FLORA OF SOUTHERN AFRICA

VOLUME 31

Editor O. A. Leistner

Part 1 RUBIACEAE

Fascicle 2 Rubioideae (Second part)

Paederieae, Anthospermeae, Rubieae

by C. Puff

Botanical Research Institute
Department of Agriculture and Water Supply
Republic of South Africa

FLORA OF SOUTHERN AFRICA

All contributions should be compiled in accordance with the Guide to Contributors to the Flora of Southern Africa (compiled by Ross, Leistner & De Winter) which is available from the Librarian, Botanical Research Institute, Private Bag X101, Pretoria, 0001.

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FLORA OF SOUTHERN AFRICA

VOLUME 31

PART 1, FASCICLE 2

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FLORA OF SOUTHERN AFRICA

which deals with the territories of

SOUTH AFRICA, CISKEI, TRANSKEI, LESOTHO, SWAZILAND, BOPHUTHATSWANA, SOUTH WEST AFRICA/NAMIBIA, BOTSWANA AND VENDA

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Edited by

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1986

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INTRODUCTION

For a key to the families and the genera not keyed out in this fascicle, the Flora should be used in conjunction with R. A. Dyer's Genera of Southern African Flowering Plants, Vol. 1 (1975) and Vol. 2 (1976), which are arranged on the lines of the Engler system. The genera are numbered, as far as possible, according to the list published by De Dalla Torre and Harms in their Genera Siphonogamarum (1900–1907) in order to facilitate reference, though genera in the Flora are not necessarily arranged in this sequence.

The following condensed abbreviations for literature references are used in this Flora but not necessarily in the present fascicle:

C.F.A.	Conspectus Florae Angolensis
R. A. Dyer, Gen. ...	The Genera of Southern African Flowering Plants by R. A. Dyer. Vol. 1 (1975) and Vol. 2 (1976)
F.C.	Flora Capensis
F.C.B.	Flore du Congo et du Rwanda-Burundi
F.S.W.A.	Prodromus einer Flora von Südwestafrika
F.T.A.	Flora of Tropical Africa
F.T.E.A.	Flora of Tropical East Africa
F.W.T.A.	Flora of West Tropical Africa
F.Z.	Flora Zambesiaca
Burtt Davy, Fl. Transv.	Manual of the Flowering Plants and Ferns of the Transvaal and Swaziland, Vol. 1 (1926) and Vol. 2 (1932).

Localities are sometimes referred to in terms of the degree reference system (Leistner & Morris in Ann. Cape Prov. Mus. 12: 1–565; 1976).

Cited voucher specimens given without indication of herbarium are housed in PRE (National Herbarium, Pretoria).

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Volume 31 of the Flora, of which the present publication is a component, will appear in parts of which the first is divided into fascicles (see p. ix). The number of the part, which in the present publication is '1', and the number of the fascicle, namely '2', precede the page number on all pages marked with Arabic numerals. This was done with a view to compiling a combined index to the entire volume.

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Part 5: Astereae
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Fascicle 2: *Gnaphaliinae (First part)* (Published 1983). Price: R13,70. Other countries: R16,20
Part 8: Heliantheae, Eupatorieae
Part 9: Senecioneae

Tribe PAEDERIEAE

by C. PUFF*

Paederieae *DC.*, Prodr. 4: 343 & 470 (1830); Puff in Bot. J. Linn. Soc. 84: 371 (1982).

Shrubs, dwarf shrubs or perennial herbs, often fetid. *Flowers* ♂, occasionally also ♀; corolla cylindrical to campanulate; filaments inserted above middle of corolla tube; disk present; ovary 2–5-locular, each locule with a single basally attached anatropous ovule. *Fruit* fleshy to dry, indehiscent or variously dehiscent. *Seed* with membranous testa and copious endosperm, remaining enclosed in endocarp. *Chromosome numbers*: x = 11 (2n=22, 44 in the Flora area).

A tribe centred in the northern hemisphere; only two genera (three infrageneric native taxa) occur in Africa south of the Sahara [see Puff in Bot. J. Linn Soc. 84: 355–377 (1982) for details].

Key to genera

1a Climbing shrubs; leaves petiolate, elliptic to ovate, longer than 40 mm; fruits with a shiny papery exocarp and 2 laterally compressed, winged, glabrous pyrenes ..... **Paederia** (below)

1b Many-stemmed, intricately branched shrubs or dwarf shrubs; leaves subsessile, linear to ± elliptic, shorter than 15 mm; fruits (tardily) dehiscing into 2 mericarps with long whitish hairs..... **Crocyllis** (p.1,2: 3)

8430 PAEDERIA

Paederia *L.*, Mant. Pl. 1: 7, 52 (1767), nom. conserv.; R.A. Dyer, Gen. 1: 621 (1975); Verdc. in F.T.E.A. Rubiaceae 1: 175 (1976). Type species: *P. foetida* L.

Hondbessen Adans., Fam. Pl. 2: 158 (1763), nom. rej.

Lygodisodea Ruiz & Pav., Prodr. 32, t.5 (1794).

Lecontea A. Rich. ex DC., Prodr. 4: 470 (1830); A. Rich. in Mém. Rubiac. 115 (1830) & Mém. Soc. Hist. nat., Paris 5: 195 (1834).

Siphomeris Boj., Hort. Maurit. 170 (1837), nom. superfl.

Shrubs, mostly climbing, fetid. *Leaves* usually petiolate; stipules entire, ± triangular, deciduous. *Flowers* in axillary or terminal thyrsic inflorescences, or solitary. *Calyx*: lobes 4–5, persistent. *Corolla*: tube cylindrical to narrowly campanulate, often hairy inside, base often splitting into 4–5 parts; lobes 4–5, shorter than tube, valvate in aestivation. *Stamens* 4–5, inserted near or at mouth of corolla tube; anthers included or exserted and often at different heights; filaments short. *Ovary* 2–3-locular, with a solitary erect ovule in each chamber, crowned by a small disk; styles filiform, free or joined; stigma lobes 2–3, filiform. *Fruit* subglobose to compressed-ovoid or -ellipsoid; exocarp thin, papery and brittle, at length breaking open and falling off, exposing 2–3 round to elliptic, laterally compressed and often distinctly winged 1-seeded pyrenes which are pendulous from a detached, persistent median vein. *Seed* compressed, similar in shape to unwinged part of pyrene; testa thin; endosperm copious; embryo large, with conspicuous cordate cotyledons. *Chromosome number*: 2n=44 (tetraploid).

A tropical to subtropical genus of c. 50 species; only two taxa are native to Africa and only one subspecies reaches Southern Africa.

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* University of Vienna, Austria.

Financial support from The Department of Agriculture and Water Supply (Research Fellowship) and the Hochschuljubiläumsstiftung der Stadt Wien is acknowledged.

FIG. 1.—**Paederia bojeriana** subsp. **foetens:** 1, part of plant, × 0,7; 2, node with stipule, × 2,1; 3, bud, × 2,1; 4, flower × 2,1; 5, opened bud, × 2,9; 6, immature fruit with persistent calyx lobes, × 1,4; 7, part of fruiting branch, note exocarp covering pyrenes (right), × 1,4; 8, winged pyrene, dorsal side, × 2,1 *(Obermeyer* 676).

Paederia bojeriana *(A. Rich.) Drake* in Grandidier, Hist. Madag. 36, Hist. Nat. Pl. t. 412/a (1897); Verdc. in F.T.E.A. Rubiaceae 1: 176 (1976), as *bojerana*. Type: Madagascar, *Bojer* (P, holo.).

Lecontea bojerana A. Rich. ex DC., Prodr. 4: 470 (1830); A. Rich. in Mém. Rubiac. 115, t.10/1 bis (1830) & Mém. Soc. Hist. nat., Paris 5: 195, t.20/1 bis (1834).

Paederia ligun Sweet, Hort. Brit., App. 487 (1827), nom. nud. *Siphomeris ligun* (Sweet) Boj., Hort. Maurit. 170 (1837), nom. superfl.

subsp. **foetens** *(Hiern) Verdc.* in Kew Bull. 30: 285 (1975). Syntypes: Mozambique, north of Sena, N'Keza and by the Shire R. about the cataracts, *Kirk* (K!) & 'Zambesiland', *Stewart* (BM!).

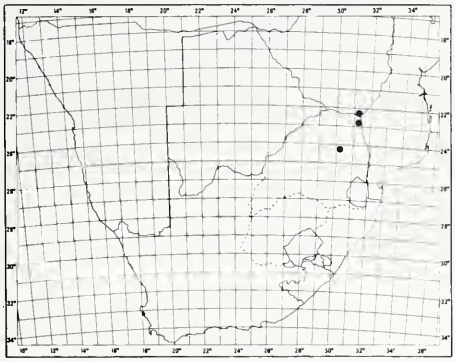
Siphomeris foetens Hiern in F.T.A. 3: 229 (1877). *Paederia foetens* (Hiern) K. Schum. in Pflanzenfam. 4, 4: 125 (1891) & in Engl. Pflanzenw. Ost-Afr. C: 393 (1895).

Shrub, climbing, fetid. *Stems* to several m long, slender and flexuous, pubescent to velvety hairy. *Leaves* decussate or in whorls of 3, petiolate; blades (30–)50–110(–140) × (30–)35–80(–110) mm, elliptic to ovate, acuminate at apex, cordate or rounded at base, somewhat pubescent above, densely velvety-tomentose beneath; petioles (15–)25–150 mm long, (velvety) pubescent; stipules to 10 mm long. *Inflorescences* mostly axillary, on stalks c. 40–130 mm long, often ± condensed and many-flowered, sometimes rather extensive; pedicels to 1 mm long. *Flowers* 5-merous. *Calyx*: lobes c. 3–8 mm long, subulate, recurved above. *Corolla* whitish to greenish yellow, somewhat pubescent outside; tube 6–10 mm long, more or less cylindrical, splitting into 5 segments near base, hairy inside at least near throat; lobes oblong-lanceolate, 3–5 × 1–2 mm, hairy inside at least near base. *Anthers* exserted. *Ovary* c. 2–3 mm long, ovoid, pubescent; style to c. 10 mm long; stigma-lobes to c. 5 mm long. *Fruit* elliptic in outline, strongly compressed, 10–12 × 8–11 mm; exocarp shiny, yellowish brown to brownish, bearing persistent calyx lobes; pyrenes slightly smaller than exocarp, conspicuously winged. *Seed* black, c. 3–6 × 3–5 mm. Fig. 1.

Subsp. *foetens* occurs from southern Tanzania to the northern and north-eastern Transvaal; growing in lowland woodland and riverine scrub. Map 1.

Vouchers: *Codd* 5344; *Obermeyer* 676.

[Subsp. *bojeriana* is confined to Madagascar, Mauritius and the Comoro Islands.]



MAP 1.—**Paederia bojeriana** subsp. **foetens**

8449 CROCYLLIS

Crocyllis *E. Mey.* [in Drège in Flora 26, Bes. Beigabe 176 (1843), nom. nud.] *ex Hook. f.* in Benth. & Hook. f., Gen. Pl. 2: 136 (1873); R. A. Dyer, Gen. 1: 623 (1975); Puff & Mantell in Bot. Jb. 103: 90 (1982). Type species: *Anthospermum crocyllis* Sond., i.e. *Crocyllis anthospermoides* E. Mey. ex K. Schum.

Gynodioecious, fetid shrub or dwarf shrub. *Leaves* decussate, subsessile, linear to ± elliptic, small; stipular sheath narrow, with a small triangular appendage on either side. *Flowers* shortly pedicellate, in clusters of several to many, terminal on new growth, ♂ (and protandrous) or ♀, 5-merous. *Stamens* inserted at throat of corolla tube. *Ovary* bicarpellate, each locule with a solitary erect ovule; style joined; stigma-lobes 2, as long as style. *Fruit* (tardily) dehiscing into 2 mericarps. *Seed* remaining enclosed in mericarp.

Monotypic. Endemic to the southern Namib Desert (southern South West Africa/Namibia and adjacent parts of South Africa) and centred in the lower Orange River valley. Without close allies in Southern Africa; related to Saharo-Sindian and Irano-Turanian taxa.

FIG. 2.—**Crocyllis anthospermoides:** 1, flowering branch, × 1; 2, node with pair of long shoot leaves and clustered short shoot leaves, × 5; 3, bud, × 5; 4, ♂ flower, × 5; 5, ♀ flower, corolla with rudimentary anthers folded open, longitudinal section of ovary, × 5; 6, fruit, × 3 (1 & 2: *Giess* 14597; 3 & 4: *Giess & Merxmüller* 14302; 5: *Puff* 780811-1/1; 6: *Leistner* 2588).

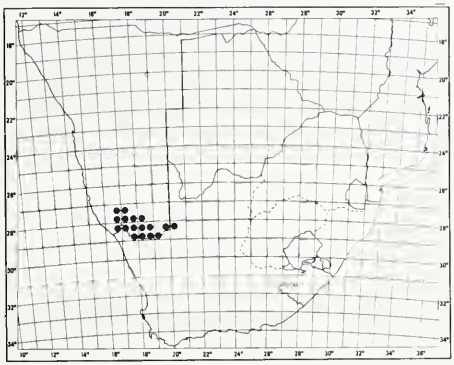
Crocyllis anthospermoides *E. Mey.* [in Drège in Flora 26, Bes. Beigabe 92–93, 176 (1843), nom. nud.] *ex K. Schum.* in Pflanzenfam. 4, 4: 132 (1891); Puff & Mantell in Bot. Jb. 103: 90 (1982). Lectotype: Cape, *Drège* s.n. (E!).

Anthospermum crocyllis Sond. in F.C. 3: 32 (1865). Lectotype: Cape, *Drège* s.n. (E!).

Crocyllis intricatissima Dinter in Feddes Reprium Beih. 53: 64 (1928), nom. nud.

Shrub, ± erect, many-stemmed, intricately branched, c. 0,6–1,5 m tall, occasionally low dwarf shrub; stems and branches whitish grey. *Leaves* on younger parts on long and short shoots, on older parts tightly fasciculate on much contracted short shoots only; blades (2–)3,5–12(–14,5) × 0,5–1(–1,5) mm, often ± round in section, fleshy, occasionally with a few short hairs, obtuse at apex. *Flowers*: calyx lobes c. (0,2–)0,4–1,1(–1,3) mm long, ± triangular, erect, usually hidden amongst ovary hairs; corolla lobes 1–2,8(–3,4) mm long, elliptic to lanceolate, ± recurved, pilose on both surfaces, tube funnel-shaped to ± campanulate, usually less than half as long as lobes; filaments 0,5–3 mm long; anthers c. 1,5 mm long in ♂ (♀ with rudimentary anthers to c. 0,5 mm long); ovary c. 0,3–0,8 mm long, densely hairy; style c. 1–2 mm long. *Fruit* 1–2(–2,5) × 0,5–1,5 mm, obovate, densely covered with long white hairs. *Chromosome number*: 2n=22 (diploid). Fig. 2.

Found on sandy flats, along ephemeral watercourses or on rocky slopes. Map 2.



MAP 2.—**Crocyllis anthospermoides**

Vouchers: *Merxmüller & Giess* 3244 (BR; M; PRE; WIND); *Schlechter* 11444 (B; BM; BOL; G; GRA; K; PRE).

The species cannot be confused with any other Rubiaceae occurring in the area. Extensively browsed plants are often low, more or less cushion-like and have spine-tipped branches (*"Crocyllis intricatissima"!*). ♀ flowers in a male state (protandry!) should not be mistaken for ♂ flowers.

Tribe ANTHOSPERMEAE

by C. PUFF*

Anthospermeae *Cham. & Schlechtd. ex DC.*, Prodr. 4: 343, 578 (1830); Puff in Bot. J. Linn. Soc. 84: 370 (1982).

Anthospermeae (as 'sectio') Cham. & Schlechtd. in Linnaea 3: 309 (1828).

Shrubs, dwarf shrubs, short-lived subshrubs or perennial herbs. *Flowers* ☿, ♂ or ♀, sexes variously distributed, plants quite often dioecious; corolla cylindrical to subcampanulate, in ☿ and ♂ always larger than in ♀; filaments inserted at base or at least below middle of corolla tube; disk absent; ovary mostly 2- or 1-locular, each locule with a single basally attached anatropous ovule; style ± 0 or very short; stigmas long, hairy. *Fruit* dry or fleshy, dehiscing into 2 mericarps or into exocarp-valves and endocarp plus seed, or indehiscent. *Seed* with membranous testa and copious endosperm, remaining enclosed in endocarp. *Chromosome numbers*: x=11 (2n=22, 44, 66 in the Flora area).

A tribe centred in tropical, subtropical and temperate regions of the southern hemisphere.

All African and Madagascan taxa belong to subtribe *Anthosperminae*, which is distinguished by *dry* fruits and unisexual and/or *protandrous* ☿ flowers.

Wind-pollination (flowers small and inconspicuous, odourless, without disk, often unisexual, anthers dangling on long, slender filiform filaments, stigmas long exserted, hairy all around, etc.) is characteristic for the entire tribe. See Puff in Bot. J. Linn. Soc. 89: 357 (1982) for further details.

Key to genera

1a Fruit separating into exocarp-valves and endocarp plus seed; flowers ☿, ♀ or (less commonly) ♂, mostly with only 1 fertile carpel and 1 stigma; corolla (4–)5–7-merous, lobes distinctly hooded; calyx lobes mostly large, leaf-like; south-western Cape only ..... **Carpacoce** (p. 1,2: 52)

1b Fruit either separating into 2 indehiscent mericarps or indehiscent; flowers ♂, ☿, ♀, sexes variously distributed, with 2 fertile carpels[1] and 2 stigmas; corolla 4–5-merous, lobes not hooded; calyx lobes mostly small or subobsolete:

2a Perennial herbs with rhizomes or rootstocks; leaves strictly decussate, blades relatively large and thin, distinctly petiolate; inflorescence terminal, paniculate to thyrso-paniculate; fruit without calyx lobes, separating into two mericarps, never supported by a carpophore [2]; south-eastern Africa..... **Galopina** (p. 1, 2: 48)

2b Large shrubs, dwarf shrubs, short-lived subshrubs or perennial herbs; leaves decussate or in whorls of 3 or 4, blades mostly small and narrow, frequently ericoid, often without distinct petioles; inflorescence mostly variously congested, frequently much reduced and inconspicuous, in dioecious taxa often dimorphic (in ♀ more conspicuous than in ♂); fruit often with small calyx lobes, separating into two mericarps and supported by a carpophore [2] or indehiscent, without carpophore:

3a Growth form variable; leaves relatively large and broad to small and ericoid, decussate or in whorls of 3 or 4; flowers ♂, ☿, ♀, sexes variously distributed; ♀, ☿ with long, cylindrical to short, broadly funnel-shaped to campanulate tubes; ♀ mostly with whitish to greyish (green) stigmas; fruit always dehiscing into two merricarps always supported by a carpophore[2]; widely distributed in Southern Africa..... **Anthospermum** (p. 1, 2: 8)

3b Many-stemmed, often intricately branched dioecious dwarf shrubs; leaves frequently ericoid, mostly decussate; ♂ flowers never with long, cylindrical tubes; ♀ mostly with reddish-purplish stigmas; fruit dehiscent or indehiscent, sometimes distinctly inflated, not always supported by a carpophore; centred in the south-western and western Cape ..... **Nenax** (p. 1, 2: 37)

* University of Vienna, Austria.

[1] Except for two *Anthospermum* species.

[2] A ±U-shaped outgrowth on a pedicel which supports the two mericarps of a fruit (see Fig. 5).

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Anthospermum *L.*, Sp. Pl. 1058 (1753), Gen. Pl., edn 5: 479 (1754); Hook. f. in Benth. & Hook. f., Gen. Plant. 2: 140 (1873); Sond. in F. C. 3: 26 (1865); K. Schum, in Pflanzenfam. 4,4: 129 (1891); R. A. Dyer, Gen. 1: 622 (1975); Verdc. in F.T.E.A. Rubiaceae 1: 324 (1976). Type species: *A. aethiopicum* L.

Ambraria Heister [Syst. Plant. 11 (1748)] ex Fabr., Enum. Meth. Plant. (Hort. Med. Helmstad.), edn 2: 435 (1763) [based on *A. aethiopicum*]; non *Ambraria* Cruse [See *Nenax*].

Large shrubs, dwarf shrubs, short-lived subshrubs or perennial herbs, ♂, ♀, ♂', ♂', + ♀, or occasionally ♂ + ♂' + ♀, ♂' + ♂' or ♂ + ♀. *Leaves* decussate or occasionally in whorls of 3 ♂ or ♂ (rarely 4), often seemingly in much larger numbers at nodes[1], blades ± broad and large to ± ericoid and small, mostly narrowed to base, acute to acuminate (seldom ± mucronate of ± obtuse) at apex, shortly petiolate to sesile, with ± cup-shaped stipular sheaths bearing one to many seae[2]or fimbriae on either side. *Inflorescence* frequently leafy and inconspicuous, made up of mostly subsessile, many- to very few-flowered cymes, in dioecious taxa often sexually dimorphic (♀ inflorescence contracted, ± cylinder-like; Fig. 3: 1,2). *Flowers* mostly subsessile, subtended by a pair of leafy bracts, ♂, ♂' or ♀, 4–5-merous. *Calyx*: lobes large, conspicuous to small, indistinct or ± lacking. ♂', ♂: *Corolla*: tube ± cylindrica, broadly funnel-shaped to subcampanulate, lobes recurved, ± lanceolate; *anthers* yellowish to whitish, exserted, dangling on long slender filiform filaments. ♀: *corolla* much smaller; tube cylindrical, lobes mostly erect, linear to ± lanceolate. *Ovary* bicarpellate and biovulate, in 2 species one carpel reduced; style 0 or very short; stigmas 2, only in *A. ericifolium* (no. 20) 1, long exserted, hairy, greyish to greenish white, seldom purplich red. *Fruit* crowned by persistent calyx lobes, supported by a ± U-shaped carpophore (Fig. 5), dehiscing into two mericarps, each convex on dorsal side, plane to concave or sometimes hollowed out and with a prominent to inconspicuous median longitudinal ridge on ventral side (Fig. 5: 6,8).*Chromosome number*: 2n=22, seldom 44, 66.

A genus of 39 species widely distributed in Africa south of the Sahara and in Madagascar. The highest concentration of taxa is found in Southern Africa; 21 species (29 taxa) occur in the Flora area, of which 18 spp. (26 taxa) are endemic; of these, 10 spp. (16 taxa) are endemic (or nearly so) to the south-western Cape Region. Map 3.

The inexperienced and those without field knowledge of the plants may often find it difficult to distinguish species from each other. Some of the reasons for this are:

— Environment-induced morphological variability. Individuals exposed to fire and capable of resprouting from a woody base often differ markedly from shrubby plants of the same taxon sheltered from fire. Browsing, especially in the drier parts of the Flora area, frequently causes considerable morphological changes.

— More widely distributed taxa often contain a number of "Forms" (in the sense of ecotypes of geographical races) which may be very distinct locally. They are, however, often connected with other "Forms" by a series of morphologically intermediate populations so that it is not possible to clearly define and delimit them or to recognize them taxonomically. The more prominent of these are pointed out in the text and included in the key [e.g. *A. galioides* subsp. *galioides* ('Papillatum Form', etc.)].

— The occurrence of characters which are constant in some but variable in other taxa. Notably the arrangement of the leaves–e.g. decussate *or* in whorls of 3 in *A. bergianum* (variable even within populations), or either strictly decussate or strictly in whorls of 3 (e.g. *A. spathulatum* vs. *A aethiopicum*). For this reason (and also in view of the variable sex distributions within a taxon; see below) taxa should be studied with care in the field and representative samples should be collected.

