Low 2831* (NBG); Melkbosstrand, (–AD), 24 Sept. 1966, *Dahlstrand 1066* (PRE); 30 Sept. 2010, *Goldblatt & Manning 13598* (MO, NBG); Bok Point, (–CB), 14 Sept. 1940, *Barker 779* (NBG); Bok Bay, (–CB), 14 Sept. 1940, *Compton 9389* (NBG); Robben Island, (–CD), Oct. 1932, *Adamson s.n.* (BOL); 20 Aug. 1943, *Walgate 512* (NBG); 19 Nov. 1987, *Van Jaarsveld & De Lange 9546* (NBG); Blaauwberg [Blouberg], (–CD), Sept. 1954, *Stokoe s.n. SAM67560* (SAM); Blouberg Strand, dunes S of Dolphin Hotel, (–CD), 3 Oct. 2010, *Goldblatt & Manning 13601* (MO, NBG); Paarden Eiland, Klein Zoar Vlei, 1 m, (–CD), 8 Oct. 1979, *Linder s.n.* (BOL); Milnerton, (–CD), 17 Sept. 1913, *Phillips s.n. NBG103292* (NBG); 'in leter montis tabularis', (–CD), Oct. 1873, *Bolus 2718* (BOL); 'prope Rondebosch', (–CD), Oct. 1878, *Bolus 2718a* (BOL); Bergvliet Farm, (–CD), 1–2 Nov. 1915, *Purcell s.n.* (SAM); Van Kampsbay [Camps Bay], without date, *Zeyher s.n.* (BOL); Camps Bay, (–CD), 13 Oct. 1956, *Cassidy 51* (BOL, NBG); W slopes of Table Mtn, (–CD), 5 Jul. 1936, *Adamson 970* (PRE); Malmesbury Dist., near Pella, Burgers Post Farm, 200 m, (–DA), 9 Oct. 1979, *Boucher & Shepherd 4764* (NBG, PRE); Cape Flats Nature Reserve, University of Western Cape campus, ± 200 m, (–DC), 9 Oct. 1980, *Low 1095* (NBG); Cape Flats near Tygerberg Station, (–DC), 15 Oct. 1927, *Smuts 2490* (NBG). **3319** (Worcester): Tulbagh Waterfall, (–AC), Oct. 1928, *Levyns 2566* (BOL); Laken Vlei, (–BC), 19 Oct. 1941, *Compton 12076* (NBG); Worcester, Riverside, (–CB), 11 Sept. 1962, *Walters 878* (NBG); Robertson, (–DD), 25 Sept. 1935, *Lewis s.n. BOL31663* (BOL). **3320** (Montagu): Laingsburg Dist., [Matjiesfontein], Fisantekraal Valley, (–BC), 7 Nov. 1948, *Compton 21152* (NBG); Montagu, (–CC), 5 Jul. 1938, *Levyns 6457* (NBG). **3418** (Simonstown): Llandudno, (–Ab), 26 Sept. 1928, *Hutchinson 535* (BOL, K); Hout Bay, (–AA), 20 Sept. 1941, *Compton 11749*

(NBG); Red Hill, (–AB), 6 Oct. 1962, *Taylor 4128* (NBG); Clovelly, (–AB), 22 Oct. 1940, *Adamson s.n.* (BOL); Noordhoek, (–AB), 1 Nov. 1944, *Barker 3293* (NBG); Muizenburg, (–AB), Dec. 1894, *Guthrie s.n.* (BOL); Gifkommetjie turnoff, Cape of Good Hope Nature Reserve, (–AD), 6 Oct. 1971, *Taylor 7952* (NBG); Buffels Bay, (–AD), 8 Oct. 1966, *Taylor 6949A* (PRE); Cape Flats, Swartklip, ± 170' [51 m], (–BA), 6 Sept. 1972, *Taylor 8171* (NBG, PRE); Penhill, Eerstevier, 50 m, (–BA), 24 Oct. 1984, *Raitt 5431* (NBG); Gordon's Bay, (–BB), Dec. 1901, *Bolus s.n.* (BOL); Strand/Macassar, Somchem, 5 m, (–BB), 28 Aug. 1995, *Low 2462* (NBG). **3419** (Caledon): Onrus River, (–AC), 28 Sept. 1958, *Williams 57* (NBG). Kleinmond, (–AC), 15 Oct. 1949, *De Vos 1489* (NBG); Hermanus, Riviera, (–AC), 5 Oct. 1916, *Purcell s.n.* (SAM); road from Stanford to Gansbaai, (–CB), 21 Sept. 1938, *Gillett 4294* (BOL); Baviaansfontein Farm, ± 3.5 miles [5.6 km] E of De Kelders, (–CB), 27 Sept. 1962, *Taylor 4106* (NBG); Uilkraals River, 2 m, (–CB), 3 Nov. 1987, *O'Callaghan 3/11/2e* (NBG). **3420** (Bredasdorp): De Hoop, Potberg Nature Reserve, (–AD), 2 Aug. 1979, *Burgers 2145* (NBG). **3421** (Riversdale): Jongensfontein Farm, Stillbay, (–AD), 23 Aug. 1978, *Bohnen 3995* (NBG); Melkhoutfontein, (–BD), 7 Oct. 1897, *Galpin 3775* (PRE).

EASTERN CAPE.—**3325** (Port Elizabeth): Zwartkopsrivier, (–DC), Sept. without year, *Zeyher 1961 S11-24180* (S); Swartkops River near Port Elizabeth, (–DC), 28 Aug. 1947, *Rodin 1064* (BOL).

9b. subsp. **longiflora** *J.C.Manning & Goldblatt*, subsp. nov.

TYPE.—Western Cape, 3219 (Wuppertal): Swartruggens, Knolfontein Farm, 60 km NE of Ceres, 1 184 m, (–DC), 25 Oct. 2006, *I. Jardine & C. Jardine 562* (NBG, holo.).

Plants ± lax. *Stems* erect. *Leaves* narrowly oblanceolate, 3–5 mm wide. *Calyx* 16–18 mm long. *Carpophore* ± 10 mm long, slightly longer than capsule.

Diagnosis: distinguished by its longer calyx, 16–18 mm long.

Distribution and ecology: restricted to the Cold Bokkeveld and Cedarberg–Bidouw Mtns, occurring in sandy soils on sandstone slopes at mid-altitudes (Figure 18).

Additional specimens

WESTERN CAPE.—**3219** (Wuppertal): pass into Biedouw Valley, 6.2 miles [10 km] from Clanwilliam–Calvinia road, 1 500' [450 m], (–AA), 27 Aug. 1967, *Thompson 351 pp.* (NBG); Driehoek Valley, (–CA), 3 Oct. 1952, *Esterhuysen 20573* (BOL); Swartruggens, Knolfontein Farm, 60 km NE of Ceres, 1 185 m, (–DC), 7 Oct. 2005, *Jardine & Jardine 230* (NBG).

Silene sect. **Silene**

Annuals, with eglandular and mostly glandular hairs. *Leaves*: lowermost obovate-spathulate. *Flowers* in monochasia, with axis simple or 1–3-forked below, spreading or erect, vespertine, diurnal or cleistogamous; anthophore short, pubescent. *Calyx* pubescent to hirsute, with or without glandular hairs, 10-veined, with or without anastomosing venation, tubular to fusiform in flower, tapering apically in fruit. *Petals*: claw glabrous, not auriculate, sometimes wanting, limb entire or bifid; coronal scales present. *Stamens*: filaments glabrous or barbellate in proximal half. *Ovary* partially septate. *Capsule* oblong or ovoid-oblong. *Seeds* reniform, flanks excavate, back flat or furrowed, radially colliculate-echinulate.

± 20 spp. Circum-Mediterranean, extending to Macronesia and Pakistan; introduced elsewhere.

10. **Silene nocturna** *L.*, *Species plantarum* 1: 416 (1753). Type: 'Habitat in Italia, Pennsylvania', *Herb. Linn.* 583.8 [LINN, lecto.—digital image!, designated by Ghafoor: 91 (1978)].

Annual to 50 cm tall; stems erect, wand-like, simple or branched, 0.75–1.50 mm diam., lower parts closely puberulous with very short, spreading hairs mixed with longer hairs up to 1 mm long; upper parts of stems and inflorescences closely puberulous with very short, spreading hairs mixed with short, spreading, gland-tipped hairs. *Leaves* mostly basal, oblanceolate to spatulate-oblanceolate becoming oblong-lanceolate distally, 15–50 × 5–15 mm, apiculate or obtuse, base narrowed in lower leaves, ± densely pubescent with ± appressed hairs, mixed on upper leaves with gland-tipped hairs, margins towards base ciliate with hairs to 1 mm long, without evident side veins. *Inflorescence* a second, spike-like monochasium terminating main stems and branches, (3–)5–8-flowered, lower flowers remote; bracts smaller than leaves, unequal, fertile bract linear to awl-shaped, densely puberulous with gland-tipped hairs mixed with acute, eglandular hairs; pedicels up to 12 mm long in lower flowers and elongating to 35 mm long in fruit, mostly 3–4 mm long in upper flowers or more rarely upper flowers sessile, lowermost pedicels sometimes patent or deflexed in fruit. *Calyx* narrowly urn-shaped in flower, 9–12 × 2.0–2.5 mm at anthesis, equally 10-veined, reticulately veined in distal half, densely adpressed-puberulous with slightly longer hairs 0.5 mm long on veins, lobes narrowly triangular-lanceolate, ± 2 mm long, densely ciliate. *Flowers* suberect at anthesis, unscented, nocturnal or cleistogamous. *Petals* pink, claw 6–8 mm long, oblong but narrowed below, without auricles, limb bifid or emarginate, 1.5–4.0 × 1.5–4.0 mm, coronal scales 0.25–0.50 mm long. *Stamens* filaments unequal, 5–7 mm long, shorter series shortly included, longer series shortly exerted. *Ovary* pyriform, ± 4 mm long; styles ± 2 mm long, deeply included. *Capsule* ovoid, 6–8 × 4 mm, ± 4–5 × longer than carpophore, minutely transversely rugulose; carpophore ± 1.5–2.0 mm long, pubescent. *Seeds* 0.5–1.0 mm, reniform with hilar notch, reddish brown, face excavate-auriculate, testal cells radially elongated-fusiform, colliculate, back broad with narrow, tuberculate groove. *Flowering time*: (Jun.–)Aug.–Nov. Figures 1C, D, 19.