— The occasional occurrence of flowers 'transitional' between ♀' and 'pure' ♀. Such 'transitional' flowers have corollas *intermediate in size* between ♀' and ♀ and are characterized by the presence of small but clearly discernible, (±) pollenless *anther* rudiments (Fig. 4d–f); 'pure' ♀ with small corollas have no rudimentary anthers (fig. 4g). In some essentially dioecious taxa, ♂ flowers do occasionally revert to ♀'; in some it is only odd ♀' flowers on a single ♂ plant of a population, in others a considerable number of individuals may show this phenomenon. Also the reverse (transitions from ♀' to ♂) is possible (*Note*: the flowers are always protandrous; ♀ flowers at anthesis–i.e. with stigmas which have not yet fully elongated–should, therefore, not be confused with such transitional flowers). In both transitions ♂ → ♀' and ♀'→ ♂ there are, however, no marked corolla size and shape differences.

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[1] Due to the presence of leafy much-contracted short shoots (Fig. 3: 3,4); this situation is referred to as 'pseudoverticillate' in the key and in the descriptions.

[2] Single median setae are often flanked by a pair of minute gland-tipped setae. As the latter are often no longer discernible on older leaves/stipular sheaths, no mention is made of them in the following descriptions.

— Sex dimorphism in dioecious taxa. Differences between the sexes may go beyond corolla size and shape differences; dimorphic inflorescences are rather common (contracted and often quite conspicuous in ♀; compare Fig. 3: 1 and 3: 2); occasionally ♂ and ♀ differ somewhat in leaf size and shape. It is recommended that both ♂ and ♀ are collected whenever possible.

Because of the lack of other suitable and usable characters, it is often necessary to use calyx lobe, corolla or fruit sizes or hair lengths as differential characters. It should be noted that measurements exact to tenths of millimeters are essential for correct identifications.

In the following two regional keys taxa which may extend from one area to the other are included in both keys. Especially in the eastern Cape a considerable mixing of south-western Cape species and species centred in the summer rainfall area takes place, often making it extremely difficult to identify taxa with certainty.

KEY I

Key to taxa occurring in the Flora area excluding the Cape Floristic Region (the south-western Cape)

1a Flowers in distinct terminal thyrsic or thyrso-paniculate inflorescences (from Transkei and eastern Cape to south-western Cape) ..... 8. *A. paniculatum*

1b Flowers in clusters of many to few at nodes; in ♀ plants sometimes in ± condensed, cylindrical inflorescences:

2a Plants of coastal sand dunes; at least lower parts of stems usually buried in sand; mericarps densely covered with spreading hairs to 0,8 mm long ..... 3. *A. littoreum*

2b Habitat and habit not as above; mericarps glabrous or variously hairy, but not as above:

3a Often scrambling, straggling or trailing perennial herbs; ♀ and ♂ flowers with cylindrical corolla tube to 3,7 mm long ..... 10. *A. herbaceum*

3b Shrubs or subshrubs, erect, mat- or cushion-forming perennial herbs; ♀ and ♂ flowers with corolla tube much shorter and broader (funnel-shaped) or, if tube long and cylindrical, habit not as above:

4a Leaves densely covered with spreading hairs c. (0,1–)0,3–0,5 mm long:

5a Leaves 2,5–5(–6) × 0,8–1,2(–1,8) mm; mericarps 2–2,5 × 1–1,5 mm; dioecious, cushion- or mat-forming dwarf shrubs of high altitudes (high Drakensberg areas of Cape, Natal, Lesotho and Orange Free State) ..... 7. *A. basuticum*

5b Leaves 5–12(–20) × 1–3,5(–5) mm; mericarps 1,7–2 × 0,7–1 mm; plants not dioecious, not occurring above 2000(–2300) m (from Transvaal and Swaziland to Transkei) ..... 9. *A. hispidulum*

4b Leaves glabrous, or hairs on margins and/or midvein only:

6a Low, ± cushion-forming dwarf shrubs, rooting at nodes, occurring at high altitudes (above 2400 m; Lesotho) ..... 6. *A. monticola*

6b Growth form different, plants not rooting at nodes, confined to lower altitudes or, if at high altitudes, perennial herbs:

7a Rounded dwarf shrubs, low subshrubs or perennial herbs; mericarps roundish in side view; plants not dioecious:

8a Leaves linear to narrowly ovate-lanceolate, to 1,5(–2) mm wide; mericarps glabrous or with ± hooked or curled hairs:

9a Leaves mostly distinctly needle-like, to 0,8(–1) mm wide; often mat- or cushion-forming, very densely leafy dwarf shrubs (Natal South Coast only) ..... 12. *A. streyi*

9b Leaves to 1,5(–2) mm wide, sometimes linear but not distinctly needle-like; subshrubs with numerous unbranched stems or ± robust dwarf shrubs:

10a Mostly subshrubs with numerous unbranched stems; leaves (4–)6–12(–22) × (0,5–)0,8–1,5(–2) mm, linear to narrowly lanceolate; ♀ and ♂ flowers with corolla tube to 1,4(–1,7) mm long, lobes to 1,9(–2,5) mm long (from Transvaal to eastern and north-eastern Cape) ..... 11 (a). *A. pumilum* subsp. *pumilum*

10b Fairly robust dwarf shrubs; leaves 3–6(–8) × 1–1,5 mm, ovate-lanceolate, often tough and thickish; ♀ and ♂ flowers larger, corolla tube to 1,5(–1,9) mm long, lobes to 3(–3,2) mm long (Orange Free State and Cape excl. the south-western Cape) ..... 11 (b). *A. pumilum* subsp. *rigidum*

8b Leaves broader, often ovate or ovate-lanceolate, to 6(–10) mm wide; mericarps glabrous, ± tuberculate or papillate, but never with curled or hooked hairs:

11a Diffusely and divaricately branched robust dwarf shrubs with tough, thickish, ovate to oblong-lanceolate leaves to 4(–4,5) mm wide; fruits without ± broad, conspicuous longitudinal grooves between mericarps (Namaqualand and southern S.W.A./Namibia) ..... 15 (a). *A. dregei* subsp. *dregei*

11b Low cushion- or mat-forming perennial herbs or ± erect and tufted subshrubs; fruits mostly tuberculate and with ± broad, conspicuous longitudinal grooves between mericarps (Fig. 5:5):

12a Leaves ± succulent in nature; stipular sheaths often with only 1 seta; near the sea (Natal and Transkei) ..... 10. *A. herbaceum* ('Salt Spray Zone Form')

12b Leaves not succulent; stipular sheaths with several setae; growing at high altitudes or in (burnt) grassland:

13a Low, matted or cushion-forming perennial herbs; leaves small; partial inflorescences few- to one-flowered ..... 10. *A. herbaceum* ('High Altitude' or 'Trampled Grassland Form')

13b ± Erect, several- to many-stemmed subshrubs with ± massive, almost rosette-like ± woody base ..... 10. *A. herbaceum* ('Burnt Grassland Form')

7b Single- to several-stemmed, mostly erect shrubs to 3 m tall; mericarps elongated in side view; plants dioecious:

14a Leaves in whorls of 3 (sometimes also decussate-15b):

15a Leaves to 9(–13) mm long, strictly in whorls of 3; mericarps glabrous or papillate; ♀ plants mostly with conspicuous, condensed cylindrical inflorescences (Fig. 3.2) (south-western Cape species extending into the eastern Cape) ..... 4. *A. aethiopicum*

15b Leaves to 20(–27) mm long, sometimes also decussate; mericarps densely covered with straight hairs c. 0,1–0,2 mm long; ♀ plants mostly not with very conspicuous, condensed inflorescences (Natal to eastern Cape) ..... 2. *A. galpinii*

14b Leaves decussate:

16a Leaves (0,5–)0.8–1,5(–2) mm wide, narrowly oblanceolate to ± linear; mericarps densely covered with straight hairs c. 0,1–0,2 mm long ..... 2. *A. galpinii*

16b Leaves wider or, if linear (-lanceolate), mericarps not shortly hairy:

17a Leaves (7–)10–35 × (1–)1,5–3,5 mm, oblanceolate to elliptic; stipular sheaths with 3–5(–7 or 8) setae; ♀ plants mostly with conspicuous, condensed cylindrical inflorescences usually large, single-stemmed shrubs (Transvaal; and Cape: Mafikeng?) ..... 1. *A. welwitschii*

17b Leaves (2–)3–12 × 0,5–2 mm; stipular sheaths mostly with a single median seta; ♀ plants usually not with conspicuous cylindrical inflorescences; mostly small, several- to many-stemmed shrubs:

18a Leaves (ob)ovate, oblong or (ob)ovate-lanceolate, (0,7–)1–2 mm wide; fruits with conspicuous calyx lobes 0,3–0,6(–0,8) mm long (Natal, Lesotho, Orange Free State and interior of Cape to Nieuweveld Mts) ..... 6. *A. monticola*

18b Leaves lanceolate to linear-lanceolate, 0,5–1,5 mm wide; fruits with indistinct or smaller calyx lobes:

19a Mericarps narrowly obovate to oblong, not distinctly ribbed on dorsal side, often seemingly truncate above (eastern Cape; Humansdorp distr. to Great Kei River) ..... 5(b). *A. spathulatum* subsp. *uitenhagense*

19b Mericarps broader, mostly with 3 ± distinct ribs on dorsal side and with calyx lobes to 0,4 mm long (south-western Cape taxon, extending into eastern Cape) ..... 5(a). *A. spathulatum* subsp. *spathulatum*

KEY II

Key to taxa occurring in the Cape Floristic Region (the south-western Cape)[1]

1a Leaves in whorls of 3:

2a Tall shrubs with small, ± needle-like glabrous leaves to 1,2(–2) mm wide; corolla lobes 4 (widely distributed) ..... 4. *A. aethiopicum**

2b Subshrubs or dwarf shrubs; leaves mostly ± imbricate, to 3(–3,5) mm wide, at least margins ciliate; corolla lobes 5 (south-western Cape s.str.[2]) ..... 19. *A. bergianum**

1b Leaves decussate:

3a Fruits with only 1 fertile, well developed carpel/mericarp (south-western Cape s. str.):

4a Reduced carpel with 2 calyx lobes c. 1,4–2 mm long, fertile carpel with 3 much smaller ones; leaves needle-like, to 0,5 mm wide ..... 21. *A. bicorne**

4b Calyx lobes of fertile and reduced carpel subequal, c. 0,2–0,6 mm long; leaves linear-lanceolate, to 1,2(–1,4) mm wide ..... 20. *A. ericifolium**

3b Fruits with 2 fertile carpels/mericarps:

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[1] The geographical delimitation of the Cape Floristic Region follows Bond & Goldblatt in Jl S. Afr. Bot., suppl. 13 (1984).

[2] i.e. roughly in the area from the Clanwilliam distr. south to the Cape Peninsula and to the Caledon and Bredasdorp distr.

* Taxa endemic to the south-western Cape or nearly so (i.e. sometimes extending to the eastern Cape, into the drier interior of the Cape, etc.).

5a Flowers in distinct terminal thyrsic or thyrso-paniculate inflorescences (from George distr. to eastern Cape and Transkei) ..... 8. *A. paniculatum*

5b Flowers in clusters of many to few at nodes, or (seldom) solitary and terminal; in ♀ plants sometimes in ± condensed, cylindrical inflorescences:

6a Plants prostrate (but not mat-forming), with long, trailing stems radiating out from a common base, rooting at nodes and bearing short, ascending to ± erect lateral branches, dioecious; only in coastal dune sand (from West Coast to Port Elizabeth distr.) ..... 14. *A. prostratum**

6b Growth form different, if prostrate, stems not rooting at nodes and not with short ascending to erect lateral branches, plants not dioecious:

7a Leaves, stipules and stems (or at least leaf margins near base) ± densely covered with whitish spreading hairs c. 0,2–1(–1,5) mm long; corolla 5-merous:

8a Flowers solitary and terminal on branches, often overtopped by lateral shoots arising from below; plants usually mat-forming; leaves 4–6(–7,5) × (1,4–)2–3(–4) mm, ovate to lanceolate (confined to higher parts of Cape mountains) ..... 17 (b). *A. esterhuysenianum* var. *hirsutum**

8b Flowers in axillary clusters; plants not mat-forming; leaves larger, (4–)5–25(–30) × (0,5–)0,8–3(–4,5) mm, ovate-lanceolate to linear-lanceolate:

9a Plants mostly dioecious (♂ plants occasionally with odd ♀ flowers), densely leafy; leaves mostly ± imbricate, blades (4–)5–12(–15) × (1,2–)1,5–3(–3,5) mm; ♀ plants with ± condensed cylindrical inflorescences ..... 19. *A. bergianum**

9b Plants not dioecious, not densely leafy; blades larger, (6–)8–25 × (0,5–)0,8–3(–4,5) mm; ♀ inflorescences inconspicuous ..... 18. *A. hirtum**

7b Leaves and stems glabrous, very shortly hairy or papillate; if leaves with hairs to 0,4 mm long, hairs confined to margins and corolla 4-merous:

10a Plants dioecious; ♀ plants sometimes with ± conspicuous cylindrical inflorescences:

11a Tall single-stemmed shrubs or many-stemmed dwarf shrubs; ♂ corolla tube short, to 1,2 mm long, (broadly) funnel-shaped to ± campanulate; mericarps narrow and elongated in side view, often ±triangular in section and 3-ribbed; (very variable and very widely distributed):

12a Mericarps (1,5–)1,7–2,3 × 0,6–0,8(–1) mm, ± oblong, glabrous or shortly hairy, not distinctly ribbed; ♂ corolla lobes c. 1,2–2(–2,2) mm long; leaves (2,2–)2,5–4,5(–5,2) × 0,5–1(–1,3) mm (south-western Cape s.str.) ..... 5 (e). *A. spathulatum* subsp. *tulbaghense**

12b Mericarps larger, 2,2–4,2 × 1–2,2 mm, (broadly) obovate to ± oblong, often 3-ribbed, usually glabrous; ♂ corolla lobes (1,5–)1,9–3,4 mm long; leaves (3–)3,5–18(–25) × 0,5–2,5(–3) mm:

13a Leaves 8–18(–25) × 0,5–1,8(–2,2) mm, linear-(ob-)lanceolate to linear, fine and ± needle-like; mostly single-stemmed (± narrowly) cylindrical, densely leafy shrubs c. 1–2 m tall, in habit and appearance resembling *A. aethiopicum;* ♀ plants with rather conspicuous, condensed inflorescence zones ..... 5 (d). *A. spathulatum* subsp. *ecklonianum**

13b Leaves smaller and relatively broader, (3–)3,5–12 × 0,5–2,5(–3) mm; growth form not as above, plants often smaller, single- to many-stemmed shrubs or dwarf shrubs; ♀ plants with less conspicuous condensed inflorescence zones:

14a Several- to many-stemmed low cushion- or ± mat-forming dwarf shrubs with rather tough, closely spaced leaves; partial inflorescences 3–1-flowered; mericarps mostly with conspicuous calyx lobes to 1,5(–1,9) mm long (confined to highest parts of Cape mountains) ..... 5 (c). *A. spathulatum* subsp. *saxatile**

14b Rather tall, single-stemmed shrubs or small, often several-stemmed dwarf shrubs; partial inflorescences ± many- to few-flowered; mericarps with calyx lobes to 0,6(–0,9) mm long; (variable and widely distributed) ..... 5 (a). *A. spathulatum* subsp. *spathulatum**

11b Subshrubs or low dwarf shrubs; ♂ corolla tube to 1,7(–2) mm long, ± cylindrical to narrowly funnel-shaped; mericarps broad and roundish in side view, ± semi-terete in section, never ribbed:

15a Leaf blades distinctly recurved (at least near tip); ♂ corolla lobes 1,4–2,4(–2,9) mm long; mericarps c. 2–2,4 mm long; (± widely distributed, especially in mountains) ..... 13 (b). *A. galioides* subsp. *reflexifolium**

15b Leaf blades straight (but margins revolute); ♂ corolla lobes 2,7–3,2 mm long; mericarps 2,7–3 mm long (only in the interior; often in dry, karroid valleys) ..... 16. *A. comptonii**

10b Plants not strictly dioecious; sex distributions variable (plants ♀, ♂ + ♀, ♀, etc.); ♀ plants never with conspicuous ± condensed cylindrical inflorescences:

16a Plants distinctly woody and dwarf shrubby, erect and ± cylindrical to ± rounded:

17a Leaf blades distinctly recurved (at least near tip); (± widely distributed, especially in mountains) ..... 13 (b). *A. galioides* subsp. *reflexifolium**

17b Leaf blades not distinctly recurved:

18a Fruits papillate (or occasionally shortly hairy); blades narrowly lanceolate to linear (due to strongly revolute margins), c. 5–10 × (0,5–)0,8–1,5 mm, margins glabrous (south-western Cape s.str.) ..... 13 (a). *A. galioides* subsp. *galioides** ('Papillatum Form')

18b Fruits mostly glabrous; blades broader, oblong or obovate-lanceolate (less commonly linear-lanceolate), 3–9(–12) × 1–2,5(–3) mm, margins often very shortly hairy:

19a Several-stemmed, ± erect dwarf shrubs; mericarps 2–2,6(–2,8) mm long; ♂ and ♀ corolla glabrous, lobes (1,7–)2,2–3(–3,2) mm long; (only in the Gouritz River valley) ..... 11 (b). *A. pumilum* subsp. *rigidum*

19b Often rounded, low dwarf shrubs; mericarps (1,5–)1,8–2,2 mm long; ♂ and ♀ corolla mostly a little hairy outside, lobes 1,5–2,5(–3) mm long; (only in western part of south-western Cape s.str., confined to TMS areas) ..... 15 (b). *A. dregei* subsp. *ecklonis**

16b (Short-lived) perennial herbs or subshrubs; if ± dwarf shrubs, plants prostrate and mat-forming:

20a Straggling, trailing or ± ascending, sometimes rather short-lived perennial herbs; leaves mostly ± lanceolate, to 30 mm long; stipular sheaths with 3–5 setae; ♂ and ♀ corolla tube cylindrical, to 3,7 mm long; fruits often ± tuberculate and with ± broad, conspicuous longitudinal grooves between mericarps (Fig. 5:5); (± afromontane species; from Heidelberg distr. eastwards) ..... 10. *A. herbaceum*

20b Growth form different; leaves smaller, to c. 10 mm long; stipular sheaths mostly with 1 seta; ♂ and ♀ corolla tube to 1,8(–2) mm long; fruits not as above:

21a Plants often ± mat-forming, stems prostrate to ± ascending; leaves relatively broad, to 3(–4) mm wide, ovate, oblong to ± lanceolate:

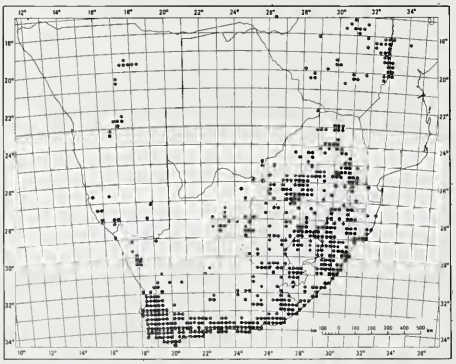
22a Flowers solitary and terminal on branches, often overtopped by lateral shoots arising from below; corolla 5-merous; (confined to higher parts of Cape mountains) ..... 17 (a). *A. esterhuysenianum* var. *esterhuysenianum**

22b Flowers in axillary clusters; corolla 4-merous; (not occurring in Cape mountains) ..... 13 (a). *A. galioides* subsp. *galioides** ('Prostrate Form')

21b Plants not mat-forming, stems erect to ± ascending; leaves narrower, to 2(–3) mm wide, linear-lanceolate to ovate-lanceolate:

23a Leaf blades distinctly recurved (at least near tip) ..... 13 (b). *A. galioides* subsp. *reflexifolium**

23b Leaf blades straight, spreading to ascending (but margins occasionally revolute) ..... 13 (a). *A. galioides* subsp. *galioides**



MAP 3.—**Anthospermum**, all taxa

1. **Anthospermum welwitschii** *Hiern*, Cat. Afr. Pl. Welw. 2: 500 (1898); Brenan in Mem. N.Y. bot. Gdn 8: 455 (1954); Verdc. in F.T.E.A. Rubiaceae 1: 330 (1976). Type: Angola, Huila, Panda forests, near Eme, *Welwitsch* 5335 (BM; G; K, iso.!).[1]

[1] The holotype, according to Verdcourt (op. cit.) in LISU, was not amongst LISU material sent to me on loan.

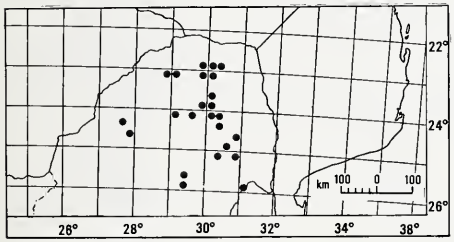
A. cliffortioides K. Schum. in Bot. Jb. 30: 416 (1901). Type: Tanzania, Usafua, Beya-Berg (=Mbeya Mt.), *Goetze* 1082 (B, holo.†; BM; BR; E; G; K, iso.!).

A. ammannioides sensu auctt. Afr. austr., non S. Moore.

Dioecious shrub, single- or (seldom) several-stemmed, ± erect, c. 1–3 m tall. *Stems* mostly much branched above, branches usually ± regular, paired, often ascending. *Leaves* decussate, mostly pseudoverticillate; blades (7–)10–35 × (1–)1,5–3,5 mm, (narrowly) oblanceolate, elliptic to ± linear-lanceolate, mostly glabrous; petioles ± 0–1 mm long; stipular sheath with 3–5 (–7,8) setae, the longest c. (0,5–)0,7–4,5(–5,6) mm. *Flowers* subsessile to shortly pedicellate (pedicels to 0,7 mm in ♂), in clusters of many (very many: ♀) at nodes, inflorescences dimorphic, in ♀ often quite contracted, dense, ± cylindrical inflorescence zones; corolla 4-merous, greenish yellow to pale yellow, occasionally purplish tinged outside, mostly glabrous. ♂: tube (0,5–)0,7–1,2 mm long, funnel-shaped, lobes (1,2–)1,5–2,2(–2,7) × (0,4–)0,6–0,9(–1,1) mm; anthers 1–2 mm long; small rudimentary ovary with 4 minute calyx lobes. ♀: tube 0,2–0,5 mm long, lobes 0,2–0,7 × 0,1–0,2 mm; style ± 0–1 mm long, stigmas 2,

3–7,5(–10) mm long; ovary c. 0,6–1 × 0.3–0,6 mm, with 4 sometimes unequal calyx lobes. *Fruit* mostly reddish brown, shiny; mericarps 1,5–2,7 × 0,7–1,2 mm, oblong, elliptic to ± obovate, glabrous or (seldom) ± sparsely shortly hairy, with 2 ± triangular calyx lobes c. (0,3–)0,5–1(–1,2) × 0,2–0,5 mm, one occasionally longer than the other. *Chromosome number*: 2n=22.

Known from Transvaal; extending to tropical East Africa and Angola. Typically growing at the edge of afromontane forest or scrub, sometimes in disturbed sites. Map 4.



MAP 4.—**Anthospermum welwitschii**

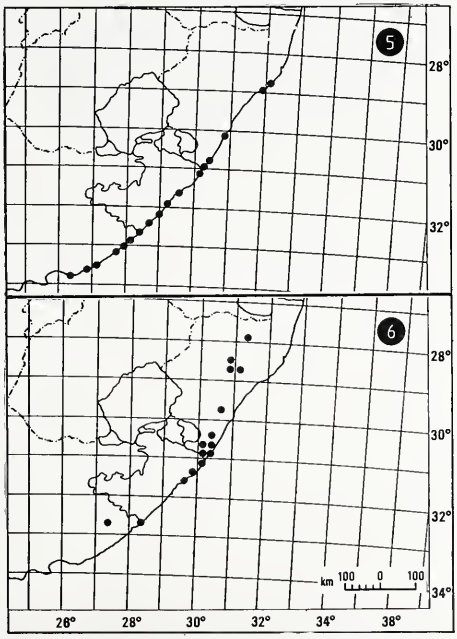
Vouchers: *Acocks* 23578 (BR; K; M; PRE); *Edwards* 4055 (K; PRE; SRGH); *Scheepers* 851 (B; BM; K; M; PRE; SRGH).

A record from Mafikeng (Cape, 2525–DC: *Kassner* 1541, E!) appears highly doubtful (not mapped). In the Flora area *A. welwitschii* is rather uniform in its characters. *A. ammannioides*, with which it has consistently been confused, occurs in the eastern highlands of Zimbabwe and on Gorongosa Mt. and is distinguished by its leaves in whorls of three.

2. **Anthospermum galpinii** *Schltr.* in J. Bot., Lond. 35: 342 (1897). Type: Transkei, West Gate above Port St. Johns, *Galpin* 3472 (BOL, holo.!; GRA; K; PRE; iso.!).

Dioecious shrub, mostly single-stemmed, erect and ± cylindrical to roundish, c. 0,6–2(–2,5) m tall [several-stemmed, often not more than 0,25 m tall if burnt]. *Stems* much-branched above, branches mostly ± erect to ascending, often in threes. *Leaves* in whorls of 3 or (seldom) decussate, pseudo-verticillate; blades (6–)10–20(–27) × (0,5–)0,8–1,5(–2,5) mm, ± narrowly oblanceolate, linear-lanceolate to ± linear, glabrous or sometimes lower half of midrib below shortly hairy; petioles subobsolete; stipular sheath with a small seta. *Flowers* subsessile or ♂ occasionally with peduncles to 2 mm long, in clusters of many to few at nodes, ♀ inflorescences sometimes ± contracted and conspicuous; corolla 4-merous, yellow to greenish yellow, shortly hairy or glabrous (especially ♀). ♂: tube 0,4–1 mm long, (broadly) funnel-shaped to subcampanulate, lobes 1,4–2,2 × 0,7–1 mm; anthers 1,3–2 mm long; minute rudimentary ovary present. ♀: tube 0,5–0,8 mm long, lobes 0,2–0,5 × 0,1–0,2 mm; style 0 or c. 0,2–0,4 mm long; stigmas 2, (2,5–)3–5(–7) mm long; ovary c. 1 × 0,8 mm, with 4 small calyx lobes. *Fruit* reddish brown to greyish; mericarps c. 1,8–3 × 0,7–1,2 mm, elliptic, oblong to ± obovate, densely covered with whitish hairs or papillae c. 0,1–0,2 mm long, with 2 rounded to ± triangular calyx lobes c. 0,1–0,3 mm long or calyx lobes ± lacking. *Chromosome number*: 2n=22.

Occurring from northern Natal to eastern Cape. Mostly growing on rocky outcrops or at the edge of gorges or kloofs, often in grassland-forest/scrub borders; mainly on (confined to ?) TMS. Map 6.



MAPS 5–6:—5. **Anthospermum littoreum**
6. **Anthospermum galpinii**

Vouchers: *Edwards* 2263 (NU; PRE); *Rudatis* 1113 (BM; G; K; PRE; S; W); *Strey* 8682 (K; NH; PRE; SRGH).

In the eastern Cape, *A. galpinii* (especially ♂ plants) may be difficult to separate from the closely allied *A. aethiopicum* (no. 4); also some forms of *A. spathulatum* subsp. *spathulatum* (no. 5) occurring in that area are sometimes very similar. Some collections with decussately arranged leaves from the Natal Midlands and northern Natal approach *A. monticolum* (no. 6) in leaf size and shape and habit; again, ♂ specimens may be problematic.

3. **Anthospermum littoreum** *L. Bol.* in Ann. Bolus Herb. 2: 96 (1917). Syntypes: Cape, East London, *Sim* 1483 (BOL!; PRE!), *Rattray* 38 (BOL, lecto.!; GRA!; US!); Kentani distr., nr. Black Rock Cove, *Pegler* 2139 (BOL!; PRE!; US!; W!); Transkei, Port St. Johns, *Galpin* 2850 (BOL!; GRA!; K!; PRE!).

A. ambiguum Greves in J. Bot., Lond. 63: 203 (1925). Type: Transkei, Port St. Johns, *Moss* 2456 (BM, holo.!; J, iso.!).

Shrub, dioecious or ± dioecious (♂ plants occasionally with odd ♀ flowers), ± procumbent, somewhat straggling or ± erect, at least older parts often deeply buried in sand. *Stems* c. 0,5–3 m long, mostly much-branched, branches spreading to ± ascending, buried parts often rooting at nodes. *Leaves* decussate, pseudo-verticillate; blades (6–)8–15(–20) × (2–)2,5–5(–7) mm, obovate, oblanceolate, oblong to ± elliptic, ± thick and fleshy in nature, glabrous or lowermost part of midrib below hairy, often ± discolourous; petioles ± 0–1,5 mm long; stipular sheath with a small seta. *Flowers* mostly subsessile, in clusters of several (to many: ♀) at nodes, inflorescences often ± conspicuous in ♀; corolla 4-merous, creamy yellow, yellow to greenish yellow, hairy on outside at least near base (♂) or glabrous (♀). ♂(♀): tube (0,3–)0,4–0,6(–0,8) mm long, broadly funnel-shaped to subcampanulate, lobes 2–2,4 × 0,6–0,8(–1) mm; anthers 1,7–2 mm long; minute, densely hairy rudimentary ovary present. ♀: tube c. 0,3–0,7(–1)mm long, lobes 0,2–0,5(–0,7) × 0,2 mm; style ± 0–1 mm long; stigmas 2, (3–)4–6, 7(–10) mm long; ovary c. 0,8–1,2 mm long, densely hairy, with 4 minute calyx lobes. *Fruit* greyish brown or greyish; mericarps (1,7–)2–3(–3,5) × (0,7–)1–1,4(–1,8) mm, oblong to ± elliptic, densely covered with whitish spreading hairs c. (0,2–)0,4–0,8 mm long, with 2 ± triangular calyx lobes c. 0,1–0,4 × 0,1–0,2 mm, usually hidden amongst hairs. *Chromosome number*: 2n=22. Fig. 5: 9.

Occurring along the Indian Ocean coast from Natal (Zululand) to eastern Cape (Alexandria distr.). Growing mostly in dune sand, on the seaward-facing side of the first dunes, in stabilized dunes amongst scrub or in grassy patches, or at the edge of dune forest. Map 5.

Vouchers: *Galpin* 5664 (GRA; K; PRE); *Strey* 11204 (E; K; MO; NH; NU; PRE; SRGH; WAG); *Venter* 1836 (NH; PRE).

In areas where *A. littoreum* and the allied *A. galpinii* (above) grow in close proximity, the occasional presence of hybrids was observed.

4. **Anthospermum aethiopicum** *L.*, Sp. Pl. 1058 (1753), edn 2: 1511 (1754); Cruse in Linnaea 7: 132 (1832). Type: Cape, no collector given (LINN 1233.1, holo.!).

[Linnaeus, Hortus Cliffortianus: 455: t. 27 (1737) (BM!)]

[Frutex africanus ambram spirans, Plukenet, Almagesti Mantissa Botanici 159, t. 183, fig. 1 (1700)].

'A. aromaticum', Salisb., Prodr. 59 (1796).

'Ambraria heisteri' Willd., Sp. Pl. 4: 732 (1806).

A. aethiopicum L. var. *ternifolium* Cruse, Rub. Cap. 11 (1825), in Linnaea 6: 9 (1831); Sond. in F.C. 3: 28 (1865). Type: none given.[1]

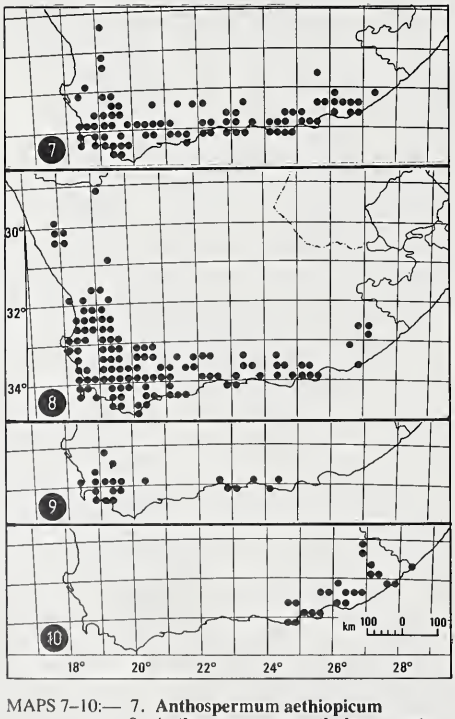
Dioecious shrub, single-stemmed, erect, c. (0,5–)0,75–2 m tall. *Stems* sparingly to much branched above, branches often regular and ternate, curving upwards to ± erect, in ♂ frequently more numerous than in ♀. *Leaves* in whorls of 3, pseudo-verticillate; blades 3–9(–13) × (0,3–)0,5–1,2(–2) mm (in ♂ often smaller than in ♀), narrowly lanceolate or oblanceolate to linear, glabrous or occasionally very shortly hairy near base; stipular sheath with a small triangular to subulate seta. *Flowers* subsessile, in clusters of very many (to many: ♂) at nodes, inflorescences dimorphic, in ♀ very conspicuous, much contracted, ± cylindrical inflorescence zones c. (35–)50–170 mm long; corolla 4-merous, creamy yellow, greenish yellow or pale yellow, glabrous or ± papillate. ♂: tube (0,2–)0,4–0,9(–1,2) mm, (broadly) funnel-shaped, lobes (1,2–)1,6–2,5(–2,9) × 0,6–1,2(–1,4) mm; anthers 1–1,8 mm long; small rudimentary ovary present. ♀: tube 0,1–0,4(–0,6) mm long, lobes 0,1–0,5 (–0,7) × 0,1–0,2(–0,4) mm; style ± 0–0,7 mm long; stigmas 2, 4–6,3 mm long; ovary c. 0,6–0,9 × 0,5–0,7 mm. *Fruit* reddish brown to dark grey brown; mericarps (1,4–)1,7–2,5

[1] Presumably any of Ecklon's *A. aethiopicum* collections from Table Mt. (e.g. *Ecklon* 24; GOET!; PRE!; S!). See Cruse in Linnaea 7: 132 (1832).

FIG. 3.—1–3, **Anthospermum aethiopicum:** 1, part of ♂ plant, × 0,5; 2, part of ♀ plant, note congested inflorescence regions, × 0,5; 3, node with long and short shoot leaves ('pseudoverticillate' leaf arrangement), long shoot leaves (shaded) in whorl of 3, × 5 (*Puff* 790911-2/1). 4, **A. spathulatum** subsp. **spathulatum,** long shoot leaf pair with short shoot leaves, × 5 (*Davies* s.n. sub PRE 41520).

(–2,7) × 0,8–1(–1,2) mm, oblong, elliptic to narrowly obovate, glabrous and often with large, conspicuous epidermis cells or, less commonly, papillate, with 2 indistinct rounded to ± triangular calyx lobes c. 0,1–0,2 mm long or calyx lobes ± lacking. *Chromosome number*: 2n=22. Fig. 3: 1–3.

Very widely distributed in the Cape Floristic Region and extending to the eastern Cape (Albany, Bathurst and Peddie distr.) and, in the north, to the Calvinia distr. (Nieuwoudtville area). Found in all principal vegetation types of the Cape Flora (except for the Strandveld) and perhaps most abundant in areas where a moderately high rainfall is experienced and in relatively fertile (clayey) soils; in drier areas often in moist to ± wet sites Map 7.



MAPS 7–10:— 7. **Anthospermum aethiopicum**
8. **Anthospermum spathulatum** subsp. **spathulatun**
9. **Anthospermum spathulatum** subsp. **ecklonianum**
10. **Anthospermum spathulatum** subsp. **uitenhagense**

Vouchers: *Bayliss* 957; *Boucher* 3289 (PRE; STE); *Galpin* 4102 (GRA; PRE); *Muir* 841; 1955; *Thompson* 1854 (PRE; STE).

A. aethiopicum is distinguished from *A. spathulatum* (below), the other (large) shrubby South-western Cape species, by its strictly *ternately* arranged leaves. It should not be confused with *A. spathulatum* subsp. *ecklonianum* (below) which is often very similar in habit and appearance. On the eastern fringes of its distribution range the distinction of *A. aethiopicum* from *A. galpinii* (no. 2) can become problematic.

5. **Anthospermum spathulatum** *Spreng.*, Syst. Veg. 1: 399 (1825); Cruse, Rub. Cap. 13 (1825), in Linnaea 7: 133 (1832). Type: Cape, no collector given.[1]

In the past, *A. spathulatum* has consistently been confused with *A. aethiopicum* (above) and has, as 'opposite-leaved' varieties (var. *oppositifolium*, var. *ecklonianum*, var. *montanum*), been included in that species.

A. spathulatum is perhaps the most complex and most variable of the *Anthospermum* species centred in the south-western Cape. It is also the most widely distributed Cape species and extends beyond the limits of the Cape Floristic Region (1) to the north and east, and (2) into the karroid and drier interior of the Cape. It occurs from sea level to the highest mountain tops and over a wide array of substrates. It is the only *Anthospermum* species known, to date, to comprise di-, tetra- and hexaploids.

5 subspecies are recognized:

5 (a). subsp. **spathulatum.**

A. aethiopicum L. var. *oppositifolium* Cruse, Rub. Cap. 11 (1825), in Linnaea 6: 10 (1831); Sond. in F.C. 3: 28 (1865); Salter in Jl S. Afr. Bot. 3: 109 (1937), in Adamson & Salter, Fl. Cape Penins. 732 (1950). Type: none given.[2]

A. aethiopicum L. var. *montanum* Sond. in F.C. 3: 28 (1865). Type: none given.[3]

A. tricostatum Sond. in F.C. 3: 28 (1865). Syntypes: Cape, Rietvallei, *Ecklon & Zeyher* s.n. (S!); between Driekoppen and Bloodrivier, *Drège* 9550 (S, lecto.!).

Dioecious shrub or dwarf shrub, single- to several-stemmed, ± erect, cylindrical to rounded, c. 0,3–1,5(–2) m tall. *Stems* much to sparsely branched above or from the base up-

[1] Cruse [1825, op. cit., and in Linnaea 6: 10 (1831)] claims having seen and studied "Sprengel's" specimens of *A. spathulatum* and stated (1831) that specimens determined by Sprengel are in herbarium B(†). A specimen in G, labelled '*A. spath.* Sprg.' (no collector given) and clearly marked as being from the Berlin herbarium, is most likely an isotype of *A. spathulatum*.

[2] In his 1831 publication [but not in Rub. Cap.] Cruse noted that several *Ecklon* specimens are 'var. *oppositifolium*'. None of these are in B(†?) nor is there an *Ecklon* collection in any other herbarium which bears a handwritten identification by Cruse. It, nevertheless, appears to be safe to select *Ecklon* 5 (Table Mountain; S!) as a lecto-(neo-?) type.

[3] Sonder considered var. *montanum* to be identical to *A. aethiopicum* L. ζ *alpinum* Eckl. & Zeyh. [Enum.: 366 (1836) (nomen non valide publ.; since descr.)]. *Ecklon & Zeyher* 2307 ζ ['in vertice montis "Kasteelsberg" (altit. V), in montibus prope "Simonstown" (Cap), et in montibus "Hottentottshollandsberge" supra "Palmietrivier" (Stellenbosch).] can, therefore, be considered to be the type (SAM!, holo.!; FI!; G!; LY!; M!; MO!; P!; PRE!, iso.!).

wards, branches often regular, paired, ascending to ± divaricate or ± irregular and intricate (if browsed). *Leaves* strictly decussate, pseudoverticillate; blades (3–)4–12 × 0,5–2,5(–3) mm, obovate, oblanceolate, lanceolate to linear-lanceolate, glabrous, upper surface often ± shiny, with conspicuous, small epidermis cells; stipular sheath with a small seta. *Flowers* subsessile or fruiting ♀ sometimes with pedicels c. 0,2–1(–1,4) mm long, in clusters of many to 2 at nodes, ♀ sometimes in ± condensed inflorescence zones; corolla 4-merous, yellow to greenish yellow or pale whitish yellow, occasionally purplish tinged outside, glabrous. ♂: tube 0,5–1,2 mm long, (broadly) funnel-shaped, lobes 2–3,4 × 0,7–1,2(–1,5) mm; anthers 1,2–2,5 mm long; minute rudimentary ovary with 4 small calyx lobes. ♀: tube 0,1–0,4 mm long, lobes 0,3–0,8 × 0,1–0,3 mm; style ± 0–0,5 mm long; stigmas 2, (1,5–)2–7,6 mm long; ovary c. 0,9–1,5 × 0,5–0,8 mm, with 4 calyx lobes. *Fruit* shiny reddish brown to dull greyish brown; mericarps 2,4–4,2 × 1,2–2,2 mm, (broadly) obovate to ± elliptic, distinctly to rather obscurely 3-ribbed (hence mericarps often ± triangular in section), glabrous or, very rarely, shortly hairy, with 2 distinct to obscure ± triangular calyx lobes 0,3–0,6(–0,9) × 0,5–0,7 mm or, less often, calyx lobes ± lacking. *Chromosome numbers*: 2n=22, 44, 66. Fig. 3: 4.

Very widely distributed in the south-western Cape Region and extending north to the Namaqualand distr. and east to the King William's Town and Keiskammahoek distr.; also extending slightly into the drier interior parts of the Cape. Growing on rocky slopes and ridges, on outcrops, in gravelly areas or on sandy flats or sand dunes; usually in relatively dry habitats; occurring mostly over TMS, granite, Witteberg quartzite or limestone. Map 8.

Vouchers: *Acocks* 24076 (K; LISU; PRE; US); 14893 (K; PRE); *Bolus* 12701 (BOL; NH; PRE); *Bos* 510 (K; M; PRE; STE; WAG); *Esterhuysen* 5840 (BOL; PRE); *Laidler* 148 (PRE; STE).

Subp. *spathulatum* is extremely variable, especially in growth form (single-stemmed, rather tall plants to ± rounded, several-stemmed dwarf shrubs; very irregularly branched browsed forms are not uncommon in drier areas), in the extent of the ♀ inflorescences, in the fruits (dorsal ribs; width of mericarps; size of calyx lobes), in leaf size and shape and in chromosome number (polyploids morphologically inseparable from diploids).

In spite of this variability, some 'Forms' (morpho- or ecotypes) can be distinguished:

—'Typical' subsp. *spathulatum:* Single- to few-stemmed, often rather tall shrubs with typically regular, paired, ± ascending branches; leaves (narrowly) obovate to ± lanceolate; ♀ inflorescences somewhat condensed and conspicuous, many- to several-flowered; fruits distinctly ribbed and mostly sessile. Widely distributed and ecologically eurytopic.

—'*Latifolium* Form': rather robust shrubs with broader leaves than in the 'typical' form; ♀ inflorescences inconspicuous, partial inflorescences few- to 1-flowered; fruits usually larger than in the 'typical' form, relatively broad, conspicuously ribbed and mostly distinctly pedicellate. Seems to be concentrated in the interior of the Cape (from southern Calvinia distr. to Karroopoort, Witteberg and Seven Weeks Poort); entirely absent in the south-western Cape s.str.

—'Dune Sand Form': Rather small, bushy, several- to many-stemmed (dwarf) shrubs with rather fine, ± linear leaves [small branches, especially of ♂ plants, should not be confused with subsp. *ecklonianum* (d), below, which may look similar but tends to have longer leaves; specimens without information on growth form and habitat may be difficult to place]; ♀ inflorescences rather inconspicuous, partial inflorescences usually few-flowered; the subsessile fruits tend to be smaller and less distinctly ribbed than in the other Forms. Observed from the Cape Peninsula east to the Port Elizabeth distr.

Some collections from the easternmost localities such as Amatole Range, Hogsback Mt., Pirie (*Rattray* 231, BOL, PRE; *Sim* 1328, PRE, STE; *Story* 3660) are somewhat atypical.

Subsp. *spathulatum* (especially ♂specimens) should not be confused with *Nenax* (notably *N. acerosa* subsp. *macrocarpa* and *N. divaricata)*, which may be similar in appearance. The latter are distinguished vegetatively by having (at least a few) short hairs on the lower part of the leaf margins and blades which are not narrowed to the base as in subsp. *spathulatum*.

5(b). subsp. **uitenhagense** *Puff, subsp. nov., mericarpiis anguste obovatis vel oblongis, sine costis distinctis dorsalibus, saepe apice ut videtur truncatis a subsp.* spathulato *differt.*

[*A. aethiopicum* L. var. *uitenhagense* Eckl. & Zeyh., Enum. 365 (1836), nomen non valide publ. (since descr.)]. Type: Cape, 'Zwartkopsrivier inque planitie inter Krakakamma et montes Van Stadensriviersberge altit. I, II (Uitenhage)', *Ecklon & Zeyher* 2307β (SAM, holo.!; BOL; GOET; LY; M; MO; S, iso.!).

Dioecious dwarf shrub, several- to many-stemmed, mostly ± erect and cylindrical or somewhat reclining, c. 0,2–0,6(–0,9) m tall, with thick, woody root; often with massive, ± rosette-like woody base if burnt regularly. *Stems* with several to many, ± erect to ascending branches (unbranched if burnt), quite densely leafy above. *Leaves*: blades (3–)3,5–8(–10) × 0,5–1,2 mm, narrowly lanceolate or oblanceolate to ± linear, mostly tough and thickish; stipular sheath (broadly) cup-shaped and conspicuous, with a minute seta. *Flowers* subsessile, in clusters of several to few at nodes, ♀ plants often with more flowers than ♂; corolla 4-merous, glabrous or occasionally papillate near tip. ♂: tube 0,4–0,9 mm

long, lobes (1,5–)1,9–2,5 × 0,5–1 mm; anthers 0,8–1,5 mm long. ♀: tube 0,2–0,5 mm long, lobes 0,3–0,7 × 0,1–0,2 mm; style ± 0–0,7 mm long; stigmas 2, (1,7–)2–5,1 mm long; ovary 0,6–0,7 × 0,4 mm, with 4 minute, often ± indistinct calyx lobes. *Fruit* shiny reddish brown to greyish green-brown; mericarps 2,2–3 × 1–1,3 mm, (narrowly) obovate, elliptic to oblong, sometimes ± obscurely 3-ribbed, glabrous, often seemingly truncate above due to 2 sometimes ± joined (broadly) triangular calyx lobes c. 0,1–0,5(–0,7) × 0,4–0,5 mm. *Chromosome number*: 2n=22.

Endemic to the south-eastern and eastern Cape and occurring from the Humansdorp and Hankey distr. northeast to the Cathcart distr. and the Great Kei River mouth. Frequently associated with rocky outcrops in grassland, occasionally in grassland or on dry, rocky slopes; often over Witteberg quartzite. Map 10.

Vouchers: *Flanagan* 612 (GRA; PRE; SAM); *Killick* 780 (K; PRE); *Sidey* 3126 (PRE; S).

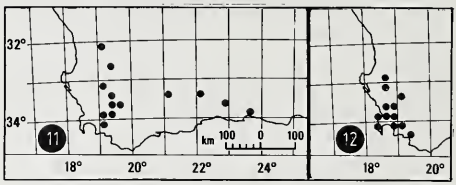
Very distinct in the eastern part of its distribution range but sometimes difficult to separate from coastal 'Dune Sand Forms' of subsp. *spathulatum* (see above) from the Port Elizabeth and Uitenhage distr. westwards; especially ♂ specimens may be problematic.

5(c). subsp. **saxatile** *Puff, subsp. nov., habitu decumbenti vel pulvinato, internodiis brevibus, foliis tenacibus et lobis calycis conspicuis longisque a subsp.* spathulato *distinguitur.*

Type: Cape, Hex River Mts, Milner Peak, 5500–6000 ft., Jan. 1959, *Esterhuysen* 28089 (BOL, holo.!; WU, iso.!).