Vernacular name: Mediterranean catchfly.

Ecology and distribution: widespread through the Mediterranean, extending to Portugal and Northern Spain; introduced and established in western Australia and an occasional introduction in the southwestern Cape, where it has been recorded mainly from the Cape Peninsula but also from Bredasdorp, with a recent record from Sardinia Bay west of Port Elizabeth (Figure 20). The species appears to be restricted to disturbed ground and roadsides.

The species was first collected in South Africa under the name *Silene ?pendula* *L.* by Carl Thunberg (Table 1), who travelled in the country from 1772 to 1774. Another early South African record of *Silene nocturna* that we have seen was made by Carl Zeyher (*Zeyher 1960*) in the mid-nineteenth century, somewhere in the vast tract of country between Malabarshoogde [near

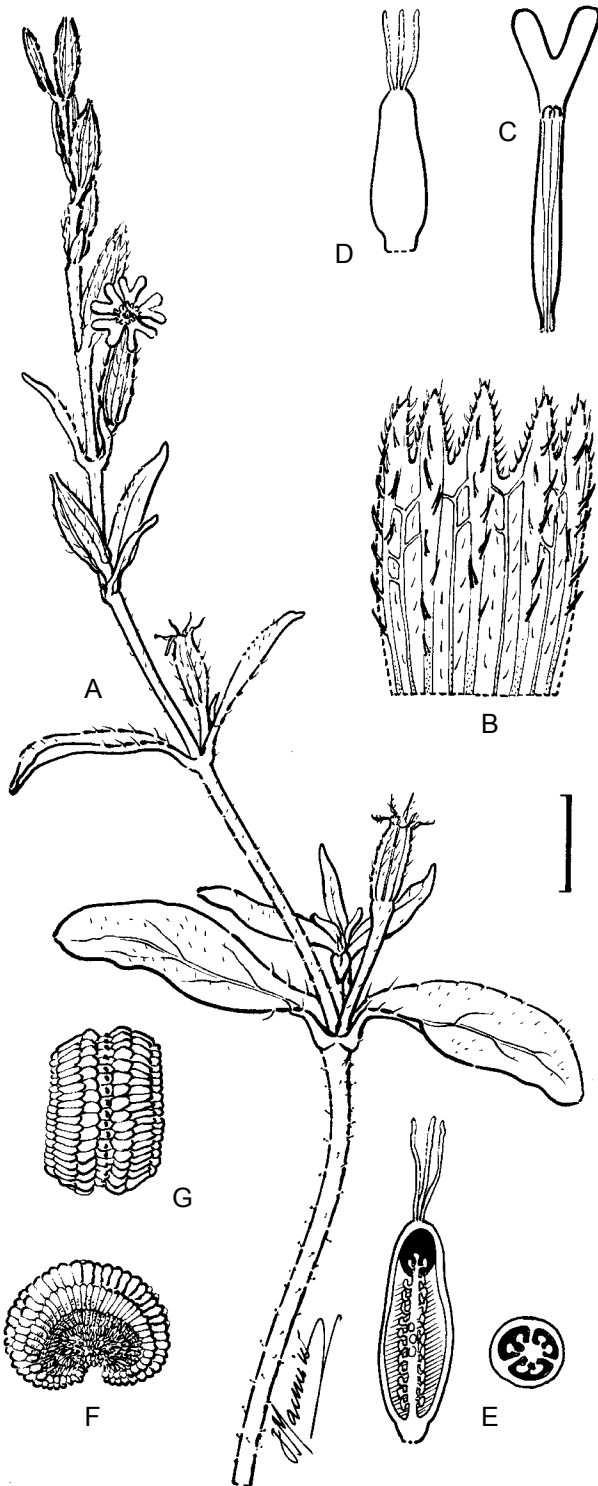


FIGURE 19.—*Silene nocturna*, Sardinia Bay, Goldblatt & Porter 13661. A, flowering stem; B, calyx laid out; C, petal; D, gynoecium; E, gynoecium 1/5 and 1/5; F, seed side view; G, seed dorsal view. Scale bar: A, 10 mm; B, 5 mm; C, D, 2.5 mm; E, 2 mm; F, G, 0.5 mm. Artist: John Manning.

Queenstown in Eastern Cape] and Hessaquaskloof [near Rivieronderend in Western Cape]. The next collection, from Wynberg Hill, dates from the end of the nineteenth century. Certainly, within two decades of this latter collection, the species was being found at several other localities around the Peninsula but has so far failed to establish itself as invasive. These early collections were

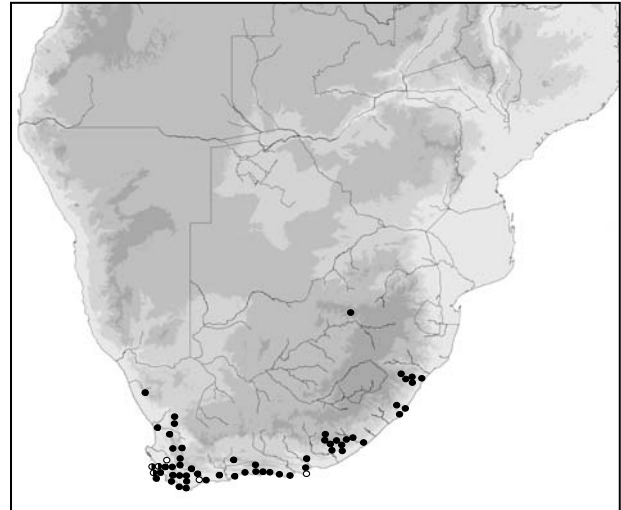


FIGURE 20.—Recorded southern African distribution of *Silene gallica*, ●; *S. nocturna*, ○.

misidentified as either *S. gallica* or *S. clandestina* [now *S. aethiopica*] or were left unnamed.

Diagnosis and relationships: the occurrence of *Silene nocturna* in southern Africa has been overlooked until now due to confusion with *S. gallica*, another introduced annual. The two species are superficially similar vegetatively and can be confused as herbarium specimens, although *S. nocturna* usually has more slender and lax flowering stems, typically with the lowermost flowers on long pedicels up to 35 mm long in fruit. They are best distinguished by details of stem vestiture, and especially by their flowers and seeds. Both species have a mixture of short and long eglandular hairs on the lower portions of the stem but in *S. gallica* the longer hairs are distinctly shaggy and 1–2 mm long, whereas in *S. nocturna* they are shorter and at most up to 1 mm long. The flowers of *S. nocturna*, as the name suggests, are typically nocturnal with distinctly bilobed petals (Figure 19C), and the calyx is appressed-puberulous, without gland-tipped hairs and with only slightly longer hairs on the veins (Figure 19B). *S. gallica*, in contrast, has diurnal flowers with distinctive, unlobed petals (Figure 21C), and a glandular-haired calyx with characteristic glassy bristles 2–3 mm long on the veins (Figure 21B). Both species have seeds with deeply excavated flanks but differ in detail: seeds of *S. nocturna* have spreading, almost wing-like shoulders with a narrowly grooved back (Figure 1C, D, 19F, G), and those of *S. gallica* have rounded, unwinged shoulders and a flat or slightly concave back (Figure 1E, F, 21G, H).

Additional specimens

WESTERN CAPE.—**3318** (Cape Town): mountain side above Clifton, (–CD), Aug. 1913, *Kensit s.n.* (BOL); Cecilia boundary, (–CD), 16 Sept. 1945, *Levyns 17426* (BOL); Rondebosch, (–CD), Sept. 1902, *Anon STE 13264* (NBG); Cape Peninsula, between Bishopscourt and Kirstenbosch, (–CD), 3 Oct. 1951, *Salter 9048* (BOL); Bishopscourt, (–CD), Nov. 1951, *Pillans 10646* (MO); Paradise Estate, N slopes of Wynberg Hill, (–CD), Sept. 1918, *L. Bolus s.n.* (MO); Suider Paarl, (–DB), Aug. 1917, *Roberts & Adendorf 17671* (PRE); Tygerberg Nature Reserve, (–DC), 6 Sept. 1975, *Loubser 3380* (NBG); Sept./Oct. 1976, *Loubser 3384* (PRE). **3418** (Simonstown): Wynberg Hill, (–AB), 8 Nov. 1896, *Wolley Dod 1817* (BOL); E slopes of Vlaggenberg [Vlakkenberg], 19 Sept. 1915, *Pillans 2832* (BOL). **3420**