Dioecious dwarf shrub, several- to many-stemmed, often decumbent, cushion- or ± mat-forming. *Stems* to c. 250 mm long, occasionally rooting at lowermost nodes, mostly much branched, branches ± ascending to erect, densely leafy. *Leaves*: blades (3,5–)5–8(–12) × 1–2 mm, lanceolate to oblanceolate or narrowly obovate, tough and thickish; stipular sheath with a small seta. *Flowers* subsessile, in clusters of several to 2 at nodes; corolla 4-merous, glabrous. ♂: tube 0,8–1,4 mm long, lobes 2,2–2,5 × 0,8–1 mm; anthers 1,5–2,1 mm long; minute rudimentary ovary with distinct calyx lobes. ♀: tube 0,2–0,5 mm long, lobes 0,5–1(–1,4) × 0,2–0,4 mm; style ± 0–1 mm long; stigmas 2, 2,7–9,2 mm long; ovary 1,4–1,7 × 0,5–0,8 mm, with 4 conspicuous calyx lobes. *Fruit* shiny reddish brown; mericarps 2,4–3(–3,4) × 1,2–1,6 mm, obovate to elliptic, ± indistinctly 3-ribbed (± triangular in section), glabrous, with 2 ± triangular calyx lobes 0,3–1,5(–1,9) × 0,5–0,7 mm. *Chromosome number*: 2n=44.

Confined to the south-western Cape mountains and occurring from c. 1500–1800(–1900) m. Growing on rocky slopes, ledges or cliffs or in steep rocky gulleys; over TMS and in damp to moist, ± shady, sheltered places. Map 11.



MAPS 11–12.—11. **Anthospermum spathulatum** subsp. **saxatile**
12. **Anthospermum spathulatum** subsp. **tulbaghense**

Vouchers: *Esterhuysen* 6407 (BOL; K; NBG; PRE); 11018 (BOL; K; NBG; PRE; SAM); 27943 (BOL; WU).

Very distinct in the field (cushion-forming or ± matted habit; habitat!); perhaps closest to subsp. *spathulatum*.

5(d). subsp. **ecklonianum** *(Cruse) Puff,* comb. et stat. nov. Syntypes: Cape: 'Baviansberg bei Genadenthal', *Ecklon* s.n. (S, lecto.!); 'Schwarze Berg bei Caledon-Bad', *Ecklon* s.n. (S!; SAM!).[1]

A. aethiopicum L. var. *ecklonianum* Cruse in Linnaea 6: 10 (1831); Sond. in F.C. 3: 28 (1865).

A. spathulatum Spring. var. *ecklonianum* (Cruse) Cruse in Linnaea 7: 133 (1832).

Dioecious shrub, single-stemmed, ± erect and typically (narrowly) cylindrical, c. (0,5–)1–2 m tall. *Stems* ± much branched above, branches mostly erect to ± ascending, usually regular, paired, quite densely leafy. *Leaves*: blades 8–18(–25) × 0,5–1,8(2,2) mm, linear-(ob-) lanceolate to ± linear, often fine and ± needle-like; stipular sheath with a seta to 1,2(–1,9) mm long. *Flowers* subsessile or

[1] The label of the lectotype specimen was written by Cruse and signed 'W. Cruse 1829'. Although no reference is made on the label to Ecklon, there is no doubt that this is one of the specimens referred to by Cruse (1831, op. cit.). The second-mentioned collection may have later been distributed as *Ecklon & Zeyher* 2307 ε ['inter frutices (altit. II, III) montis "Zwarteberg" *haud longe a thermis* (= Caledon baths), nec non in collibus prope "Babylons Toorensberg" (Caledon)': Ecklon & Zeyher 1836: 366] (BOL!; FI!; G!; GOET!; M!; MO!; P!; S!; SAM!; W!).

sometimes shortly pedicellate (♂), in clusters of many to several at nodes, ♀ sometimes in somewhat condensed, ± cylindrical inflorescence zones; corolla 4-merous, glabrous. ♂: tube (0,3–)0,5–1,4 mm long, lobes 1,9–2,9 (–3,4) × 0,7–1(–1,3) mm; anthers 1,3–2 mm long. ♀: tube 0,1–0,3 mm long, lobes 0,2–0,6(–0,8) × 0,1–0,3 mm; style ± 0–0,3 mm long; stigmas 2, 2–4,4 mm long; ovary c. 0,5–0,9 × 0,4–0,6 mm, with 4 minute calyx lobes. *Fruit* shiny reddish brown; mericarps 2,5–3,1 × 1–1,5 mm, ± obovate to oblong, rather obscurely 3-ribbed, glabrous or, very rarely, shortly hairy, with 2 ± indistinct calyx lobes c. 0,5 × 0,5–0,7 mm, or calyx lobes ± lacking. *Chromosome number*: 2n=44.

Endemic to the south-western Cape and rather widely distributed. Mostly growing on rocky, well drained mountain slopes, at the base of cliffs or along streams; very often in granite-derived clayey soils. Map 9.

Vouchers: *Kruger* M26 (STE); *Van Rensburg* 425 (K; PRE; STE); *Williams* 3070, 3071 (NBG; PRE).

Subsp. *ecklonianum* in habit and appearance resembles *A. aethiopicum* (no. 4., above) and morphologically appears somewhat intermediate between *A. spathulatum* and *A. aethiopicum*. Despite its tetraploidy there is no concrete evidence for a hybrid origin of subsp. *ecklonianum;* its strictly decussate leaves (ternate in *A. aethiopicum)* are a strong argument against such a speculation.

Some collections from the eastern part of its range (George to Humansdorp distr.) appear to be ± atypical and often do not fully match material from the south-west; specimens from that area may approach the 'Dune Sand Form' of subsp. *spathulatum* (see above).

5(e). subsp. **tulbaghense** *Puff, subsp. nov., mericarpiis parvis, plus minusve oblongis, sine costis distinctis dorsalibus, floribus masculis minoribus et foliis parvis a subsp.* spathulato *differt.*

[*A. aethiopicum* L. var. *tulbaghense* Eckl. & Zeyh., Enum. 365 (1836), nomen non valide publ. (sine descr.)]. Type: Cape, '. . . non procula catarractis vallis "Tulbagh" (Worcester)', *Ecklon & Zeyher* 2307 (SAM, holo.!; FI; LY, iso.!; S?).

Dioecious dwarf shrub, several- to many-stemmed, erect to ± reclining and spreading. *Stems* (100–)200–600(–750) mm long, mostly much branched, branches ± irregular and rather diffuse to ± regular, paired (♀ plants occasionally less branched than ♂). *Leaves*: blades (2,2–)2,5–4,5(–5,2) × 0,5–1(–1,3) mm, (narrowly) obovate, oblanceolate, lanceolate to ± linear-lanceolate; stipular sheath with a minute seta. *Flowers* subsessile, in clusters of several to ± many at nodes, ♀ plants often more-flowered than ♂; corolla 4-merous, glabrous. ♂: tube 0,5–0,8(–1) mm long, lobes 1,2–2(–2,2) × 0,5–0,9 mm; anthers 0,9–1,4 mm long. ♀: tube 0,2–0,3 mm long, lobes 0,2–0,5 × 0,1–0,2 mm; style ± 0; stigmas 2, 1,4–3 mm long; ovary 0,5–0,8 × 0,4–0,7 mm, with 4 ± indistinct calyx lobes. *Fruit* shiny, light reddish brown to dark purplish brown; mericarps (1,5–)1,7–2,3 × 0,6–0,8(–1) mm, ± oblong to (narrowly) obovate or elliptic, glabrous, papillate or, less commonly, very shortly hairy, with 2 indistinct ± triangular calyx lobes c. 0,1–0,3(–0,4) × 0,3 mm or calyx lobes ± lacking. *Chromosome number*: 2n=22.

Endemic to the south-western Cape and occurring from the Piketberg distr. south and south-east to the Cape, Worcester and Caledon distr. Often found in coastal renosterveld, in degraded fynbos or disturbed sites; mostly growing in clayey soils. Map 12.

Vouchers: *Acocks* 24512 (MO; PRE); *Boucher* 3386 (PRE; STE); *Kruger* KR557 (K; PRE).

Distinguished from the other subspecies primarily by its smaller mericarps, which, furthermore, are distinctly narrower (over two times longer than broad) and usually lack distinct ribs. ♀ plants, especially when in fruit, differ quite markedly in habit (low dwarf shrubs, branches densely beset with fruits) from the other subspecies. Leaves and ♂ flowers are also rather smaller but are too variable in size to allow an absolute separation from the other subspecies, namely subsp. *spathulatum*. Subsp. *tulbaghense* may deserve specific rank.

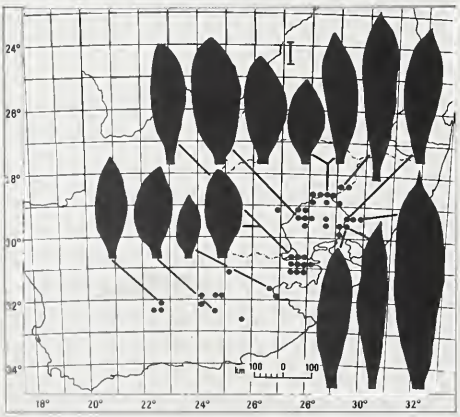
6. **Anthospermum monticola** *Puff, sp. nov., tubo corollae floris masculi breviore, fructibus obovatis lobis calycis conspicuis coronatis et saepe foliis brevioribus ab* A. spathulaato, *et foliis fructibusque glabris ab* A. basutico *differt.*

Type: Cape, Witteberge, Lundean's Nek-Belmore rd., c. 8,5 km beyond (SSE of) New England turnoff, towards Belmore, *Puff* 790113-3/1 (WU, holo.!; NBG; NU; PRE, iso.!).

Dioecious shrub, few- to several-stemmed, ± erect and cylindrical or roundish, low, ± cushion-forming if browsed excessively, c. (0,2–)0,3–1,5(–2) m tall, often with thick, woody tap root. *Stems* mostly much branched, branches ± spreading or curving upwards, usually paired. *Leaves* decussate, often pseudoverticillate; blades (2–)3–10(–13) × (0,7–)1–2 mm, (ob)ovate, oblong, (ob)ovate-lanceolate to

± lanceolate, glabrous; petioles subobsolete; stipular sheath with a small seta. *Flowers* subsessile, in clusters of (2–)6 (rarely more) at nodes; corolla 4-merous, yellowish or greenish yellow, occasionally reddish purplish tinged outside, glabrous. ♂: tube 0,3–0,5 mm long, broadly funnel-shaped to (sub)campanulate, lobes 2,2–2,7(–3) × (0,5–)0,8–1,2(–1,5) mm; anthers 1–2 mm long. ♀: tube 0,4–0,5 mm long, lobes 0,3–0,4 × 0,2–0,4 mm; style 0; stigmas 2, c. 3–5 mm long; ovary c. (1–)1,3–1,8 × 0,8–1 mm, with 4 conspicuous calyx lobes. *Fruit* reddish brown to greyish brown; mericarps 2–3 × 1,5–2 mm, (broadly) ovate or obovate, oblong or ± elliptic, sometimes (faintly) 2- or 3-ribbed, glabrous, with 2 ± triangular, erect to ± spreading calyx lobes 0,3–0,6(–0,8) mm long. *Chromosome number*: 2n=22.

Known from mountainous areas of Orange Free State, Natal, Lesotho and Cape; in the Cape mainly on the higher mountains of the interior (from Drakensberg and Witteberg west to the Nieuweveld Mts). Growing on rocky slopes, on outcrops, around rock sheets or sometimes in scrub along streams; found over sandstone, dolerite or (less often) basalt. Map 13.



MAP 13.—**Anthospermum monticola** (scale bar for leaf silhouettes is 10 mm)

Vouchers: *Acocks* 15844 (K; PRE); *Hilliard & Burtt* 13552 (E; NU; PRE; WU); *Killick* 4446; *Scheepers* 1833 (K; LMU; MO; PRE; SRGH; WAG).

Very variable in leaf size and shape. Collections from Natal and from the Natal-Lesotho-Orange Free State border area tend to have larger and relatively narrower leaves (see Map 13) and sometimes also slightly narrower fruits which often lack distinct dorsal ribs; also their habit is somewhat different (see also *A. galpinii*, no. 2).

Browsed individuals and plants growing at very high altitudes (above 2400 m; Lesotho, Maluti Mts) tend to form cushions; their stems may root at the nodes. They should not be confused with *Nenax microphylla* which can be similar vegetatively.

A. monticola is allied to both *A. spathulatum* (subsp. *spathulatum*; = *A. tricostatum* sensu auct.), for which it has often been mistaken, and *A. basuticum* (below). It is known to form hybrids with the latter in areas where the species occur together.

7. **Anthospermum basuticum** *Puff, sp. nov.*, A. hispidulo *simile sed habitu dioecio, floribus masculis minoribus, tubo corollae breviore et fructibus longioribus latioribusque differt;* A. monticolo *affine sed foliis fructibusque pilosis praeclare distinguitur.*

Type: Lesotho, Sehlabathebe National Park, across stream from Motsea, 2550 m, 5.11.1976, *Hoener* 1607 (PRE, holo.!).

Dioecious dwarf shrub, many-stemmed, cushion- or mat-forming or ± erect and cylindrical. *Stems* (40–)100–300(–500) mm long, erect to ± prostrate, mostly much branched, branches often ascending, densely hairy, ± densely leafy. *Leaves* decussate, often pseudoverticillate; blades often curved upwards or ascending, 2,5–5(–6) × 0,8–1,2(–1,8) mm, narrowly lanceolate, often seemingly terete due to strongly revolute margins, upper surface densely covered with white spreading hairs 0,1–0,3(–0,6) mm long, lower surface often glabrous except for midrib; petioles subobsolete; stipular sheath with a hairy seta. *Flowers* subsessile, usually paired at nodes; corolla 4-merous, yellowish to yellowish green, usually hairy outside. ♂: tube 0,7–1 mm long, broadly funnel-shaped to subcampanulate, lobes (1,4–)1,7–2,3 × 0,6–1,1 mm; anthers 1–1,6 mm long. ♀: tube ± 0–0,3 mm long, lobes 0,5–1 × 0,2–0,5 mm; style 0; stigmas 2, (2–)3–6(–7,5) mm long; ovary 1–1,2 × 0,8 mm, mostly densely hairy, with 4 calyx lobes. *Fruit* greyish or greyish brown; mericarps 2–2,5 × 1–1,5 mm, ± obovate, mostly densely covered with white spreading hairs 0,1–0,3(–0,5) mm long, with 2 somewhat hairy, ± triangular erect to spreading calyx lobes 0,5–0,8 × 0,3–0,5(–0,7) mm. *Chromosome number*: 2n=22. Fig. 5: 4.

Known from Orange Free State, Lesotho, Natal and eastern Cape; largely confined to the Drakensberg escarpment and mostly occurring above c. 2300 m in basalt. Map 19.

Vouchers: *Galpin* 6649 (BOL; GRA; K; PRE); *Hilliard & Burtt* 7121 (E; K; MO; NU; PRE; S); *Killick & Marais* 2196 (K; NH; NU; PRE).

In the past, often confused with *A. hispidulum* (no. 9), a non-dioecious 'hairy' species with larger ♂ and ♀ flowers and (narrowly) funnel-shaped, longer corolla tubes, smaller, narrower fruits and an entirely different distribution range, which is probably only superficially similar. See also *A. monticola* (above).

8. **Anthospermum paniculatum** *Cruse*, Rub. Cap. 15 (1825), in Linnaea 6: 15 (1831); Sond. in F.C. 3: 31 (1865). Type: Cape, 'in terra Houtniquas ad Promontorium bonae spei mense Ianuario 1820', *Mund(t) & Maire* s.n. (B, holo. †; G, iso.!).

A. paniculatum Cruse var. *confertum* Eckl. & Zeyh., Enum. 367 (1836). Type: Cape, ... ad "Zwartehoogdens" non longe ab urbe "Grahamstown" (Albany), in monte "Winterberg" prope fluvium "Katrivier" (Ceded Territory), *Ecklon & Zeyher* 2314β (FI!; G!; LY!; M!; MO!; P!; SAM!; W!).[1]

A. paniculatum Cruse var. *elongatum* Eckl. & Zeyh., Enum. 367 (1836). Type: Cape, ... prope sylvas "Krakakamma" et in montibus "Van Stadensriviersberge" (Uitenhage), *Ecklon & Zeyher* 2314γ (MO!; SAM!).[1] [?also *Ecklon* or *Ecklon & Zeyher* 349 (Vanstadensrivier Mts.) (BOL!; BM!; K!; M!; PRE!; SAM!), 349 bis (BM!)].

'*A. confertum* Cruse', Walp., Repert. 2: 462 (1843). Probably an error [*A. paniculatum* Cruse var. *confertum* Eckl. & Zeyh.].

Dwarf shrub or subshrub, ± dioecious (♂ plants occasionally with some, rarely with numerous ♀ flowers), few to several-stemmed; with numerous erect, mostly unbranched flowering stems from a woody base, if burnt regularly. *Stems* (100–)150–400(–700) mm long, erect to ascending, less commonly decumbent and sometimes basal portions rooting at nodes, branches erect to ± spreading. *Leaves* decussate, pseudo-verticillate; blades 5–12(–17) × (0,3–)0,5–2,5(–4) mm, linear, lanceolate to narrowly obovate, seldom (in fire-exposed individuals) ± broadly oblanceolate or obovate, glabrous or sometimes ± papillate on upper surface and/or midrib below; petioles ± 0–0,5 mm long; stipular sheath with a small 3-angular to subulate seta. *Flowers* in terminal thyrsic or thyrso-paniculate, ± narrowly cylindrical inflorescence, peduncles (0,8–)1,2–3 mm long, pedicels to 0,7 mm long, slightly elongating in fruit; corolla 4-merous, creamy yellow to yellow or greenish, glabrous. ♂(♀): tube 0,8–1,2(–1,7) mm long, funnel-shaped, lobes 2,2–2,7 × 0,5–1,1 mm; anthers 1,5–2,2 mm long. ♂: ± prominent rudimentary ovary with 4 ± massive calyx lobes, often also rudimentary stigmas present; ♀: gynoecium as in ♀. ♀: tube ± 0–0,3 mm long, lobes 0,5–0,6 × 0,1–0,2 mm, corolla sometimes absent altogether; style 0–0,6 mm long; stigmas 2, (3–)4–8 mm long, reddish to reddish purplish; ovary 1,5–2,4 × 0,9–1,6 mm, with conspicuous calyx lobes. *Fruit* brown; mericarps 2,5–3,5(–4) × 1,7–2 mm, oblong to ± rectangular or ± obovate, often with two faint ribs below 2 ± triangular, often massive calyx lobes 0,5–1,2(–2,2) × 0,4–1 mm. *Chromosome number*: 2n=22.

Occurring from Transkei to south-western Cape (George distr.); centred in the eastern Cape. Mostly growing in grassveld, bush-clump veld or on rocky ridges; occasionally in disturbed sites (roadsides, fire-breaks, etc.). Map 25.

Vouchers: *Britten* 1205; *Flanagan* 215 (BOL; NH; PRE; SAM); 2284 (BOL; K; P; PRE; SAM); *Keet* 1073 (GRA; PRE; STE).

The terminal, 'typical' thyrsic to thyrso-paniculate inflorescence of *A. paniculatum* is unique in the genus. This feature as well as the unusual, relatively large fruits (anatomically resembling those of *Nenax*) and the reddish stigmas put the species into a somewhat isolated position.

(Regular) exposure or non-exposure to veld fires appears to be the main factor responsible for the sometimes striking growth form differences.

9. **Anthospermum hispidulum** *E. Mey.* [in Drège in Flora 26, Bes. Beigabe 164 (1843), nom. nud.] *ex Sond.* in F.C. 3: 29 (1865). Syntypes: Transkei, Omsamwabo to Omsamcabo, *Drège* s.n. (S, lecto.!; G!; K!; LY!; MO!; W!); Natal, Zululand, *Gerrard* [& *"M'K"* (=*McKen*)] 1361 (BM!; K!; W!).

A. burkei Sond. in F.C. 3: 29 (1865); Compton, Fl. Swazild 587 (1976). Types: Transvaal, Magaliesberg, ["*Burke & Zeyher*"=] *Burke* 86 (BM; K; PRE; SAM, iso.!), *Zeyher* 770 (S, holo.!; BM; G; LY; K; P, iso.!).

[1] On numerous sheets, cut-out parts from Ecklon & Zeyher's "Enumeratio" are used as labels. These often comprise the entire bottom part of page 367 ("2314. *Anthospermum paniculatum* Cruse", β. *confertum*, γ. *elongatum*"), so that it is not always quite certain to what variety a particular specimen is meant to belong.

A. arenicolum Greves in J. Bot., Lond. 63: 203 (1925). Type: Transvaal, Witpoortjie Kloof nr. Johannesburg, *Moss* 9806 (BM, holo.!; PRE, iso.!).

A. rubricaule K. Schum., nom. nud.

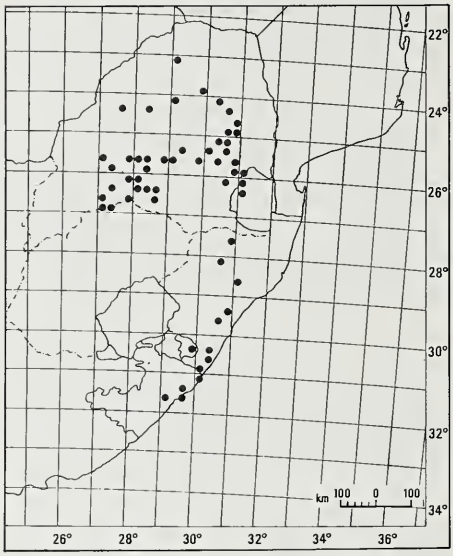
Dwarf shrub, ♂, ♂ + ♀, ♀, ♂ + ♂ or (rarely) ♂, usually several- to many-stemmed, often with thick, woody (tap-)root. *Stems* c. (100–)150–400(–600) mm long, ascending to erect, sparingly to much branched, branches ascending to ± erect, hairy. *Leaves* decussate, usually pseudo-verticillate; blades often ascending, 5–12(–20) × 1–3,5(–5) mm, oblanceolate, ovate-lanceolate to narrowly lanceolate, less commonly ± obovate, usually both surfaces densely covered with whitish spreading hairs c. (0,1–)0,3–0,5 mm long, sometimes less hairy below except for midrib; margins mostly revolute; petioles subobsolete; stipular sheath hairy, with a seta (0,5–)0,8–1,4 mm long. *Flowers* subsessile, in clusters of c. (9–)6–2 at nodes; corolla 4-merous (very rarely also 5-merous in ♀), greenish yellow to yellowish, at least lobes hairy on outside. ♀, ♂: tube 1,4–1,6 mm (♂) or –2(–2,4) mm (♀) long, (narrowly) funnel-shaped, lobes (1,7–)2–2,7 × 0,6–0,9 mm; anthers 1,4–1,9 mm long; ♀: stigmas 2, c. 2,9–4,1 mm long, ovary c. 0,7–1,2 × 0,5–0,9 mm, hairy, with 4 calyx lobes; ♂: small rudimentary ovary, sometimes also rudimentary stigmas present. ♀: tube 0,3–0,7 mm long, lobes 0,2–0,7 × 0,1–0,4 mm; style ± 0–0,8 mm long; stigmas 2, 3–6,5 mm long; ovary as in ♀. *Fruit* reddish brown; mericarps c. 1,7–2 × 0,7–1 mm, ± oblong, ± densely (less commonly ± sparsely) covered with whitish spreading hairs c. 0,2–0,5 mm long, with 2 often hairy, ± triangular calyx lobes c. (0,2–)0,4–0,7(–0,9) × 0,1–0,3(–0,4) mm. *Chromosome number*: 2n=22.