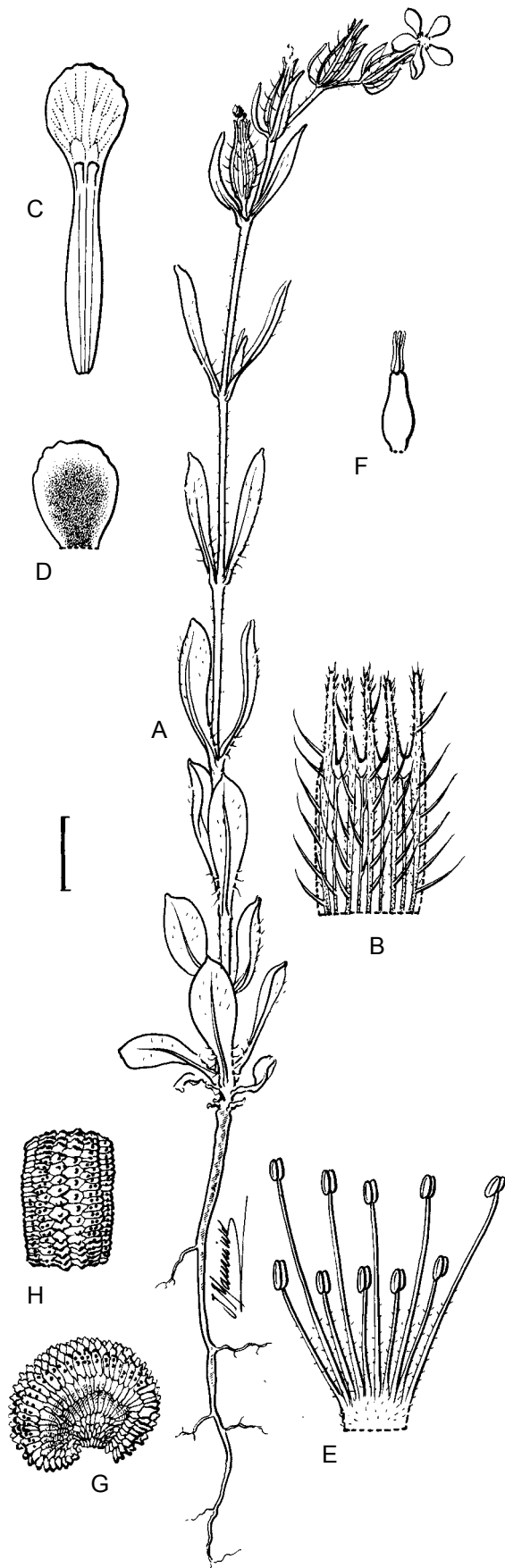


FIGURE 21.—*Silene gallica*, Kleinmond, without voucher. A, flowering plant; B, calyx laid out; C, petal; D, petal limb [var. *quinquevulnera*]; E, androecium laid out; F, gynoecium; G, seed side view; H, seed dorsal view. Scale bar: A, 10 mm; B, 5 mm; C–F, 2.5 mm; G, H, 0.5 mm. Artist: John Manning.

(Bredasdorp): De Hoop, flats in Grootwildkamp, (–AD), 2 Aug. 1979, *Burgers 2144* (NBG).

EASTERN CAPE.—3425 (Skoenmakerskop): Sardinia Bay, road side at Loerie road intersection, (–BA), 18 Sept. 2010, *Goldblatt & Porter 13661* (MO, NBG). *Locality uncertain*: South Africa, between Malabarshoogde and Hessaquaskloof, Sept. [without year], *Zeyher 1960 S11-24179* [left hand specimen] (S).

11. *Silene gallica* L., *Species plantarum*: 417 (1753), nom. cons.; *Sond.*: 127 (1860). Type: ‘Habitat in Gallia’, *Herb. Linn.* 583.11 [LINN, lecto.—digital image!, designated by Greuter: 102 (1995a)].

Silene anglica L.: 416 (1753), nom. rej. in favour of *S. gallica* L. *S. gallica* var. *anglica* (L.) W.D.J.Koch: 109 (1843). Type: ‘Habitat in Anglia, Gallia’, *Herb. Linn.* 583.1 [LINN, lecto., designated by Talavera & Muñoz Garmendia: 498 (1989)].

[see Chater & Walter (1964) and Greuter (1997) for additional heterotypic synonyms].

Annual to 40 cm tall; stems ascending or erect, simple or well-branched from base and above, 0.75–3.00 mm diam., lower parts closely puberulous with very short, ± deflexed or spreading hairs mixed with longer, shaggy, spreading or upcurved hairs 1–2 mm long but later glabrescent; upper parts of stems and inflorescences closely puberulous with very short, ± deflexed or spreading hairs mixed with short, spreading, gland-tipped hairs, inflorescence axis especially densely glandular-pubescent. *Leaves* oblanceolate to spatulate-oblanceolate becoming oblong-lanceolate distally, 15–50 × 4–15 mm, apiculate, base narrowed in lower leaves, sparsely or densely pubescent with erect or ± appressed hairs, mixed on upper leaves with gland-tipped hairs, margins towards base ciliate with long, straggling hairs to 3 mm long, without evident side veins. *Inflorescence* a second, spike-like monochasium terminating main stems and branches, (4–)8–15(–20)-flowered, lower flowers often remote; bracts smaller than leaves, unequal, fertile bract linear, sterile bract larger and more leaf-like, densely puberulous with gland-tipped hairs mixed with acute, eglandular hairs; pedicels mostly up to 3 mm long in lower (rarely up to 12 mm long in lowermost flower developed in axil of upper most leaf) but upper flowers subsessile. *Calyx* sub-cylindrical in flower, 8–10 × 1.5–2.0 mm at anthesis, equally 10-veined without reticulate venation, densely puberulous with mix of gland-tipped and acute hairs and with conspicuous, glassy bristles 2–3 mm long on veins, lobes awl-like, 2–3 mm long. *Flowers* suberect at anthesis, unscented, diurnal. *Petals* longitudinally twisted and propellar-like, white or pink, sometimes with large crimson blotch or stain, claw 6–8 mm long, oblong, without auricles, limb obovate or oblong, minutely crenulate, unlobed, 1.5–4.0 × 1.0–2.5 mm, coronal scales ± 1 mm long. *Stamen* filaments unequal, shorter series ± 4–6 mm long, included, longer series ± 7–9 mm long, exerted up to 2 mm, puberulous. *Ovary* pyriform, ± 2 mm long; styles ± 1.5 mm long, deeply included. *Capsule* ovoid, 6–8 × 4–5 mm, ± 6–8 × longer than carpophore, minutely transversely rugulose; carpophore ± 1 mm long, pubescent. *Seeds* 0.7–1.0 mm, reniform, greyish brown, face concave-excavate, testal cells radially elongated-fusiform and mostly 2–4 granulate, back flat or weakly concave, tuberculate. *Flowering time*: (Jun.–)Aug.–Nov. in the southwestern and south-