Known from Transvaal, Swaziland, Natal and Transkei; also on Orange Free State side of Vaal River (near Parys; one record). Growing on rocky ridges, outcrops, koppies, krantzes or in cracks of rock sheets, less commonly in rocky grassland; often occurring over sandstone (Natal, Transkei), quartzite or old granite (Transvaal). Map 14.

Vouchers: *Codd* 7673 (K; NH; NU; PRE); *Galpin* 13079 (K; PRE; US; W); *Strey* 9015 (K; NH; PRE); *Van der Schijff* 5996 (K; PRE; W).

Rather variable. Flowering shoots of recently burnt individuals *('A. arenicolum')* may look very different from typical material. Hybridogenous contact with *A. pumilum* subsp. *pumilum* (no. 11) is suspected in parts of the Transvaal where both taxa may grow in immediate vicinity.

Allied to the similar *A. whyteanum* Britten (Zimbabwe to southern Tanzania) which is distinguished by strictly iternately arranged leaves.



MAP 14.—**Anthospermum hispidulum**

10. **Anthospermum herbaceum** *L. f.*, Suppl. 440 (1781); Murr., Syst. Veg. 919 (1784); Brenan in Mem. N.Y. bot. Gdn 8: 455 (1954); Agnew, Upl. Kenya Wild Flow. 407 & fig., p. 406 (1974); Verdcourt in F.T.E.A. Rubiaceae 1: 325 & fig. 46 (1976). Type: Cape, *Thunberg* s.n. (LINN 1233.5, holo.!).

A. lanceolatum Thunb., Prodr. 1: 32 (1794), Fl. Cap., edn Schultes 157 (1823); Cruse, Rub. Cap. 12 (1825), in Linnaea 6: 12 (1831); Sond. in F.C. 3: 30 (1865); De Wild., Pl. Bequaert. 2: 301 (1923); Robyns, Fl. Parc. 2: 371 (1947); Compton, Fl. Swazild 587 (1976). Type: Cape, *Thunberg* (sheet 23314, *A. lanceolatum* 'α', UPS, holo.!; G; S, iso.!).

A. muriculatum Hochst. ex A. Rich:., Tent. Fl. Abyss. 1: 345 (1847); Hiern in F.T.A. 3: 229 (1877). Syntypes: Ethiopia, 'Prov. Ouedgerate', [*Quartin-Dillon* &] *Petit* s.n. (P, lecto.!); 'Koubi', *Schimper* 732 (BR!; G!; K!; S!; P!-mixed with *A. pachyrrhizum*).

A. ferrugineum Eckl. & Zeyh., Enum. 366 (1836). Type: Cape, Van Stadensriviersberge (Uitenhage), prope Grahamstown (Albany) et ad flumen Makasanirivier prope montem Chumiberg (Adelaide), *Ecklon & Zeyher* 2309 (SAM, holo.!; BOL; FI; G; GOET; M; MO; S; W, iso.!).

A. hedyotideum Sond. in F.C. 3: 30 (1865). Syntypes: Cape, 'Caffraria, Kreili's Country', *Bowker* [595] (S, lecto.!; K!; PRE-photo.!); Keiskamma, *Drège* s.n. ('Herb. Drège, Sonder'; not located).

A. lanceolatum Thunb. var. *hedyotideum* (Sond.) Kuntze, Rev. Gen. 3: 117 (1898).

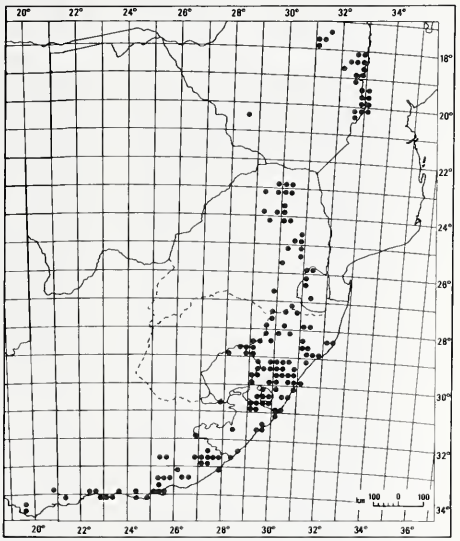
A. lanceolatum Thunb. var. *latifolium* Sond. in F.C. 3: 30 (1865). [*A. latifolium* E. Mey. in Drège in Flora 26, Bes. Beigabe 164 (1843), nom. nud.] Lectotype: Port Natal, *Gueinzius* '468' (S!; as s.n.: G; SAM sub 16062, isolecto.!).

A. nodosum E. Mey. in Drège in Flora 26, Bes. Beigabe 164 (1843), nom nud. ['Port Natal' *Drège* s.n. (E!; G!; K!; LY!; S!)].

A. mildbraedii K. Krause in Wiss. Ergebn. Dt. Zentral-Afr. Exped. 2: 341 (1914). Type: Rwanda, west of Lake Mohasi, *Mildbraed* 497 (B, holo.†; BR; iso.!).

Perennial herb or ± subshrub, ♂, ♂ + ♀, ♀, ♂ + ♂, ♂ + ♂ + ♀, less commonly ♂ or ♂ + ♀, several- to many-stemmed, somewhat woody near base and with often ± thick, woody root; sometimes rather short-lived. Habit variable: plants scrambling, straggling or trailing and with stems to 2,5(–3) m long; sometimes ± erect, cylindrical to rounded, to c. 0,3(–0,5) m tall and with ± thick, almost rosette-like base; occasionally low and ± mat- or cushion-forming with shoots c. (20–)75–150(–200) mm long. *Stems* unbranched to much branched; branches often ± regular, arising in pairs, frequently with short branches of a higher order, often with short shoots bearing rather small leaves. *Leaves* decussate; blades 5–55 × (1–)2–25 mm, ± ovate, ovate-lanceolate, lanceolate to ± linear-lanceolate, cuneate to rounded at base, glabrous, ± densely papillate or shortly hairy, often distinctly discolourous; petioles 0,7–6,5 mm long; stipular sheath typically with (3–)5(–7) filiform setae*, seldom with only 1 ± triangular seta, the longest (0,3–)0,7–6,1 mm. *Flowers* mostly on short lateral branches, in ± sessile to somewhat elongated clusters of many to 6 (less commonly only 2) at nodes; corolla 4-merous, greenish to yellow or yellowish, sometimes reddish purplish tinged, mostly papillate or shortly hairy at least near tip. ♀, ♂: tube (1,5–)2–3,7 mm long (in ♀ often longer than in ♂), cylindrical, lobes (1,5–)2–2,7(–3,4) × 0,3–0,7 mm; anthers (0,9–)1,2–2(–2,5) mm long; ♂: small rudimentary ovary and stigmas present, the latter hidden in corolla tube; ♀: gynoecium as in ♀ but stigmas only c. (2–)2,4–5(–6,4) mm long. ♀: tube 0,3–0,7(–1,2) mm long, lobes 0,3–0,7(–1) × 0,1–0,3 mm; style ± 0–0,8 mm long; stigmas 2, (2–)4–10,2 mm long; ovary 0,5–1,2 × 0,4–0,7 mm, sometimes with 4 often indistinct calyx lobes. *Fruit* yellowish brown or reddish brown, mostly with ± broad, conspicuous longitudinal grooves between mericarps; mericarps (1,5–)1,7–2,5(–2,8) × 0,9–1,6 mm, elliptic, oblong to ±obovate, ± densely covered with ± tuberculate structures, shortly hairy, papillate or subglabrous, occasionally with 2 obscure, ± triangular to rounded calyx lobes c. 0,2–0,3 × 0,2–0,3 mm. *Chromosome number*: 2n=22. Fig. 4; 5: 5 & 6.

Occurring from Transvaal to the south-western Cape; extending north to Ethiopia and the south-western Arabian Peninsula. Growing in forest edge vegetation, scrub, riverine thicket, at the edge of marshes, in (fire-prone) grassland, on rocky slopes or occasionally in littoral scrub and near the sea in the salt spray zone. Map 15.



MAP 15.—**Anthospermum herbaceum**

Vouchers: *Thompson* 1814 (PRE; STE); *Van der Schijff* 5596 (K; PRE); *Ward* 4316 (K; NH; NU; PRE).

Highly variable in most of its characters. *A. herbaceum* contains a number of 'Forms' or ecotypes which in places are quite distinct and well discernable. Some of the more conspicuous are:

* Setae should not be confused with small, sometimes ± linear short shoot leaves crowded in axils of long shoot leaves!

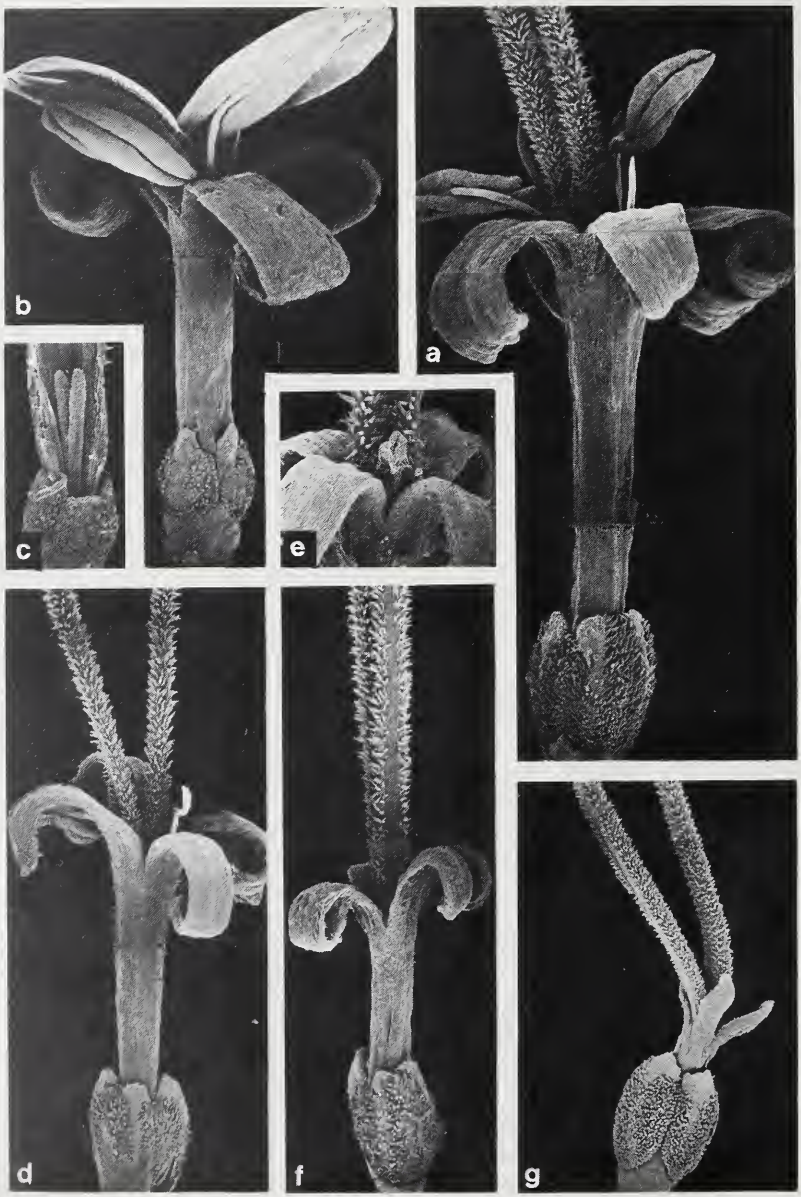


FIG. 4.—**Anthospermum herbaceum**, flowers from a single plant: a, ♀, × 17,5; b, ♂, × 17,5; c, ♂, rudimentary gynoecium, corolla tube opened to show rudimentary stigmas, × 25; d & f, functionally ♀ with rudimentary anthers, × 17,5; e, detail of rudimentary anther, × 25; g, 'pure' ♀ without anther rudiments, × 17,5 *(Puff* 780409-1/1) (SEM-graphs).

— The ('typical') 'Afromontane Forest (Edge) Form': Rather robust plants with the longest (scrambling, straggling) stems and the largest leaves; mostly growing in shady, moist to wet places.

— The '(Burnt) Grassland (*'A. hedyotideum'*) Form': ± erect, several- to many-stemmed plants, hardly more than 300 mm tall; stems mostly unbranched, arising from a ± massive woody base; partial inflorescences normally very few- to one-flowered.

— The 'High Altitude (Grassland) Form': Often found at the base of boulders or small rocks in high altitude grassland. Low prostrate plants which often form mats or cushions; stems usually very short (c. 100 mm), leaves small and relatively broad, inflorescences much reduced, flowers often only paired at nodes. Plants occurring in trampled areas (at lower altitudes) are similar in appearance but do not usually form dense cushions.

— The 'Salt Spray Zone Form': Mostly growing in cracks of rocks near the sea. Glabrous, ± prostrate plants with rather broad leaves which tend to be quite succulent; the stipular sheaths often only bear a single seta; the partial inflorescences are frequently only 1-flowered. Not very common, from the Natal South Coast to the Transkei (Wild Coast).

In the south-westernmost part of its distribution range, subglabrous and rather short-lived (?) forms with narrow, lanceolate leaves and rather reduced inflorescences are predominant in places. Similar forms, but with more slender stems and longer internodes, occur on the Natal South Coast.

In the south-western Cape, *A. herbaceum* should not be confused with *Carpacoce spermacocea* (vegetatively rather similar but characterized by a strong foetid odour, by flowers with only one stigma and one fertile carpel and by fruits with leaf-like calyx lobes which do not separate into mericarps) and ecotypes of *A. galioides* (no. 13) with reddish stems and relatively broad, discolourous leaves (distinguished from *A. herbaceum* by smaller ♀ flowers, a differing fruit morphology and a different habit).

11. **Anthospermum pumilum** *Sond.* in F.C. 3: 31 (1865). Type: Orange Free State, Caledon River, *Zeyher* s.n. (S, holo.!; LY; SAM sub no. 16064, iso.!).

A. rigidum sensu auctt. Afr. austr., non Eckl. & Zeyh. (1836).

A. humile N.E.Br. in Kew Bull. 1895: 145 (1895). Type: Natal, Ulundi, *Evans* 370 (K, holo.!; NH, PRE-photo., iso.!).

A. ericoideum K. Krause in Bot. Jb. 39: 570 (1907); Engler, Pflanzenwelt Afr. 1: 574, fig. 508 (1910); Launert & Roessler in F.S.W.A. 115: 8 (1966). Type: South West Africa/Namibia, Auasberge, Damara-Namaland, *Dinter* 291 (B, holo.†?).

A. pumilum Sond. var. *pilosum* Phill. in Ann. S. Afr. Mus. 16: 112 (1917). Lectotype: Lesotho, Leribe Plateau, *A. Dieterlen* 629 (SAM!; GRA; K; NH; PRE; STE, isolecto.!).

A. spicatum Suesseng. in Trans. Rhod. Sci. Assoc. 43: 55 (1951). Type: Zimbabwe, Marandellas, *Dehn* 547 (M, holo.!).

A. frutescens Dinter, nom. nud. [South West Africa/Namibia, Auros, Otavi, *Dinter* 5659].

A species widely distributed in the Flora area (except for the south-western Cape) and extending north to southern Tanzania and to Angola. Belongs to the *Anthospermum galioides* group, which is centred in the south-western and western Cape (no. 13–16). The Natal South Coast sandstone endemic, *A. streyi* (no. 12), also forms part of this alliance.

Two subspecies are recognized:

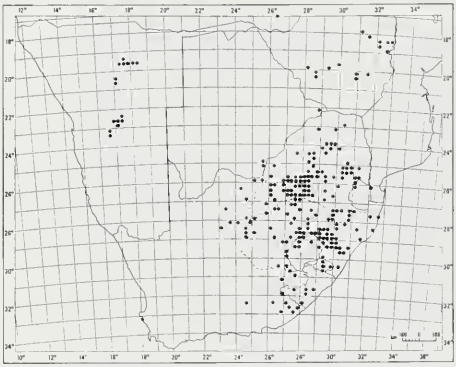
11(a). subsp. **pumilum.**

Synonyms as above.

Subshrub, ♀, ♀ + ♀, ♀, occasionally ♂ or ♀ + ♂, rounded to cylindrical. *Stems* numerous, unbranched, c. (50–)80–200(–300) mm long, arising from a massive, often ± rosette-like woody base (if exposed to fire) or dwarf shrub, much branched, to 400 mm tall, with thick, woody root; plant mostly ± densely leafy. *Leaves* decussate, pseudoverticillate; blades (4–)6–12(–22) × (0,5–)0,8–1,5(–2) mm, linear, linear-(ob-)lanceolate or narrowly lanceolate, ± membranous; flat to somewhat revolute margins mostly papillate, midrib below often reddish brown and prominent; petioles subobsolete; stipular sheath with 1 (rarely 3) small seta(e). *Flowers* subsessile, in clusters of 6–2 (occasionally more) at nodes; corolla 4-merous, greenish to yellowish, often papillate near tip. ♀, ♂: tube (0,5–)0,7–1,4(–1,7) mm long, narrowly funnel-shaped, lobes 1,2–1,9 (–2,5) × 0,3–0,7 mm; anthers 1–1,8(–2) mm long; ♀: stigmas often shorter than in ♀. ♀: tube 0,2–0,5 mm long, lobes 0,2–0,5 × 0,1–0,2 mm; style 0–0,5 mm long; stigmas 2, 2,4–9,8 mm long; ovary c. 0,5–0,9 × 0,3–0,8 mm, with 4 ± indistinct calyx lobes. *Fruit* reddish brown, shiny; mericarps (1,5–)1,8–2,4 × 1–1,5 mm, elliptic to obovate, mostly ± glabrous, often with 2 ± broadly triangular to rounded calyx lobes c. 0,1–0,3 × 0,3–0,4 mm. *Chromosome number*: 2n=22. Fig. 5: 10.

Known from South West Africa/Namibia and south-eastern Botswana and from Transvaal to the eastern and north-eastern Cape. Usually growing in (rocky) grassland or open woodland; mostly in fire-prone habitats. Map 16.

Vouchers: *Flanagan* 1217 (BOL; GRA; PRE; SAM); *Liebenberg* 6949; *McClean* 659 (NH; PRE); *Obermeyer* 110, 2769.



MAP 16.—**Anthospermum pumilum** subsp. **pumilum**

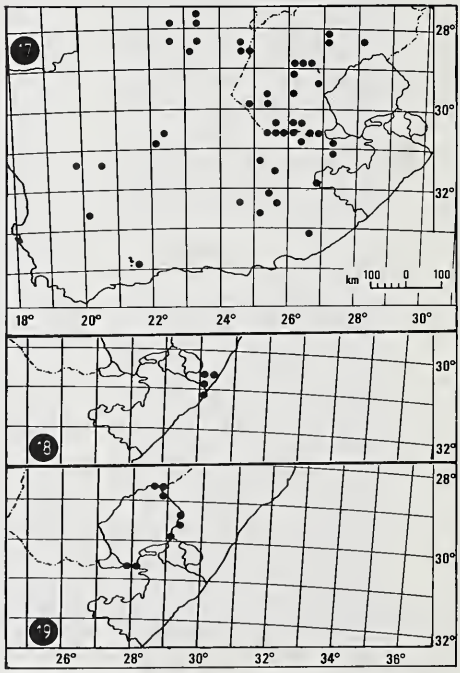
Some populations from Transvaal and Natal are characterized by an unusual ± cushion- or mat-forming habit, slightly larger flowers than typical subsp. *pumilum* and a trend towards unisexual flowers, i.e. dioecy (*'A. humile'*). They seem to be confined to ± wet seepage areas associated with rock sheets, etc.

11(b). subsp. **rigidum** *(Eckl. & Zeyh.) Puff,* comb. et stat. nov. Type: Cape, 'in collibus Karoo similibus (alt. II) prope fluvium "Gauritzrivier" . . .', *Ecklon & Zeyher* 2315 (S, holo.!; LY; SAM, iso.!). [See comments below].

A. rigidum Eckl. & Zeyh., Enum. 367 (1836).

Dwarf shrub, ♂, ♀ (occasionally ♀ + odd ♂ or ♀ + odd ♀) or ♀, several- to many-stemmed, ± erect and cylindrical to ± rounded, with often thick, woody root; low and ± cushion-forming or with long, thin shoots from a thick woody base if browsed. *Stems* (100–)200–400(–550) mm long, ± sparingly to much branched; branching irregular if browsed; internodes mostly longer than leaves, plant not densely leafy. *Leaves* decussate, sometimes ± pseudo-verticillate (but short shoot leaves often distinctly smaller than long shoot leaves); blades 3–6(–8) × 1–1,5 mm (occasionally to 22 × 3 mm on new growth), narrowly ovate- or obovate-lanceolate, lanceolate to linear-lanceolate, ± tough and thickish, glabrous or margins papillate, upper epidermis cells often ±large and conspicuous; stipular sheath with or without a minute seta. *Flowers* subsessile (in fruiting ♀ pedicels occasionally to 0,5 mm long), in clusters of 2–6 (rarely more) at nodes; corolla 4-merous (very rarely 5-merous in ♀). ♂, ☿: tube 0,5–1,5(–1,9) mm long (in ♀ often somewhat longer than in ♂), narrowly funnel-shaped to ± cylindrical, lobes (1,7–)2,2–3 (–3,2) × 0,5–0,8 mm, anthers 1,5–2,2(–2,5) mm long; ♂: small rudimentary ovary present, often with rudimentary stigmas; ☿: stigmas often shorter than in ♀. ♀: tube 0,2–0,5 mm long, lobes 0,3–1 × 0,1–0,3 mm, style ± 0–1 mm long; stigmas 2, c. 3,4–7,5 mm long; ovary c. 0,6–0,9 × 0,5–0,7 mm. *Fruit:* mericarps 2–2,6(–2,8) × 1–1,5 mm, mostly ± sparsely covered with whitish, curved, ± hook-like hairs c. 0,1–0,3 mm long. *Chromosome number*: 2n=22.

Known from the Orange Free State and Cape, possibly also in western Lesotho. Mostly growing in rocky places (koppies, hillsides, etc); usually in relatively dry karroid and 'false karroid' vegetation types. Map 17.



MAPS 17–19:—17. **Anthospermum pumilum** subsp. **rigidum**
18. **Anthospermum streyi**
19. **Anthospermum basuticum**

FIG. 5.—1–3, **Anthospermum bicorne:** 1, plant, × 0,56 *(Bolus* 341); 2, fruit in side view, × 10; 3, from back, sterile carpel (arrow) with 2 enlarged calyx lobes, × 10 *(Puff* 800101-5/1). 4, **A. basuticum,** fruit in side view, × 10 *(Puff* 790113-5/3). 5 & 6, **A. herbaceum:** 5, fruit in side view, note broad longitudinal groove between mericarps, × 10; 6, mericarp, ventral side, note longitudinal median ridge, × 10 *(Puff* 810916-3/1). 7, **A. streyi,** fruit in side view, × 10 *(Puff* 790426-3/1). 8, **A. galioides** subsp. **galioides,** mericarp, ventral side, with attached carpophore (arrow), × 10 *(Puff* 790913-2/1). 9, **A. littoreum,** carpophore, × 10 *(Puff* 790415-5/1). 10, **A. pumilum** subsp. **pumilum,** longitudinal section of ovary showing ovules, × 10 *(Puff* 790112-2/1).

Vouchers: *Brynard* 132 (K; PRE); *Galpin* 2013; *Herman* 348; *Leistner & Joynt* 2734 (K; KMG; PRE; SRGH).

The type locality of *A. rigidum* appears to be clearly outside the distribution range of the taxon. The Gouritz River valley both north and south of the Langeberge, however, is characterized by karroid vegetation rather than south-western Cape fynbos. See Muir's "Vegetation of the Riversdale Area" [Mem. bot. Surv. S. Afr. 13 (1929)] for details.

In a number of respects, subsp. *rigidum* is ± intermediate between *A. dregei* subsp. *dregei* (no. 15) and subsp. *pumilum*. Some western collections of subp. *rigidum* (e.g. *Acocks* 17746) are rather similar to *A. dregei* but in its eastern and north-eastern range of distribution subsp. *rigidum* shows much greater affinity to subsp. *pumilum*.

The separation of subsp. *pumilum* and *rigidum* is not always clear-cut in the north-eastern Cape and in parts of the Orange Free State where their distributions overlap. Environmental factors in particular (fire-exposure and browsing) often complicate the separation of the subspecies: Shrubby plants of subsp. *pumilum* sheltered from fire may somewhat resemble the more robust subsp. *rigidum* (occurring in less fire-prone habitats); browsed plants of subsp. *rigidum* may superficially look very similar to subsp. *pumilum*. Subsp. *rigidum* differs in having larger (♂, ♀) flowers and in its clear trend to dioecy.

12. **Anthospermum streyi** *Puff, sp. nov., habitu dissimili, foliorum laminis magis acerosis, saepe recurvatis et floribus hermaphroditis majoribus ab* A. pumilo *distinguitur*.

Type: Natal, Port Shepstone distr., Beacon Hill East, *Strey* 7248 (NH, holo.!; K; NU; PRE, iso.!).

Dwarf shrub, ♂ or ♀ (always?), procumbent and ± straggling, sometimes cushion-forming. *Stems* c. (100–)150–300(–400) mm long, ± sparsely to much branched, mostly densely leafy. *Leaves* decussate, pseudoverticillate; blades often curved, (5–)8–12 × (0,3–)0,5–0,8(–1) mm, linear to linear-lanceolate, often seemingly terete and needle-like when dried due to strongly revolute margins, glabrous, midrib below (and sometimes also upper surface) reddish brown; petioles subobsolete; stipular sheath mostly with a seta to 0,6 (–1) mm long. *Flowers* subsessile, in clusters of 2–6 at nodes; corolla 4-merous, yellowish, often with a few short hairs near tip. ♂: tube 1–1,3 mm long, narrowly funnel-shaped, lobes (1,3-)1,5–2,5 (–3) × 1 mm; anthers 1,3–2 mm long; style 0; stigmas 2, 3–5 mm long; ovary c. 0,8–1,2 × 1 mm, with 4 indistinct calyx lobes. ♀: tube c. 0,3–0,5 mm long, lobes 0,2–0,5 × 0,2 mm; gynoecium as in ♂. *Fruit* reddish brown, ± heart-shaped in side view; mericarps 2–2,5 × (1–)1,2–1,5 mm, ovate to obovate, ± sparsely covered with curled whitish hairs c. 0,1–0,2 mm long, sometimes with 2 indistinct ± triangular calyx lobes c. 0,1–0,2 mm long. *Chromosome number*: 2n=22. Fig. 5: 7.

Narrowly endemic to the Natal South Coast (Port Shepstone distr.). Growing on rocky outcrops in grassland, amongst rocks, at the edge of krantzes. Map 18.

Vouchers: *Huntley* 752 (NH; NU); *Nicholson* 1145.

A. streyi 'replaces' the closely allied and widely distributed *A. pumilum* subsp. *pumilum* (above) in the sandstone areas of Natal's southern border. It differs from the latter in habit, in its more needle-like, often curved leaf-blades, in having larger ♂ flowers and rounder (larger) fruits.

13. **Anthospermum galioides** *Reichb. f.* in Sprengel, Syst. Veg. 4: 338 (1827). Type: 'C.B.S.', no collector given [*C. W. Bergius* s.n. (B †; G, neo.!)].[1]

A. ciliare L., sensu auctt.[1]

Subshrub or dwarf shrub with often thick, woody root, ♂, ♂ + ♀, ♀, less commonly ♂ or ♂ + ♂, several to many-stemmed, erect and ± cylindrical, rounded or prostrate and ± mat- or cushion-forming. *Stems* c. (50–)80–300 (–500) mm long, unbranched to much branched, not rooting at nodes in prostrate forms. *Leaves* decussate, pseudoverticillate; blades ascending to spreading, often recurved at least near tip, (2,2–)2,7–10(–12) × (0,5–)0,8–2,5(–3) mm, linear to lanceolate or ovate-lanceolate [occasionally to 20 × 4 mm, (ovate-lanceolate on young flowering plants or new growth], ± membranous to ± tough and thickish, sometimes distinctly discolourous, upper surface often shiny and with large, conspicuous epidermis cells; margins flat to strongly revolute with whitish spreading hairs c. 0,1–0,4 mm long, only minutely scabrid or entirely glabrous; petioles ±0–1 mm long; stipular sheath with a (± broadly) triangular to subulate seta c. (0,5–)0,7–1,5(–2) mm long. *Flowers* subsessile, in clusters of 2–6 (rarely more) at nodes;

[1] Cruse in Linnaea 6: 11 (1831) considered *A. galioides* to be a synonym of '*A. ciliare* L.', a conclusion reached after studying 'Reichenbach's specimen'. Hence all specimens (including the above Bergius collection) cited by Cruse (op. cit. & Rub. Cap. 14, 1825) under '*A ciliare* L.' can be considered to be identical to *A. galioides*. Since Cruse's publications on Cape Rubiaceae (op. cit.) the name *A. ciliare* has been consistently misapplied [the type of *A. ciliare* L. (1763) corresponds to *A. bergianum* Cruse (1825)]. It has been proposed to reject the name *Anthospermum ciliare* L., Sp. Pl., edn 2: 1512 (1763); see Puff in Taxon 31: 759 (1982) for details.

corolla 4-merous (very rarely also odd 5-merous ♂ and 3-merous ♀), greenish yellow to yellowish, sometimes reddish purplish tinged outside, mostly shortly hairy or papillate at least near tip. ♂, ☿: tube 0,7–1,7(–2) mm long, ± cylindrical to (narrowly) funnel-shaped, lobes 1,4–2,4(–2,9) × 0,3–0,8(–1) mm; anthers (0,7–)1–1,8(–2,1) mm long; ☿: stigmas often shorter than in ♀. ♀: tube 0,2–0,5 mm long, lobes 0,2–0,8 × 0,1–0,3 mm; style ± 0–0,6 mm long, stigmas 2, 2–8,1 mm long, whitish grey, greyish or (seldom) purplish; ovary c. 0,3–0,7 × 0,3–0,5 mm, often with 4 ± indistinct calyx lobes. *Fruit* reddish brown, shiny; mericarps (1,5–)1,7–2,4 × 0,9–1,3(–1,5) mm, elliptic to obovate, glabrous, ± sparsely covered with very short whitish hairs or distinctly papillate, occasionally with 2 indistinct calyx lobes to 0,2 × 0,2 mm. *Chromosome number*: 2n=22.

One of the most common and widely distributed southwestern Cape species of *Anthospermum*, *A. galioides* is ecologically eurytopic and highly variable in most of its characters. It is, nevertheless, possible to subdivide the species into two subspecies which are (at least in part) ecologically distinct and normally easily separated morphologically.

A. galioides and allied species (nos. 11 & 12, 14–16) form a highly complex group. Some forms of *A. galioides* may morphologically rather closely resemble *A. pumilum* subsp. *pumilum* (no. 11), others may be similar to *A. prostratum* (no. 14) or approach *A. dregei* subsp. *ecklonis* (no. 15) in certain characters. In terms of absolute measurements, several characters often overlap considerably between these taxa and, in addition, some characters are variable within a given taxon. Differences sometimes only become evident in the field and/or if their growth habit and habitat are known.

Two subspecies are recognized:

13 (a). subsp. **galioides.**

A. ciliare L. var. *angustifolium* Eckl. & Zeyh., Enum. 366 (1836). Type: Cape, . . . ad radicem montis 'Duyvelsberg', in monte prope 'Tokay' (Cap), in montibus 'Hottentottshollands- et Hauhoeksberge' (Stellenbosch), prope 'Caledon', *Ecklon & Zeyher* 2308 γ (FI!; LY!; M!; MO!; S!; SAM!; W!; as '51–8: Caledon': S!).

A. ciliare L. var. *glabrifolium* Sond. in F.C. 3: 29 (1865). Type: none given.

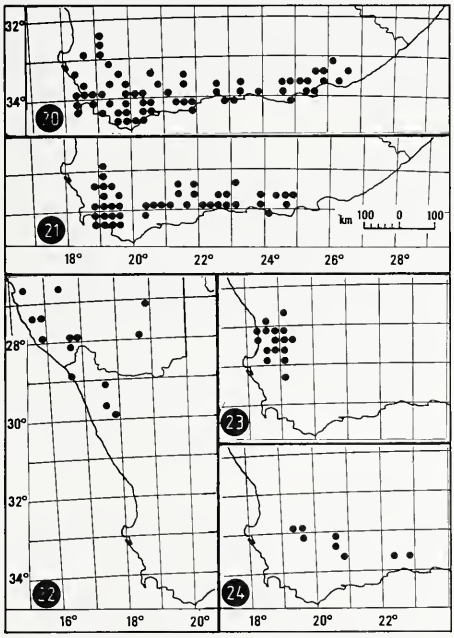
A. ciliare L. var. *latifolium* Eckl. & Zeyh., Enum. 366 (1836). Type: Cape, prope 'Somerset' in 'Hottentottsholland' (Stellenbosch), *Ecklon & Zeyher* 2308β (FI!; GOET!; LY!; M!; MO!; S!; SAM!; W!).

A. ciliare L. var. *papillatum* Sond. in F.C. 3: 29 (1865); Salter in Jl S. Afr. Bot. 3: 110 (1937), in Adamson & Salter, Fl. Cape Penins. 733 (1950). Type: Cape, Simon's Bay and Rietvalley; no collector given.

A. ciliare L. var. *scabrum* Eckl. & Zeyh., Enum. 366 (1836), *pro parte*. Type: Cape, . . . inter 'Coega- et Zondagsrivier', in planitie prope 'Krakakamma' inque alveo lapidoso fluminis 'Zwartkopsrivier' (Uitenhage), *Ecklon & Zeyher* 2308 δ (B!; FI!; G!; GOET!; LY-one sheet!; P-one sheet!; S!; SAM!; W!) [specimens mixed, subsp. *reflexifolium* in other herbaria].

A. aethiopicum L. var. *ciliare* (L.) Kuntze, Rev. Gen. 3: 117 (1898). Type: as for *A. ciliare*.

Sex distributions and growth form as for species as a whole. *Stems*: younger parts mostly densely covered with short whitish hairs or papillae. *Leaves*: blades linear to ovate-lanceolate, at least margins ciliate; if glabrous, blades ascending or spreading and straight, not distinctly recurved. *Fruit* distinctly papillate or shortly hairy; if glabrous, mericarps mostly not longer than 2 mm. Fig. 5: 8.



MAPS 20–24:—20. **Anthospermum galioides** subsp. **galioides**
21. **Anthospermum galioides** subsp. **reflexifolium**
22. **Anthospermum dregei** subsp. **dregei**
23. **Anthospermum dregei** subsp. **ecklonis**
24. **Anthospermum comptonii**

Widely distributed in the south-western Cape and, in the east, slightly extending beyond the Cape Floristic Region to the Alexandria and Albany distr. Found in all principal vegetation types of the Cape Flora except for the West Coast Strandveld and occurring on rocky slopes, in sandy flats or gravelly areas and sometimes also in disturbed sites; growing over a variety of different substrates (TMS, shale, granite, Witteberg quartzite, limestone). Map 20.

Vouchers: *Oliver* 4368 (K; PRE; STE); *Taylor* 3805 (K; PRE; STE); *Van Breda & Joubert* 1927.

'Typical' subsp. *galioides* is characterized by having ovate-lanceolate to linear-lanceolate (due to revolute margins) leaves with ciliate margins; plants are often many-stemmed and ± densely tufted; fruits are either glabrous and shiny or shortly hairy. This 'typical' form appears to be centred in the Cape Peninsula.

Two more 'forms' (ecotypes) are occasionally quite distinct:

— The *'Papillatum* Form': plants with ± few to several, often ± erect stems; leaves (narrowly) lanceolate to linear, glabrous; fruits mostly distinctly papillate. In habit it may resemble *A. pumilum* subsp. *pumilum* (no. 11a, which, however, does not extend into the Cape Floristic Region). This form may be ± confined to Mountain Fynbos and TMS areas; recorded from the Cape Peninsula east to the Caledon distr. and north(-east) to the Worcester, Ceres (Cold Bokkeveld Mts), Piketberg and Clanwillian districts (Cedarberg).

— The *'Prostratum* Form': characterized by an often entirely prostrate habit. Stems radiate out from a common base and form ± dense mats; they do not root at the nodes. Leaves are small but relatively broad, margins are glabrous or sometimes ciliate; fruits are glabrous or shortly hairy and smaller than in the other forms (hardly 2 mm long). Occurring from the Caledon distr. east to the Suurbergpas north of Addo and north to the Ceres and Lainsburg distr.; possibly also in the Cape Peninsula. Most frequently found in fertile soils (often associated with *Elytropappus rhinocerotis),* occasionally in limestone areas or, inland, over Witteberg quartzites; apparently never in TMS areas. Should not be confused with *A. prostratum* (no. 14).

13(b). subsp. **reflexifolium** *(Kuntze) Puff,* comb. et stat. nov. Type: Cape, Swellendam, *Kuntze* s.n. (US sub 554666, holo.!; K, iso.!).

A. aethiopicum L. var. *reflexifolium* Kuntze, Rev. Gen. 3: 117 (1898).

A. ciliare L. var. *scabrum* Eckl. & Zeyh., Enum. 366 (1836), *pro parte.* Type: *Ecklon & Zeyher* 2308 δ (LY-one sheet!; M!; MO!; P-one sheet!) [see also subsp. *galioides*].

Plants mostly ♂, ♀ + ♀ or ♀, densely leafy, ± erect, cylindrical and quite woody to less densely leafy, ± rounded, weaker and ± subshrubby. *Stems*: younger parts often only with two rows of short hairs. *Leaves*: blades linear-lanceolate to lanceolate, recurved (at least near tip) to strongly recurved, mostly firm, thickish and almost leathery, glabrous (save for, sometimes, minute prickles on margins). Partial inflorescences mostly only 1-flowered. *Fruit* shiny, glabrous, epidermis cells often large and conspicuous, but mericaps never distinctly papillate or shortly hairy; mericarps relatively large, c. 2–2,4 mm long.

Occurring from the Porterville Mts (Schurweberge) south to the Caledon distr.; eastwards following the mountain ranges to the Groot Winterhoekberge, the Kouga Mts and the Humansdorp distr. Growing in dry places in Mountain Fynbos, sometimes also at the edge of riparian communities, in wooded kloofs and well drained slopes; perhaps confined to TMS areas. Map 21.

Vouchers: *Kruger* 1423 (PRE; STE); *Schlechter* 9149 (BM; BOL; COI; E; G; K; MO; P; PRE; S; US; W); *Taylor* 9664 (PRE; STE).

In the eastern part of the south-western Cape Region, plants often appear more robust and shrubbier than elsewhere, are densely leafy and bear small, quite firm and thickish leaves to c. 5 mm long. Some of these forms (e.g. *Acocks* 23082) are so different from 'typical' subsp. *reflexifolium* in habit and appearance that they should perhaps be recognized taxonomically (as a closely allied new species?). In the Caledon and Worcester distr., on the other hand, specimens may be so close to subsp. *galioides* in certain characters, that the separation of the subspecies sometimes becomes difficult.

Within subsp. *reflexifolium* there appear to be two ± well defined ecotypes:

— 'Typical' subsp. *reflexifolium,* which seems to be confined to moderately dry areas in Fynbos vegetation (the above mentioned eastern forms belong here).

— Plants of *moister habitats* which differ in habit: dense, rounded bushes to 0,5 m in diam.; stems often much-branched; internodes long, plants thus appear less densely leafy.

14. **Anthospermum prostratum** *Sond.* in F.C. 3: 28 (1865); Salter in Jl S. Afr. Bot. 3: 110 (1937), in Adamson & Salter, Fl. Cape Penins. 733 (1950). Type: only given for varieties cited below.

A. prostratum Sond. var. *glabrum* Sond. in F.C. 3: 28 (1865). Type: Cape Flats, *Ecklon* s.n. (S, holo.!; LY, iso.!) [selected as type of *A. prostratum*].

A. prostratum Sond. var. *velutinum* Sond. in F.C. 3: 28 (1865). Type: Cape Flats, *C. Wright* [491] (S, holo.!).

Dwarf shrub or subshrub with basally woody stems, dioecious (very seldom ♂ with odd ♀), prostrate, often with ± thick, woody tap root. *Stems* trailing, rooting at nodes, to c. 1 m long, with ascending to ± erect short lateral branches, c. 10–50(–100) mm long. *Leaves* decussate, pseudoverticillate; blades (5–)7,5–12 × 0,7–2(–2,3) mm, lanceolate, oblanceolate to ± linear-lanceolate, glabrous or (lower half of) margins papillate; petioles subobsolete; stipular sheath mostly with a small ± broadly triangular

seta. *Flowers* subsessile, on short lateral branches, single or paired at nodes (seldom in paired 3-flowered cymes); corolla 4-merous (very seldom also 5-merous in ♂), yellowish to greenish yellow, frequently tinged reddish purplish outside, glabrous. ♂ (odd ☿): tube 1,2–2,3 mm long, narrowly funnel-shaped, lobes (2–)2,4–3(–3,7) × 0,7–1 mm; anthers 1,5–2,2 mm long; ♂: small rudimentary ovary present. ♀: tube (0,5–)0,7–0,9(–1,1) mm long, lobes 0,5–1 × 0,1–0,2 mm; style 0–1,3 mm long; stigmas 2, 4,8–10 mm long (shorter in odd ☿); ovary 0,7–1,4 × 0,5–1 mm, not crowned by conspicuous calyx lobes. *Fruit* reddish (brown), shiny; mericarps (2–)2,3–2,9 × 1,2–1,7 mm, (ob)ovate, glabrous or with very short whitish hairs, not crowned by distinct calyx lobes. *Chromosome number*: 2n=22.

Endemic to the south-western Cape and occurring in coastal areas from the West Coast (Malmesbury distr.) and Cape Peninsula east to the Port Elizabeth distr. Confined to dunes and sandy flats, c. 0–50(–75) m. Map 26.

Vouchers: *Acocks* 20675 (K; M; PRE; SRGH); *Bohnen* 7605 (PRE; STE); *Tölken* 35 (PRE; STE).

Well distinguished by its growth form and habitat. Relatively uniform in its characters except for the fruits (glabrous or shortly hairy).

15. **Anthospermum dregei** *Sond.* in F.C. 3: 29 (1865); Launert & Roessler in F.S.W.A. 115: 7–8 (1966). Type: Cape, between Koussie and Zilverfontein, *Drège* 3016 (S, holo.![1]; E; G; K; LY; MO; P; S[1]; SAM; W, iso.!).

Dwarf shrub, ♂, ☿, ☿ + ♀ or ♀, many-stemmed, diffusely to ± regularly branched, often ± rounded. *Stems* c. 150–400 mm long, branches ± irregular (especially if browsed), often divaricate. *Leaves* decussate, sometimes ± pseudoverticillate; blades 4–14(–20) × 1–4(–4,5) mm, ± ovate, oblong-lanceolate to ± lanceolate, ± membranaceous to thickish, glabrous or with a few papillae on margins, upper and/or lower surface; upper surface sometimes distinctly purplish brown, lower surface (light) green; margins ± revolute, convolutely rolled or ± flat; petioles ± 0–1 mm long; stipular sheath with or without a minute seta. *Flowers* subsessile (only in ♀ pedicels occasionally to 1 mm long), in clusters of 2–6 at nodes; corolla 4-merous (in ♀ occasionally also 5-merous), greenish yellow to creamy yellow or reddish purple, at least outside, sometimes papillate. ♂, ☿: buds 2,5–4 mm long; tube 0,7–1,4(–1,8) mm long, (narrowly) funnel-shaped to ± cylindrical, lobes 1,5–3,2 × 0,5–1,2 mm; anthers 1,3–2,8 mm long; ☿: stigmas 2, c. 1–3 mm long, greyish white, ovary c. 0,7–1,5 × 0,5–1 mm, often with 4 indistinct calyx lobes; ♂: small rudimentary ovary present. ♀: tube ± 0 or 0,1–0,7 mm long, lobes 0,2–1,3(–2) × 0,1–0,5 mm; style 0–0,7 mm long, stigmas 2, (2,5–)3–8,5 mm long, greyish white or (seldom) reddish purplish; ovary as in ☿ or somewhat larger. *Fruit* reddish brown, shiny; mericarps (1,5–)1,8–2,7 × 0,8–1,5 mm, ± oblong, glabrous or with a few papillae, mostly with 2 indistinct ± triangular calyx lobes to c. 0,2–0,3 mm long. *Chromosome number*: 2n=22.

Two subspecies are recognized:

15 (a). subsp. **dregei.**

A. thymifolium Dinter & Krause in Feddes Reprium 15: 91 (1917), nom. non valide publ. (sine descr.).

Robust dwarf shrub, thick-stemmed, to 400 mm tall, often irregularly (diffusely) and divaricately branched (especially if browsed); browsed plants sometimes ± cushion-forming and low; internodes normally much longer than leaves. *Leaves*: blades often broad and large, to 14(–20) × 4(–4,5) mm, ovate, ovate-lanceolate or oblong-lanceolate, thickish and tough, mostly papillate on lower and/or upper surface and margins, distinctly discolourous, upper surface often very dark; petioles usually c. 0,5–1 mm long. Plants mostly ♂, ♀; ☿ fairly uncommon. ♂ (☿): buds c. 3,5–4 mm long; corolla lobes 2,3–3,2 × 0,7–1,2 mm, glabrous. *Fruit* shiny, glabrous, carpophore c. 0,6–0,7 mm long; mericarps (1,8–)2,2–2,7 × 1–1,5 mm.

Known from the Namaqualand distr. and adjacent parts of South West Africa/Namibia (Lüderitz-Süd, Warmbad and Keetmanshoop distr.). Growing in semi-desert and desert areas; most commonly found in crevices, amongst rocks or sheltered under boulders on granite hills and outcrops, sometimes over mica-slate, seldom over sandstone. Map 22.

[1] There are two sheets in S. Only one of them, the sheet containing two specimens ('3016 ♂' and '3016 ♀'), bears the addition *'Dregei Sond.'* and *'8'* (=species number in Flora Capensis) in Sonder's handwriting; this must be considered the holotype.

Vouchers: *Goldblatt* 2397 (BR; MO; PRE; WAG); *Marloth* 12225 (PRE; STE); *Merxmüller & Giess* 3426 (BR; M; PRE; WIND).

Easily distinguished from subsp. *ecklonis* (below) by its more robust habit, its tough, thickish leaves and its clear trend to dioecy. These characters, however, are often only obvious in the field. Sheets only consisting of new shoots of browsed plants are difficult to identify (similar in both subspecies). Subsp. *dregei* occasionally closely approaches *A. pumilum* subsp. *rigidum* (no. 11b) in some morphological characters but the distribution ranges of the two taxa do not overlap.

15 (b). subsp. **ecklonis** *(Sond.) Puff,* comb. et stat. nov. Type: Cape, on the Olifantsriver and near Villa Brakfontein, *Ecklon* s.n. (S, holo.!; LY, iso.!).