ern Cape; Sept.–April in the summer-rainfall region. Figure 1E, F, 21.

Vernacular names: small-flowered catchfly, gunpowder weed (Sonder 1860), joppies (*Hanekom 1005*), hardebolkeiltjies [hardebolletjies] (*Wagner s.n. STE16912*).

Distribution and ecology: native through Europe and western Asia; now introduced as a weed into many parts of the world, and well established in South Africa, mainly in the winter-rainfall region, where it is most common in the southwestern Cape, ranging northwards onto the Bokkeveld Escarpment and the Kamiesberg in central Namaqualand, and eastwards along the Eastern Cape coast to Grahamstown and East London, with isolated records further north, in southern and central KwaZulu-Natal and Potchefstroom (Figure 20); it is also recorded from the highlands of east tropical Africa in Kenya, Tanzania, and Uganda (Turrill 1956a). *S. gallica* typically occurs as a weed of agricultural lands and in waste places, along roadsides, and in other disturbed sites, but in some places has also invaded more open native vegetation that has been subjected to light disturbance, such as trampling and grazing.

The species was already established in South Africa by the late eighteenth century, when it was encountered here by Carl Thunberg, who travelled in the country from 1772 to 1774. Another early collection made near Port Elizabeth by Ecklon in the 1830s was misidentified as *S. cernua* Thunb., a later synonym of *S. aethiopica* Burm.

Diagnosis and relationships: an erect or somewhat spreading, rarely ±prostrate annual with obovate-spathulate lower leaves, densely glandular-puberulous on the upper parts of the stem and on the inflorescence, and highly characteristic flowers with ± entire petals. The calyx is ± tubular at anthesis with distinctive glassy bristles 2–3 mm long on the veins, and the urn-shaped capsule, 6–8 mm long, is carried on a very short carpophore, ± 1 mm long. The styles are very short, ± 1.5 mm long.

The seed testal cells are radially elongated on the flanks, which are deeply excavated, and each cell is ornamented with a single series of 2–4 granules (Figure 1E). A double series of cells along the midline demarcates the flat or weakly convex seed back (Figure 1F).

Minor variants have been distinguished in the past, based on branching, flower colour, petal shape, and differences in capsule orientation (Greuter 1995a) but only the striking colour form, var. *quinquevulnera*, is recognized here. This variant cannot be distinguished from the typical form on any other grounds and identification of herbarium specimens depends on colour notes on the collecting labels or on residual coloration of the petals. Both varieties are sometimes represented on a single herbarium sheet. A second variety, var. *anglica*, was listed by Sonder (1860) as applying to more highly branched and spreading plants but as far as we can tell this is purely a manifestation of growing conditions and has no taxonomic value at all.

11a. var. *gallica*

Petals uniformly white to pink. Figure 21C.

Distribution: as for species (Figure 20).

11b. var. *quinquevulnera* (L.) W.D.J.Koch, *Synopsis florae germanicae et helveticae*, ed. 2: 109 (1843); Sond.: 127 (1860). *Silene quinquevulnera* L.: 416 (1753). Type: 'In Lusatia, Italia, Gallia', *Herb. Burser XI*: 72 [UPS, lecto., designated by Talavera & Muñoz Garmendia: 409 (1989)].

Petals with large crimson spot or staining in centre of petal limb. Figure 21D.

Distribution: this variant occurs mainly in the southwestern Cape, extending into the Eastern Cape as far as Grahamstown (Figure 20), but has not been recorded further east or north in southern Africa, nor from tropical Africa (Turrill 1956a; Wild 1961). It occurs mixed with the typical variety, usually in the minority.

Additional specimens

*Collections comprising or including individuals of var. *quinquevulnera*.

NORTH-WEST.—2627 (Potchefstroom): Potchefstroom, (–AC), 10 Oct. 1903, *Burt Davy 1761* (NH).

KWA-ZULU NATAL.—2930 (Pietmaritzburg): Lidgetton, (–AC), 1 April 1917, *Mogg 624* (BOL); Lions River Dist., Umgeni above Midmar, (–AC), 13 Oct. 1964, *Moll 1246* (NU); Pietmaritzburg, (–CB), Sept. 1946, *Huntley 51* (NH, NU); 1968 [without month], *Garrett 76* (NU); Inchanga, (–DA), Sept. 1955, *Alexander 14* (NU); Umlaas Road, (–DA), 4 Sept. 1981, *Manning 18* (NU); Botha's Hill, (–DC), 30 Sept. 2003, *Styles 1597* (NU). 2931 (Stanger): Durban flat, (–CC), Sept. 1883, *Wood 2245* (NH). 3029 (Kokstad): Harding, Farm Bedford, (–DB), 28 Sept. 1963, *Lennox s.n.* (NU). 3030 (Port Shepstone): St Michaels-on-Sea, (–CD), 10 Oct. 1973, *Mogg 38284* (NH). 3130 (Port Edward): Port Edward, (–AA), without date or collector, *NU2490/3* (NU). Imprecise locality: Natal, received Feb. 1884, *Wood 1932* (BOL).

NORTHERN CAPE.—3017 (Hondklipbaai): Kamiesberg, Skilpad Wildflower Reserve, (–BB), 29 Sept. 1995, *Cruz 120* (NBG). 3119 (Calvinia): top of Vanrhyns Pass, (–AC), 1 Oct. 1947, *Compton 2867* (NBG); Oorlogskloof Nature Reserve, (–CA), 16 Oct. 1996, *Pretorius 394* (NBG).

WESTERN CAPE.—3118 (Vanrhynsdorp): Gifberg, (–CD), 16 Sept. 1911, *Phillips 2490* (NBG). 3218 (Clanwilliam): Clanwilliam, Olifants River Dam, (–BB), 10 Sept. 1949, *Barker 5737* (BOL, NBG). 3219 (Wuppertal): Cold Bokkeveld, Ondertuin, (–CC), 20 Dec. 1980, *Hanekom 2610* (PRE); Cold Bokkeveld, Skoongesig, (–DC), 4 Nov. 1967, *Hanekom 1005* (NBG, PRE). 3318 (Cape Town): Signal Hill, (–CD), Sept. 1887, *Thode 9236* (NBG); Cape Town, slopes above De Waal Drive, (–CD), 26 Oct. 1928, *Gillett 1819** (NBG, PRE); slopes of Table Mt above Cape Town, (–CD), 26 Oct. 1928, *Hutchinson 997** (BOL); E slopes of Lions Head, (–CD), Sept. 1913, *Kensit s.n. BOL45322* (BOL); Raapenberg, (–CD), Dec. 1890, *Guthrie 840* (BOL); near Rondebosch, (–CD), 8 Sept. 1895, *Wolley Dod 96** (BOL); Rondebosch, (–CD), 7 Aug. 1938, *Adamson 1926* (BOL); Kuils River, Langverwacht, (–DC), 26 Oct. 1971, *Oliver 3708* (NBG); Jonkershoek, Bosboukloof, (–DC), Oct. 1967, *Kerfoot 6080* (PRE); Bonterivier Farm, SW of Stellenbosch, (–DD), 6 Oct. 1989, *Buy's 56** (NBG); Stellenbosch, Voëltjiesdorp, (–DD), 10 Sept. 1978, *Boucher 3928** (NBG); Stellenbosch, (–DD), 19 Sept. 1966, *Taylor 6888** (PRE, NBG). 3319 (Worcester): Ceres, Bokkerivier Farms, (–AD), 19 Nov. 1963, *Booyesen 95* (NBG); Worcester High School, (–CB), 18 July 1980, *Walters 2078* (NBG); Worcester, Langerug Koppie, (–CB), 24 Aug. 1977, *Walters 1880* (NBG). 3320 (Montagu): Cogmans Kloof, (–CC), 18 Oct. 1964, *Bayliss 2429* (NBG). 3418 (Simonstown): Fishhoek, (–AB), July 1918, *Pahe s.n. BOL45321* (BOL); Noordhoek, (–AB), Sept. 1937, *Eames s.n. BOL45325* (BOL); Kommetjie vlei, Farm Imhoffs Gift, (–AB), *Davies 21* (NBG, PRE); 5 km from Hout