A. ecklonis Sond. in F.C. 3: 32 (1865).

Rather weak dwarf shrub, thin-stemmed, often rounded, to c. 200 mm tall (less commonly more erect and to 400 mm tall), ± regularly branched (unless browsed), branches often numerous, ascending to erect; internodes often not much longer than leaves (except on new growth). *Leaves*: blades often narrow and short, 4–9(–12) × 1–2,5(–3) mm, (narrowly) oblong-lanceolate to lanceolate, ± membranaceous, glabrous or papillate (mainly on margins), ± discolourous; margins often revolute; petioles usually subobsolete. Plants ♂, ♂ + ♀ or ♀, rarely ♂. ♀(♂): buds c. 2,5–3,2(–3,8) mm long; corolla lobes 1,5–2,5(–3) × 0,5–0,8 mm, mostly a little hairy or papillate outside. *Fruit* shiny, glabrous or covered with some papillae, carpophore c. 0,3–0,5 mm long; mericarps (1,5–)1,8–2,2 × 0,8–1,1 mm.

Endemic to the western part of the Cape Floristic Region; occurring from the south-western Calvinia distr. and Clanwilliam distr. south to the Tulbagh distr. where its distribution range closely follows the distribution of TMS. Growing in crevices, in gravelly soil or sandy places between rock(sheets) or in depressions of large open rock surfaces in areas of very dry Fynbos. Map 23.

Vouchers: *Acocks* 15194 (K; PRE); 17479 (K; PRE); *Oliver* 3836 (K; PRE; STE).

Should not be confused with *A. comptonii* (below) and with the closely allied and very variable *A. galioides* subsp. *galioides* (no. 13a), some forms of which may rather closely resemble *A. dregei* subsp. *ecklonis* in leaf size and shape and fruit morphology.

16. **Anthospermum comptonii** *Puff, sp. nov., ab* A. dregei *subsp.* ecklone *mericarpiis longioribus et floribus masculis majoribus differt.*

Type: Cape, south side of Witteberg, farm Fisantekraal, c. 1200–1300 m, *Puff* 790914-3/2 (WU, holo.!; BOL; NBG; PRE; STE, iso.!).

Dioecious dwarf shrub, many-stemmed, ± regularly to diffusely branched, rounded to ± cylindrical or, if browsed, low cushion-like; with thick woody, sometimes twisted (tap-)root to c. 10(–20) mm in diam. *Stems* to c. (200–)300 mm long, branches few to numerous, ascending to ± erect, often irregular and ± spine-tipped if browsed. *Leaves* decussate; blades 5–8(–10) × 0,8–1,2 mm, narrowly ovate-lanceolate to linear-lanceolate (broader, to 2 mm, on new growth of browsed plants), thickish and ± tough, glabrous except for odd papillae on margins; upper surface shiny, with large conspicuous epidermis cells, midrib below often ± prominent and broad; margins usually revolute; petioles subobsolete; stipular sheath with an often indistinct minute seta. *Flowers* subsessile (in fruiting ♀ pedicels occasionally c. 0,2–1 mm long), single or paired at nodes; corolla 4-merous, (greenish) yellow or (dark) purplish at least outside, glabrous or occasionally papillate near tip. ♂: buds 3,5–4,2 mm long; tube 1–1,7 mm long, (narrowly) funnel-shaped, lobes 2,7–3,2 × 0,7–1 mm; anthers 1,9–2,4 mm long; small rudimentary ovary present, often with broad ± rounded calyx lobes to 0,3 mm long. ♀: tube 0,1–0,2 mm long or ± 0, lobes 0,7–0,8(–1) × 0,2–0,3 mm; style ± 0–0,7 mm long; stigmas 2, 2,7–5,6 mm long; ovary 1–1,4 × 0,5–0,9 mm, with ± indistinct calyx lobes. *Fruit* reddish brown, shiny; mericarps 2,7–3 × 1,5–1,7 mm, ± obovate, glabrous or (rarely) with odd papillae, with 2 ± indistinct, rounded to ± triangular calyx lobes c. 0,1–0,3 × 0,3 mm. *Chromosome number*: 2n=22.

Occurring inland of the major south-western Cape folded ranges from the southern Schurweberge and the Swartruggens to the Witteberg and the Touwsberge (Ceres, Lainsburg and Ladismith districts); also further east in the western Uniondale distr. Growing in rock fissures and crevices, among boulders or at the base of rocks in Arid Fynbos but also intruding into (open succulent) Karoo vegetation; often in Witteberg quartzite areas. Map 24.

Vouchers: *Compton* 3662 (BOL); *Levyns* 7482 (BOL); *Taylor* 5917 (PRE; STE).

Closely allied to *A. dregei* susbp. *ecklonis* (above) but distinguished by its larger mericarps and larger ♂ flowers. *A. comptonii,* furthermore, is strictly dioecious, occurs in more arid areas than the former and does not grow on TMS-derived substrates. Browsing appears to account for most of the variability in the species. Continued browsing results in low cushion-like growth forms.

♂ specimens should not be confused with *Nenax elsieae* which is similar in habit and, in part, occurs in the same general area. The latter differs in having needle-like leaves which are ± triangular to semiterete in section.

17. **Anthospermum esterhuysenianum** *Puff, sp. nov., combinatione characterum: habitu implexo vel caulibus serpentibus, floribus solitariis terminalibus ramis brevibus saepe superatis, corollis 5-meris facile distinguitur.*

Type: Cape, Ceres-Tulbagh distr., Witzenbergen, Swartgat Peak, *Esterhuysen* 27926 (BOL, holo.!).

Subshrub, ± woody near base and with woody tap root or ± dwarf shrub, mat-forming or trailing, ♀, ♀ + ♀, ♀ or occasionally ♂. *Stems* c. (60–)120–300 mm long, prostrate, mostly much branched, branches often single at nodes or, if paired, frequently of unequal length. *Leaves* decussate, sometimes ± pseudoverticillate, occasionally slightly anisophyllous; blades 4–6(–7,5) × (1,4–)2–3(–4) mm, oblong, elliptic, ovate, ovate-lanceolate to lanceolate, glabrous or margins and often also upper surface with white spreading hairs c. 0,2–0,4 mm long; petioles ± 0–0,5 mm long; stipular sheath with a small seta. *Flowers* solitary, terminal on shoots, often overtopped by lateral branches arising below, shortly pedicellate, pedicels c. 0,2–0,3(—1) mm long, often slightly elongated and curved in fruit; corolla 5-merous (very rarely 4-merous), yellowish to greenish yellow, often dark purplish tinged outside, glabrous or hairy. ♀, ♂: tube 1–1,8(–2) mm long, ± cylindrical or narrowly funnel-shaped, lobes (2–)2,2–3(–3,5) × 0,5–1(–1,3) mm; anthers 1,4–1,9 mm long; ♂: rudimentary ovary minute; ♀: gynoecium as in ♀. ♀: tube ± 0–0,3 mm long, lobes 0,6–0,9 × 0,4 mm; style 0; stigmas 2, (4,5–)5,5–7,5(–9) mm long; ovary c. 0,8–1,2 × 0,7–1 mm, with 5 minute calyx lobes. *Fruit* brownish; mericarps 1,9–2,5 × 1,3–1,5 mm, ovate, ± obovate or oblong, ± densely papillate, mostly with 2 or 3 indistinct calyx lobes (0,2–)0,3–0,5 × 0,2 mm. *Chromosome number*: 2n=22.

Occurring in the higher parts of the south-western Cape mountains in rocky places; apparently confined to shale bands and shale-derived soils.

A very distinct and unmistakable Cape mountain endemic. It should not be confused with low-growing ecotypes of *A. galioides* subsp. *galioides* (no. 13a) which do not occur in the mountains and differ in branching pattern, inflorescence and their 4-merous flowers. Resemblances to *A. galioides* are superficial and do not point to a close relationship; the species occupies a rather isolated position in the genus.

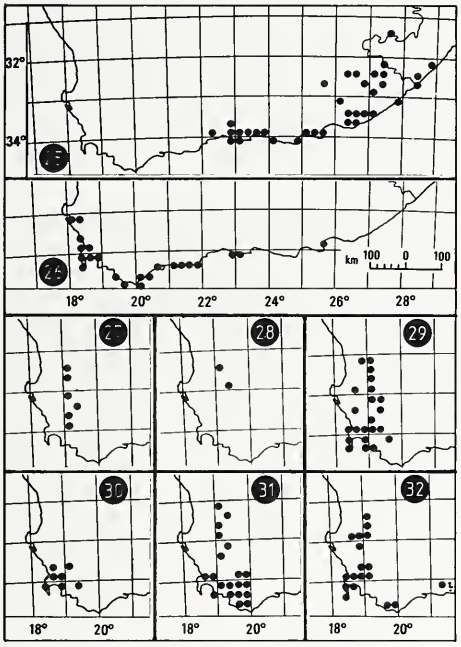
Two varieties are recognized:

17 (a). var. **esterhuysenianum.**

Leaves and corollas glabrous; leaf blades oblong, elliptic or ovate, apices ± obtuse or acute.

Confined to the high mountains in the triangle Clanwilliam-Stellenbosch-Worcester. Map 27.

Vouchers: *Esterhuysen* 22599 (BOL; K; PRE); 22599a (BOL; K; NH; PRE); 34159a (BOL; PRE).



MAPS 25–32:—25. **Anthospermum paniculatum**
26. **Anthospermum prostratum**
27. **Anthospermum esterhuysenianum** var.**esterhuysenianum**
28. **Anthospermum esterhuysenianum** var.**hirsutum**
29. **Anthospermum bergianum**
30. **Anthospermum ericifolium**
31. **Anthospermum bicorne**
32. **Anthospermum hirtum**

17(b). var. **hirsutum** *Puff, var. nov., a var. typica corolla extra et foliis margine saltem patule albo-pilosis differt.*

Type: Cape, Ceres distr., northern Cold Bokkeveld, Schurweberg Peak, *Esterhuysen* 29458 (BOL, holo.!).

Outside of corolla, leaf margins and often also upper surface covered with white spreading hairs c. 0,2–0,4 mm long; leaf blades lanceolate to ovate-lanceolate, apices mostly ± distinctly mucronate.

Only known from the Central Cedarberg and the Schurweberg (northern Cold Bokkeveld). Map 28.

Vouchers: *Esterhuysen* 34826 (BOL; K; WU); 29431 (BOL; PRE).

18. **Anthospermum hirtum** *Cruse,* Rub. Cap. 11 (1825), in Linnaea 6: 13 (1831); Sond. in F.C. 3: 30 (1865); Salter in J1 S. Afr. Bot. 3: 110 (1937), in Adamson & Salter, Fl. Cape Penins. 733 (1950). Type: Cape, ad promontorium bonae spei in monte Diaboli Orientem versus, mense Augusto 1816, *C. W. Bergius* s.n. (B, holo. †; G, iso.!).

A. rubiaceum Reichenb. f. in Spreng., Syst. Veg. 4: 338 (1827). Type: 'C.B.S.', no collector given.*

'*A. hirsutum*' DC., Prodr. 4: 580 (1830).

Subshrub or distinct dwarf shrub, ♂, ♀, ♂ + ♀, ♀ or ♂ + ♂, few- to several-stemmed, ± cylindrical, rounded or low, ± matted and weak, often with ± thick, woody (tap-)root. *Stems* c. 0,2–1(–1,5) m long, often ± much branched; ± densely covered with whitish spreading hairs c. (0,2–)0,5–1,4 mm long, or hairs sometimes only in two rows, rarely only around stipules. *Leaves* decussate, occasionally ± pseudoverticillate; blades (6–)8–25(–30) × (0,5–)0,8–3(–4,5) mm, narrowly oblanceolate to ± linear-lanceolate, often distinctly discolourous, upper surface shiny, epidermis cells large, conspicuous, lower epidermis distinctly papillate; margins, at least near base, and often also upper surface ± densely covered with white spreading hairs c. 0,4–1(–1,5) mm long; petioles ± 0–1 mm long; stipular sheath with a subulate hairy seta c. (0,5–)1–2,5(–3) mm long. *Flowers* subsessile to shortly pedicellate (in fruiting ♀ pedicels occasionally to c. 0,7 mm long), in clusters of 6–2 at nodes; corolla 5-merous (occasionally also 4-merous in ♀), greenish yellow or (dark) purplish red, with whitish spreading hairs at least near tip. ♂, ☿: tube 0,5–1,5(–2) mm long, (narrowly) funnel-shaped, lobes (1,7–)2–3,4(–3,7) × 0,5–0,8(–1) mm; anthers (1–)1,4–2(–2,2) mm long; ♂: small rudimentary ovary and sometimes also rudimentary stigmas present; ☿: style 0–1 mm long; stigmas 2, c. 2–3(–5,5) mm long, greenish white, greyish or (seldom) reddish purple; ovary c. (0,5–)0,9–1,2 × 0,5–1 mm, not crowned by distinct calyx lobes. ♀: tube 0,3–0,8(–1,2) mm long, lobes (0,1–)0,3–1 × 0,1–0,3 mm; gynoecium as in ♀ but stigmas 3,7–7,5 mm long. *Fruit* reddish brown; mericarps 1,9–2,7 × (1–)1,2–1,7 mm, ± oblong, with large conspicuous epidermis cells or (rare-ly) with odd hairs or papillae, not crowned by distinct calyx lobes. *Chromosome number*: 2n=22.

Endemic to the south-western Cape and occurring from the Cape Peninsula north to the Clanwilliam and south-east to the Bredasdorp distr. Typically growing in ± moist to damp sites (along streams, well drained slopes, base of cliffs etc.) in partial shade, occasionally in drier places (amongst rocks or boulders in sandy to gravelly soil); occurring mainly on TMS-derived substrates, sometimes in Granite (clay) soils. Map 32.

Vouchers: *Salter* 6221 (BOL; K); *Schlechter* 10722 (BM; BOL; COI; E; G; GRA; K; MO; PRE; S; US; W); *Taylor* 6883 (PRE; STE).

A record from the Riversdale distr. (*Muir* sub *Marloth* 5655; PRE) appears very doubtful (dot with question mark in Map 32); Muir, in 'Vegetation of the Riversdale area, Cape Prov.' [Men bot. Surv. S. Afr. 13 (1929)] does not list *A. hirtum* as occurring in that area.

A variable species. 'Dwarf' or stunted forms with relatively small leaves appear to occur in drier habitats and, in general, under less favourable environmental conditions (particularly obvious in the dwarf Fynbos of the Elim flats!).

Some collections from the Piketberg area (3218-BC) differ from 'typical' *A. hirtum* in being ± weak and thin-stemmed, in having hairs around the stipules and base of the leaf blades only and in their 1-flowered partial inflorescences [e.g. *Drège* 7667 (E!; G!; K!; LY!; MO!; P!; S!; W!; as '64.9': Fl!); *Bolus* 8505 (BOL!)]. 'Typical' *A. hirtum* occurs in the same area and some collections are ± intermediate. Further field observations would be required to determine whether this form deserves formal taxonomic recognition.

* Cruse in Linnaea 6: 13 (1831) claims having seen 'the author's' specimen when putting *A. rubiaceum* into synonymy with his *A. hirtum,* but he did not cite the collection. *Sieber* Fl. Cap. No. 413 (G!; MO!; W!) is likely to be the type specimen. The sheet in W bears the label '*Anthospermum rubiaceum,* Cap, Reichenb.' (likely to be in Reichenbach's handwriting) next to Sieber's distinct printed 'Fl. Cap' label which is directly attached to the plant.

19. **Anthospermum bergianum** *Cruse*[1], Rub. Cap. 9 (1825), in Linnaea 6: 7 (1831); Sond. in F.C. 3: 29 (1865); Salter in J1 S. Afr. Bot. 3: 110 (1937), in Adamson & Salter, F1. Cape Penins. 733 (1950). Type: Cape, in planitie capensi versus Tygerberg, Aug. 1816, *C. W. Bergius* s.n. (B, †); Cape Flats, Aug. 1818, *Mund(t)* 91 (S, neo.!)[2].

? *Cliffortia spicata* Reichb. f. [in sched.] ex Sprengel, Syst. Veg. 4, Cur. Post. 209 (1827). Type: 'C.B.S.', no collector given.[3]

Subshrub or ± short-lived dwarf shrub, mostly dioecious (seldom also ♂ + odd ♀ or ☿), single- to few-stemmed, usually erect, with woody tap root to 220 mm long. *Stems* (50–) 80–150 mm long in younger, occasionally to 450(–750) mm long in older flowering specimens, sparingly to much branched, branches ascending to erect, densely leafy above. *Leaves* in whorls of 3, occasionally in whorls of 4 or decussate, often pseudoverticillate; blades mostly erect or ascending, ± imbricate, (4–)5–12(–15) × (1,2–)1,5–3(–3,5) mm, linear-lanceolate to ovate-lanceolate, margins, sometimes also mid-rib below or entire lower surface, covered with white spreading hairs (0,3–)0,5–1 mm long, often reddish brown above; petioles 0; stipular sheath with or without a minute seta. *Flowers* subsessile, in clusters of 3–9 at nodes, in ♀ sometimes more; ♀ inflorescences dense and ± cylindrical, c. (20–)30–120(–170) × 10–20 mm; corolla 5-merous (in ♀ sometimes also 4-merous), yellowish, sometimes reddish tinged outside, with white hairs c. 0,3–0,5 mm long at least near tip or glabrous (especially ♀). ♂ (odd ☿): tube 0,7–1 mm long, funnel-shaped, lobes 1,9–3 × 0,6–1,1 mm, anthers 1–1,6 mm long; rudimentary ovary (♂) to c. 0,2–0,5 mm long. ♀: tube (0,1–)0,3–0,6 mm long, lobes 0,5–1,2 × 0,2–0,4 mm; style 1–2,8 mm long; stigmas 2, (6–)8–13,5 mm long; ovary 0,8–1,5 × 0,6–1 mm, not crowned by distinct calyx lobes. *Fruit* brown or reddish brown, often ± shiny; mericarps 1,8–2,5 × 0,9–1,1 mm, ± obovate to oblong, ± densely papillate or sometimes with white spreading hairs to c. 0,2 mm long, not crowned by distinct calyx lobes. *Chromosome number*: 2n=22.

Endemic to the south-western Cape and occurring from the Clanwilliam distr. (Pakhuis Pass) south to the Caledon distr. and the Cape Peninsula. Mostly growing on (dry) rocky slopes in gravelly to fine sandy soil; usually associated with TMS; often in recently burnt areas. Map 29.

Vouchers: *Esterhuysen* 13059 (BOL; PRE); *Goldblatt* 2652 (MO; PRE; WAG); *Thompson* 1556 (PRE; STE).

A. bergianum is killed by fire and regenerates from seed. Young flowering plants, often only a few cm tall and (much) less than one year old, are most common in recently burnt areas. The plants, however, are not annuals; if not exposed to fires they become ± shrubby.

Although variable in the fruit indumentum, in leaf arrangement and in the degree of the hairiness of the leaves, *A. bergianum* is one of the most easily recognizable Cape species of *Anthospermum*.

20. **Anthospermum ericifolium** *(Licht. ex Roem. & Schult.) Kuntze*, Rev. Gen. 3: 117 (1898) as *ericaefolium*. Type: Cape, nr. Rivier Zonderend (=Riviersonderend), *Lichtenstein* s.n. (?B,†).

Spermacoce ericaefolia Licht. [Spicileg. F1. Cap., MS.] ex Roem. & Schult., Syst. Veg. 3: 281 (1818).

Anthospermum lichtensteinii Cruse, Rub. Cap. 15 (1825), in Linnaea 6: 16 (1831); Sond. in F.C. 3: 32 (1865). Type: as above.

Dwarf shrub, ☿, ♀, seldom ☿ + ♂ or ♂, few- to many-stemmed, ± erect. *Stems* (150–)250–400(–600) mm long, sparsely to much branched, branches ± erect or ascending, densely leafy above. *Leaves* decussate, pseudoverticillate; blades ascending to erect, 4–7 × (0,6–)0,8–1,2(–1,4) mm, linear-lanceolate, often broadly triangular and shallowly concave above in section; margins, at least lower half, with white spreading hairs c. 0,3–0,4 mm long, upper surface and midrib below often reddish brown; petioles 0; stipular sheath with or without a minute seta. *Flowers* subsessile, in clusters of (2–)6–10(–14) at nodes; corolla 5-merous, yellowish(?), with white spreading hairs c. 0,2–0,3 mm long at least near tip. ☿, ♂: tube 0,7–1 mm long, (narrowly) funnel-shaped to ± cylindrical, lobes, 1,2–1,7 ×

[1] IMPORTANT NOTE: The name *A. bergianum* Cruse is used on the assumption that the 'Proposal to reject the name *A. ciliare* L. (1763) (Rubiaceae)' (proposal 685) is accepted. Otherwise the name *A. ciliare* will have to replace *A. bergianum*. See also *A. galioides* (no. 13) and Puff in Taxon 31: 759 (1982) for details.

[2] Specimen seen by Cruse and bearing the inscription '*A. bergianum* mihi. Cruse'. He may, in error, have attributed the specimen to *Ecklon*, because in Linnaea 6: 7 (1831) he wrote 'in planitie capensis legerunt d. *Bergius* nec non *C. F. Ecklon*' but he did not cite Mund(t).

[3] Weimarck [Monograph of the genus *Cliffortia* 160 (1934)] states that 'the *Reichenbach* type [of *C. spicata*] corresponds ..... to *Anthospermum bergianum* Cruse'. As I was unable to trace the type specimen I could not check the correctness of this statement.

0,5–0,8(–1) mm; anthers 1–1,2 mm long: ♂: rudimentary ovary minute, hardly discernible; ♀: gynoecium as in ♀. ♀: tube c. 0,2 mm long, lobes 0,4–0,6 × 0,1–0,2 mm; style 0; stigma *one*, 3–7 mm long; ovary with only *one* fertile carpel, c. 1–1,3 × 0,5–0,8 mm, densely hairy; reduced carpel with 2, fertile carpel with 3 calyx lobes. *Fruit* greyish brown to greyish; fertile mericarp (2,5–)2,8–3,5(–4) × (1–)1,3–1,8 mm, ± ovate to oblong, often curved lengthwise, densely covered with straight white hairs 0,4–0,6 mm long; reduced carpel ± strap-like, 2,5–3,5 × 0,5–0,7 mm; fertile carpel with 3 triangular-lanceolate calyx lobes 0,3–0,7(–1) ×0,2–0,4 mm, reduced carpel with 2 sometimes marginally larger ones.

Endemic to the south-western Cape and occurring from the Cape Flats to the western Worcester and the Caledon distr. Growing in sandy to gravelly soil; mostly in sandveld Fynbos. Map 30.

Vouchers: *Esterhuysen* 35553 (BOL; PRE; WU); *Schlechter* 10242 (BM; BOL; COI; E; G; GRA; K; MO; P; PRE; S; US; W).

A rather rare but unmistakable species (gynoecium with only *one* fertile carpel and *one* stigma). Allied to *A. bicorne* (below) but easily distinguished by ovaries and fruits with 5 subequal calyx lobes.

21. **Anthospermum bicorne** *Puff, sp. nov., carpello sterili lobis calycis duobus multo amplificatis coronato ab* A. ericifolio *praeclare distinguitur.*

Type: Cape, Caledon distr., Houw Hoek, *Gillett* 829 (BOL, holo.!; STE, iso.!).