Bay, (–AB), 14 Oct. 1980, *Davies 40** (NBG); Faure, (–BA), 14 Sept. 1946, *Jordaan s.n. STE2490** (NBG); Somerset West, (–BA), 10 Aug. 1944, *Parker 3898** (BOL, NBG); Betty's Bay, Harold Porter Botanic Reserve, (–BD), 11 Sept. 1968, *Ebersohn 52/68** (NBG); Kogelberg State Forest, along road near 2nd dwelling, (–BD), 29 Nov. 1991, *Kruger 102* (NBG). **3419** (Caledon): Caledon, Zwartberg [Swartberg], (–AB), 30 Sept. 1980, *Hilliard & Burt 13068* (NU); Palmietrivier near Kleinmond, (–AC), Sept. 1930, *Rossouw s.n. NBG11240* (NBG); ± 3 km from Greyton on Genadendal Road, (–BA), 29 Sept. 1997, *Meyer 1402** (PRE); 5 miles [8 km] NW of Riviersonderend, (–BB), 18 Sept. 1949, *Heginbotham 100* (BOL, NBG); Napier, (–BC), Jan. 1937 [fruiting], *Jordaan 834* (NBG); Caledon/Napier road ± 1 km E of Stanford/Rietpoel crossroads, (–BD), 25 Aug. 1995, *Paterson-Jones 565* (NBG); Fairfield Farm, (–BD), 3 Oct. 1994, *Kemper IPC657* (NBG); Groot Hagelkraal, (–DA/DC), 25 July 1995, *Paterson-Jones 470* (NBG); Bredasdorp, Anyskop, (–DD), Jan. 1937 [fruiting], *Jordaan 137* (NBG). **3420** (Bredasdorp): Swellendam, (–AB), 25 Aug. 1956, *Theron 2052* (BOL); Potberg, (–BC), 20 Aug. 1980, *Burgers 2484* (NBG).

EASTERN CAPE.—**3226** (Fort Beaufort): Cold Springs, (–BA), 9 Oct. 1983, *Jacot Guillarmou 9245* (PRE); Grahamstown, (–BC), Oct. 1888, *Galpin 227* (PRE); Grahamstown Memorial Garden, (–BC), 9 Oct. 1988, *Jacot Guillarmou 10120** (PRE); Port Alfred, (–DB), 28 Sept. 1918, *Britten 806* (PRE); Fort Hare Farm, (–DD), 11 Aug. 1978, *Gibbs Russell 4382* (PRE). **3227** (Stutterheim): Albany, (–AC), 6 Nov. 1965, *Bayliss 2998* (NBG); Albany Dist., Howison's Poort, (–AC), 16 Oct. 1966, *Bayliss 3645* (NBG); Fort Cunyngnam, (–AC), Sept. 1897, *Sim 968* (NU), *2181* (PRE); cultivated ground near Komgha, (–BD), Nov. 1891, *Flanagan 1181** (BOL, PRE); Grahamstown, Settler's Monument, (–BC), 5 Oct. 2004, *Ramdhani 496* (NH); Stutterheim Dist., Kologh State Forest, (–CB), 7 Dec. 2001, *Klein 78** (PRE); King Williamstown, (–CD), Nov. 1891, *Sim 971* (NU); East London, (–DD), Oct. 1963, *Bokelmann 8* (NBG). **3228** (Butterworth): Kentani, (–CB), 19 Oct. 1906, *Pegler 1412* (PRE). **3322** (Oudtshoorn): Basosrus, upper Cango Valley, (–AC), 4 Nov. 1974, *Moffett 434* (NBG). **3323** (Willowmore): near Avontuur, (–CA), Nov. [without year], *Bolus 2259* (BOL). **3325** (Port Elizabeth): Zuurberg Mountains, (–BC), 10 Oct. 1975, *Bayliss 7114** (NBG); Uitenhage Dist., sandy hills near the Zwartkop River, (–DC), Aug.–Oct. [without year], *Ecklon 431* (BOL, NBG); Port Elizabeth, (–DC), July 1942, *Cruden 448* (BOL); 15 Sept. 1982, *Immelman 353* (PRE); Red House, (–DC), Sept. 1914, *Paterson 16232* (PRE). **3421** (Riversdale): Reisesbaan siding, (–AB), 28 Aug. 1979, *Bohnen 6351* (NBG). **3422** (Mossel Bay): road from Kleinbrakrivier to Gannakraal along Moordkuilrivier valley, (–AA), 19 Oct. 1990, *Joffe 878* (NBG); Pinedew farm, E of Wilderness, (–BA), 7 Nov. 1979, *Hugo 1926* (NBG). **3423** (Knysna): Knysna, Belvedere, (–AA), 9 June 1921, *Duthie s.n. STE29219* (NBG); Plettenberg Bay, (–AB), Sept. 1921, *Smart sub Rogers 15459* (PRE); Ratels Bosch, (–BA), June 1908, *Fourcade 282* (BOL). **3424** (Humansdorp): Witte Els Bosch [Witelsbos], (–AA), Nov. 1922, *Fourcade 2411** (BOL, NBG); Humansdorp, (–BB), June 1932, *Wagner s.n. STE16912* (NBG); Humansdorp Dist., Modderfontein, (–BB), 19 Feb. 1932 [cult. Ondersterpoort], *Steyn s.n.* (PRE); Jeffrey's Bay, (–BB), 17 Dec. 1956, *Taylor 5154* (NBG).

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