Dwarf shrub or subshrub, ♂, ♂ + ♀ or ♀, many-stemmed, usually ± erect. *Stems* (100–)200–550 mm long, sparsely to ± much branched, branches ascending to erect, not densely leafy. *Leaves* decussate, pseudoverticillate; blades erect or ascending, (6,5–)8–16(–19) × 0,4–0,5 mm, linear, needle-like, mostly ± triangular to ± semiterete in section, glabrous or margins (often lower third only) very shortly hairy; petioles 0; stipular sheath with a minute seta. *Flowers* subsessile, in clusters of 2–6 at nodes; corolla 5-merous, yellowish or purplish outside, papillate or shortly hairy mostly near tip. ♂: tube 0,8–1,3 mm long, funnel-shaped, lobes 1,7–2,5 × 0,4–0,7 mm; anthers 1,6–2,4 mm long; style c. 0,7–0,8 mm long; stigmas 2, c. 2,5–4 mm long; ovary with only *one* fertile carpel, 0,8–1,5 × 0,5–0,7 mm, densely hairy; reduced carpel with 2 large, fertile lobes with 3 minute, indistinct calyx lobes. ♀: tube (0,1–)0,3–0,4 mm long, lobes 0,3–0,6 × 0,1–0,2 mm; gynoecium as in ♂ but stigmas to 6,5 mm long. *Fruit* reddish brown to greyish; fertile mericarp 2,5–3,5 × 1–1,7 mm, ± ovate, sometimes distinctly curved lengthwise, densely covered with white spreading hairs 0,3–0,5 mm long, sometimes with 3 minute calyx lobes c. 0,1–0,4 mm long; reduced carpel ± strap-like, c. 2,5–3,5 × 0,6–0,8 mm, less hairy than fertile one or glabrous, with 2 large, ± divaricate calyx lobes 1,4–2 × 0,2–0,4 mm. *Chromosome number*: 2n=22. Fig. 5: 1–3.

Endemic to the south-western Cape and occurring from the Clanwilliam distr. (Cedarberg Mts) south to the Cape Flats and to the Caledon and the Bredasdorp distr. Growing mostly in dry (coarse) sandy soil, usually over TMS. Map 31.

Vouchers: *Bolus* 341 (BM; G; K; PRE; SAM; US; W; as '5377': BOL); *Esterhuysen* 7428 (BOL; NBG; PRE; SAM); *Hugo* 907 (K; PRE; STE).

Its habit and needle-like leaves are reminiscent of *Nenax* species but *A. bicorne* is distinguished from both *Nenax* and *A. ericifolium* (above) by the two greatly enlarged calyx lobes borne on the modified sterile carpel of the fruit.

Excluded species

Anthospermum calycophyllum Sond. in F.C. 3: 31 (1865) is **Otiophora calycophylla** *(Sond.) Schltr. & K. Schum.* in Bot. Jb. 30: 416 (1901); see Puff in J1 S. Afr. Bot. 47: 311 (1981).

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Nenax *Gaertn.*, Fruct. 1: 165, t. 32, f. 7 (1788); Hook. f. in Benth. & Hook. f., Gen. Plant. 2: 140 (1873); K. Schum. in Pflanzenfam. 4,4: 129 (1891); Salter in Jl S. Afr. Bot. 3: 111 (1937), in Adamson & Salter, Fl. Cape Penins. 734 (1950); R. A. Dyer, Gen. 1: 622 (1975). Type species: *N. acerosa* Gaertn.

Ambraria Cruse [non Heister ex Fabr.], Rub. Cap. 16 (1825), in Linnaea 6: 18 (1831); Sond. in F.C. 3: 33 (1865). Type species: *A. glabra* Cruse.

Dwarf shrubs, dioecious, mostly many-stemmed and often much and intricately branched, with thick woody roots. *Leaves* decussate or (rarely) in whorls of 3 but often seemingly in much larger numbers at nodes*, small and often ± ericoid, ± acute, acuminate to mucronate at apex, (sub)sessile, with small, ± cup-shaped stipular sheaths with or without 1(–3) minute setae on either side. *Inflorescence* frequently leafy and inconspicuous, made up of subsessile, mostly 3–1-flowered cymes, arranged in pairs or single at nodes or flowers solitary and terminal on shoots. *Flowers* subsessile, subtended by a pair of leafy bracts, 4–5(–6)-merous. *Calyx*: lobes small or subobsolete. ♂: *Corolla*: tube short, ± cylindrical to broadly funnel-shaped, lobes recurved, ± lanceolate; *anthers* yellowish to whitish, exserted, dangling on long slender filiform filaments; minute rudimentary ovary usually present. ♀: *corolla* much smaller; tube cylindrical, lobes linear to ± lanceolate, erect to ± spreading. *Ovary* biovulate; style 0; stigmas 2, long exserted, hairy, often purplish red. *Fruit* crowned by persistent calyx lobes, sometimes supported by a small ± U-shaped carpophore, dehiscent, occasionally ± inflated, or hard, indehiscent, without carpophore. *Chromosome numbers*: 2n=22, 44.

A genus of 11 species centred in the south-western and western Cape. One species extends into South West Africa/Namibia, another is widely distributed from the central Cape to the Orange Free State and western Lesotho. Map 44.

Nenax is very closely allied to *Anthospermum* and, for the unexperienced, the distinction of the two genera may be rather troublesome. Most characters, if compared one by one, overlap to some extent, but there is a conspicuous trend towards more derived character states in *Nenax* (e.g. fruits dehiscent→indehiscent; di- →tetraploidy; dioecy in the entire genus; trend to very reduced, few-flowered inflorescences). *Nenax*, without exception, consists of distinctly woody, long-lived dwarf shrubs, whereas *Anthospermum* is more variable in growth form (tall shrubs→perennial herbs). The combination of the characters (1) distinctly woody, dwarf shrubby habit, (2) (±) needle-like leaves, (3) reduced, few-flowered inflorescence and (4) dioecy is unique to *Nenax*.

Most taxa of *Nenax* are difficult to distinguish and some experience, including field knowledge, is often required to ensure a definite identification. ♂ specimens of different taxa can be quite similar to each other and do, in general, not provide easy-to-use key characters (♂ of some species should not be confused with *Anthospermum*!). The following key is, therefore, based on (♀) fruiting material; only occasionally are ♂ flowers referred to. If no mature fruits are present on a ♀ individual, older stems should be searched for *carpophores* (cf. Fig. 8g): the presence of carpophores indicates the presence of dehiscent (not inflated) fruits (species 3–6); the absence of carpophores indicates the presence of (a) inflated, dehiscent fruits (species 1–2) or of (b) indehiscent fruits (species 7–11). It is recommended that *always* both ♂ and ♀ specimens of a given taxon are collected.

Nenax is presumably a (relatively) 'young' genus and probably in the process of actively and rapidly producing new species. This may explain the rather frequent occurrence of 'Forms' (in the sense of geographically isolated and morphologically anomalous populations or distinct geographical or ecological races) which in some respects do not fully match typical material of a given taxon. They may be extremely difficult to place; some are discussed with the respective taxa.

1a Fruit dehiscent:
2a Fruit inflated, ± round in outline, not supported by an obvious carpophore:
3a Fruit c. 1,7–3,2 mm in diam., subglobose to ± ellipsoidal; leaves glabrous or margins ± papillate ..... 1. *N. microphylla*
3b Fruit large, c. (5–)6–8 mm in diam., laterally compressed, often ± round or broadly obovate in outline; leaves silvery grey to greyish green due to dense cover of very short, often curled whitish hairs or papillae ..... 2. *N. cinerea*
2b Fruit not inflated, mericarps much longer than wide, supported by a U-shaped carpophore:
4a Mericarps covered with ± curled whitish hairs, c. 0,2–0,5 mm long; leaves needle-like, small, 3–5 × 0,5–0,8 (–1) mm; in drier parts of Worcester and Ceres distr. ..... 6. *N. elsieae*
4b Mericarps glabrous or papillate; leaves not distinctly needle-like or, if (±) needle-like, to 9(–11) mm long:

* Due to the presence of leafy much-contracted short shoots; this situation is referred to as 'pseudoverticillate' in the key and the descriptions.

5a Leaves not distinctly needle-like, 2,5–4,5(–6) × 0,9–1,4 mm; mericarps small, c. 2,1–2,6 mm long; corollas 5-merous, tube (♂) relatively long and ± cylindrical; mainly in Namaqualand.....3. *N. namaquensis*

5b Leaves needle-like, (3–)3,5–9(–11) × 0,4–1 mm; mericarps (2,4–) 2,7–5 mm long:

6a Mericarps large, 3–5 × 1,9–2,5(–3) mm, crowned by relatively large calyx lobes c. 0,6–1,2 mm long; ♂ corolla 5-merous; dwarf shrubs with often pseudodichotomous and ± irregular branching; narrowly confined to southern Van Rhynsdorp distr. and adjacent Clanwilliam distr. ..... 4. *N. coronata*

6b Mericarps smaller, c. (2,4–)2,7–3,4 × 1,2–1,7 mm, crowned by small calyx lobes c. 0,3–0,4 mm long; ♂ corolla 4-merous; dwarf shrubs with mostly ascending regular opposite branches; ± widely distributed from Calvinia distr. south to Sir Lowry's Pass .....5. *N. divaricata*

1b Fruit indehiscent:

7a Fruit ± soft, easily squashed between two fingers.....10. *Nenax* sp. *A*

7b Fruit too hard to be squashed between two fingers:

8a Fruit small, c. 2–2,8 mm long:

9a Fruit reddish, shiny, glabrous, obscurely ribbed; leaves decussate, needle-like .....11. *Nenax* sp. *B*

9b Fruit greyish, densely covered with whitish spreading hairs c. 0,1–0,2 mm long; leaves in whorls of 3 ..... 7 (a). *N. hirta* subsp. *hirta*

8b Fruit larger, 3–8 mm long:

10a Fruit 5–8 mm long, entirely glabrous; partial inflorescences 1-flowered, flowers widely spaced, paired or single at nodes: West Coast Strandveld .....9. *N. arenicola*

10b Fruit 3–5 mm long, shortly hairy or ± glabrous:

11a Leaves to 3,5 mm long, decussate or occasionally in whorls of 3, widely spaced; fruits c. 3–3,7 mm long, shortly hairy; intricately branched, robust dwarf shrubs; only on the West Coast (Langebaan Peninsula and immediately south) over limestone..... 7 (b). *N. hirta* subsp. *calciphila*

11b Leaves to 12(–15) mm long, strictly decussate, often pseudoverticillate; fruits 3–5,5 mm long, often ± crowded on shoots:

12a Stems reddish (at least when young), densely leafy, leaves usually pseudoverticillate, needle-like; plants often only distinctly woody below; fruiting inflorescence ± conspicuous and spike-like, flowers in clusters of 6(–2) at nodes; fruits reddish, glabrous or ± papillate..... ..... 8 (a). *N. acerosa* subsp. *acerosa*

12b Stems grey(ish), mostly with dimorphic leaves (long, needle-like and smaller, broader); distinctly woody dwarf shrubs; inflorescence less conspicuous, flowers mostly paired at nodes; fruits greyish (brown), mostly ± densely covered with short whitish spreading hairs..... .....8 (b). *N. acerosa* subsp. *macrocarpa*

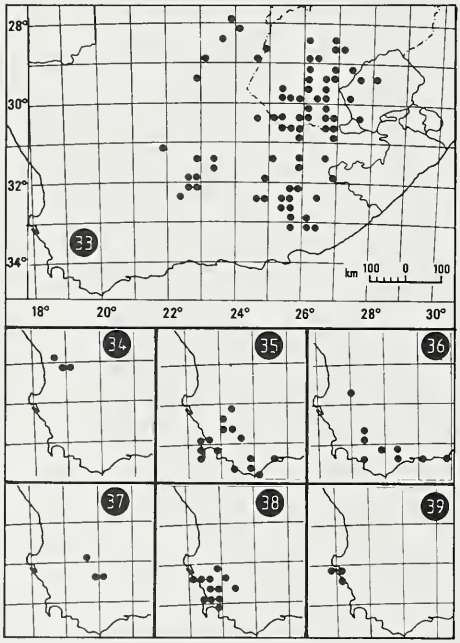
1. **Nenax microphylla** *(Sond.) Salter* in Jl S. Afr. Bot. 3: 113 (1937); Hobson & Jessop, Veld Pl. S. Afr. 220 & pl. 21 (1975). Types: Orange Free State, Sandrivier, *Burke* 506 (BM!; K!; PRE!; SAM!) *Zeyher* 769 or s.n. (SAM, lecto.!; BM!; G!; K!; PRE!).

Ambraria microphylla Sond. in F.C. 3: 34 (1865).

Dwarf shrub, rounded to ± cylindrical, intricately branched, c. 0,1–0,3(–0,4) m tall and c. 0,1–0,7 m in diam.; lower, cushion- to ± mat-forming if browsed. *Stems* ascending or erect, often ± spine-tipped if browsed; sometimes arching downward or ± prostrate, occasionally rooting at nodes and producing new plantlets. *Leaves* decussate, often pseudo-verticillate; blades (1,5–)2–4(–5,4) × 0,7–1,2 mm, (broadly) ovate to ± elliptic (often longer, to 7 mm, and ± linear-lanceolate or lanceolate on new growth), frequently recurved, glabrous or sometimes margins ± papillate. *Flowers* in clusters of 2 (seldom 4–6) at nodes, inflorescences often ± conspicuous in fruiting ♀; corolla 4-merous, pale yellow to greenish yellow, sometimes reddish (purplish) tinged outside. ♂: tube 0,5–0,7 mm long, broadly funnel-shaped, lobes 1,5–2,2 × 0,6–0,8 mm; anthers 1,2–1,9 mm long. ♀: tube 0,2–0,4 mm long, lobes 0,2–0,5 × 0,1–0,2 mm, corolla sometimes absent altogether; stigmas 2,8–4,4 mm long, whitish grey (also purplish red?); ovary 1,3–1,7 × 0,6–0,9 mm, with 4 minute calyx lobes. *Fruit* inflated, (sub)globose or ± ellipsoidal, dehiscent, not supported by a distinct carpophore, c. 1,7–3,2 mm in diam. (bright) reddish brown or reddish, glabrescent or papillate, with 4 ± triangular calyx lobes c. 0,3–0,4 × 0,2–0,3 mm. *Chromosome number*: 2n=22. Fig. 6: 1; 8a & b.

FIG. 6.—1, **Nenax microphylla,** part of fruiting browsed plant, × 0,5 *(Saunders* 10). 2 & 3, **N. cinerea:** 2, branch with ♂ buds and flowers, × 0,5; 3, leaf pair × 2,5 *(Acocks* 16947). 4 & 5, **N. divaricata:** 4, part of fruiting plant, × 0,5; 5, fruit in side view, × 5 *(Acocks* 17445). 6 & 7, **N. acerosa** subsp. **acerosa:** 6, fruiting plant, × 0,5; 7, fruit, × 5 *(Smith* 5146).

Known from the central, northern and eastern Cape, Orange Free State and lower-lying parts of Lesotho. Growing mostly in Karoo or karroid vegetation with few or no trees or tall shrubs; often in rocky or gravelly grassy areas, on stony hills or in crevices of rock sheets. Map 33.



MAPS 33–39:—33. **Nenax microphylla**
34. **Nenax coronata**
35. **Nenax elsieae**
36. **Nenax acerosa** subsp. **acerosa**
37. **Nenax acerosa** subsp. **macrocarpa**
38. **Nenax hirta** subsp. **hirta**
39. **Nenax hirta** subsp. **calciphila**

Vouchers: *Forward* A.M.1590; *Leistner* 962; *Smith* 4129.

An excellent fodder bush primarily for sheep; according to Hobson & Jessop (op. cit.) regrowth is excellent when rains are reasonable and its drought resistance is outstanding. Browsed plants remain low and become very irregularly branched and deformed.

Newly produced ♂ flowering shoots of *N. microphylla* with relatively longer and narrower leaves should not be confused with *Anthospermum pumilum* which may grow in the same area. The two taxa apparently can form viable hybrids but these seem to be very rare.

2. **Nenax cinerea** *(Thunb.) Puff*, comb. nov. Type: Cape, *Thunberg* (sheet 23686, UPS, holo.!; S, iso.!).

Cliffortia cinerea Thunb., Prodr. 2: 93 (1800).

N. dregei L. Bol. in Ann. S. Afr. Mus. 9: 215 & pl. VI,A (1917); Launert & Roessler in F.S.W.A. 115: 19 (1966). Types: Cape, Bot River bed, between Calvinia and Holle River, *Pearson* 3966 (BOL, lecto.!; K!; NBG!); c. 24 km N of Alewyn's Fontein (=Aalwynsfontein); *Pearson* 3930 (BOL!); between Klipplaat and Bitterfontein, *Pearson* 3295 (BOL!; STE!); between Anenous and Chubiessis Outspan, *Pearson* 5979 (BOL!; K!).

N. hantamensis Schltr., nom. nud.

Rigid dwarf shrub or shrub, intricately branched, c. 0,5–1 m tall; much lower, c. 0,1–0,3(–0,4) m, occasionally cushion-forming if browsed. *Stems* erect, ascending or sometimes ± prostrate, much branched; branches often single at nodes or, if paired, branches unequal, often spine-tipped if browsed. *Leaves* decussate; blades (2–)3–7(–10) × (1,2–)1,5–2 mm, ovate- or linear-lanceolate, shallowly concave above, convex below, appearing greyish, silvery grey or greenish grey due to dense cover of very short, often curled whitish hairs or papillae. *Flowers* single or (less commonly) paired at nodes, rarely in clusters of 4–6; corolla 5-merous, yellowish to greenish yellow, sometimes reddish tinged outside, usually densely papillate. ♂: tube 0,8–1,3(–1,7) mm long, broadly funnel-shaped, lobes 2,5–3,2 (–3,5) × (0,6–)0,8–1 mm; anthers (1,5–)1,8–2,5 mm long. ♀: tube (0,1–)0,3–0,6 mm long, lobes (0,1–)0,3–0,7(–0,9) × 0,1–0,2(–0,4) mm, corolla sometimes absent altogether; stigmas (1,9–)2,5–7,5 mm long, dark purple, seldom greyish; ovary 1,4–2 × 0,8–1,2(–1,7) mm, with 5 small calyx lobes. *Fruit* inflated, laterally compressed, ± round, broadly obovate or ± heart-shaped in outline, dehiscent, not supported by a distinct carpophore, c. (5–)6–8 mm in diam., light reddish brown, papillate to glabrescent, with 5 rounded to ± triangular calyx lobes c. 0,2–0,4 × 0,3 mm. *Chromosome number*: 2n=22. Fig. 6: 2 & 3.

Occurs in the interior of the western Cape (Laingsburg distr. to Namaqualand) and in southern SWA/Namibia (as far north as Aus). Growing mostly along ephemeral watercourses, in dried up river beds, in crevices or at the edge of rock sheets. Map 40.

Vouchers: *Acocks* 16947; *Dinter* 4132; *Van der Westhuizen* 328, 329.

Vegetatively distinguished from all other *Nenax* species by its greyish, densely papillate or very shortly hairy leaves.

3. **Nenax namaquensis** *Puff, sp. nov., laminis foliorum glabris et fructibus minoribus haud inflatisque a* N. cinerea *praeclare distinguitur.*

Type: Cape, Namaqualand, a little north of Middelkraal, *Pearson* 5615 (BOL, holo.!; K, iso.!).

Dwarf shrub, intricately branched, ± rounded to spreading, c. 0,15–0,6 m tall; often ± cushion-forming if browsed. *Stems* often much branched; branching irregular, branches mostly single at nodes, spine-tipped if browsed. *Leaves* decussate; blades ascending to ± spreading, often slightly curved, 2,5–4,5(–6) × 0,9–1,4 mm, narrowly ovate-lanceolate to linear-lanceolate, shallowly concave above and convex below to ± triangular in section, glabrous except for papillate margins, fresh green. *Flowers* single (rarely paired) at nodes, sometimes also terminal and overtopped by lateral shoots arising below; corolla 5-merous (in ♂ very rarely, in ♀ occasionally also 4-merous), yellowish, reddish tinged outside. ♂: tube 1–2,1 mm long, funnel-shaped or occasionally ± cylindrical, lobes 2,4–3,4 × 0,7–1 mm; anthers 1,5–2,2 mm long; rudimentary ovary often with conspicuous calyx lobes. ♀: tube 0,2–0,4(–0,7) mm long, lobes 0,4–0,7(–1,2) × 0,1–0,2(–0,3) mm; stigmas 1,4–2,4 mm long; ovary 1–1,2 × 0,8–1 mm, with 5 small calyx lobes. *Fruit* dehiscent, supported by a sometimes large U-shaped carpophore or (seldom) carpophore ± absent, dark reddish brown; mericarps 2,1–2,6 × 1–1,4 mm, ± obovate, glabrous or sparsely to densely papillate, with 3 or 2 ± triangular calyx lobes c. 0,4–0,7 × 0,4–0,7 mm. *Chromosome number*: 2n=22.

Endemic to the western Cape; only known from the Namaqualand distr. and the northern Clanwilliam distr. Growing in sandy to gravelly soil amongst rocks or in crevices. Map 41.

Vouchers: *Hutchinson* 836 (BOL; GRA; K; PRE); *Van der Merwe* 190 (PRE; STE).

Vegetatively rather similar to *N. cinerea* (above) but lacking the characteristic leaf indumentum of that species. Its dehiscent fruits, moreover, are small and not inflated. Perhaps most closely allied to *N. coronata* (below).

The ♂ collection *Hafström & Acocks* 1441 (PRE; S) from near Sutherland (3220–BC) appears to be allied to *N. namaquensis* but differs in having ± glabrous, flat leaves (± oblong in section) and short, broadly funnel-shaped corolla tubes. The absence of fruiting (♀) material makes it impossible to place it with certainty; it may be a new species.

4. **Nenax coronata** *Puff, sp. nov., mericarpiis majoribus, lobis calycis longioribus, corollis 5-meris et habitu dissimili a* N. divaricata *facile distinguitur.*

Type: Cape, west side of Pakhuis Pass, a little west of Leipoldt grave, *Puff* 800902-6/4 (WU, holo.!; BOL; NBG; PRE: STE, iso.!).

Dwarf shrub, ± erect, often with thick, woody root. *Stems* c. 0,25–0,4 m long, much-branched, branches usually single at nodes, branching often pseudodichotomous* and ± irregular. *Leaves* decussate; blades (3–)5–9 (–11) × 0,7–1 mm, linear, needle-like and ± rigid, semiterete to ± triangular in section, glabrous or margins ± papillate, upper surface and midrib sometimes (dark) brownish red. *Flowers* mostly single at nodes, sometimes also terminal and overtopped by short lateral shoots arising below; corolla 5(rarely 4)-merous, yellowish (?). ♂: tube c. 0,8 mm long, funnel-shaped, lobes 2,5–3,4 (–4) × 0,6–1 mm; anthers 1,4–2,4 mm long; minute rudimentary ovary sometimes with well discernible calyx lobes. ♀: tube 0,1–0,2 mm long, lobes 0,3–0,8 × 0,1–0,2 mm; stigmas (1,5–)2–4 mm long; ovary 1,2–2 × 0,7–1 mm, with 5 conspicuous calyx lobes. *Fruit* dehiscent, supported by a small carpophore or carpophore sometimes ± absent, reddish brown; mericarps 3–5 × 1,9–2,5(–3) mm, oblong to obovate, glabrous or papillate, with 3 or 2 triangular calyx lobes c. 0,6–1,2 × 0,3–0,5 mm. *Chromosome number*: 2n=22.

Endemic to the western Cape; confined to the southern Vanrhynsdorp distr. (Giftberg) and adjacent Clanwilliam distr. Growing in sandy areas between rocks or in cracks of rocks in dry Mountain Fynbos. Map 34.

Vouchers: *Esterhuysen* 22044 (BOL); *Schlechter* 8652, 10805 (BOL; GRA; PRE).

Allied to the remaining *Nenax* species with non-inflated, dehiscent fruits (species 3, 5 and 6) but perhaps closest to *N. divaricata*, which differs primarily in having 4-merous ♂ flowers and smaller fruits with rather minute calyx lobes. In the field, *N. coronata* and *N. divaricata* can be easily distinguished by their growth form. In *N. coronata* branches usually arise singly at nodes, branching may become seemingly dichotomous and, subsequently, shoots often show a distinct zig-zag pattern. In *N. divaricata* branching is more regular, the divaricate branches mostly arise in pairs at nodes.

* Vigorous lateral branches push main axes to the side; a Y-like appearance of the branchings results.

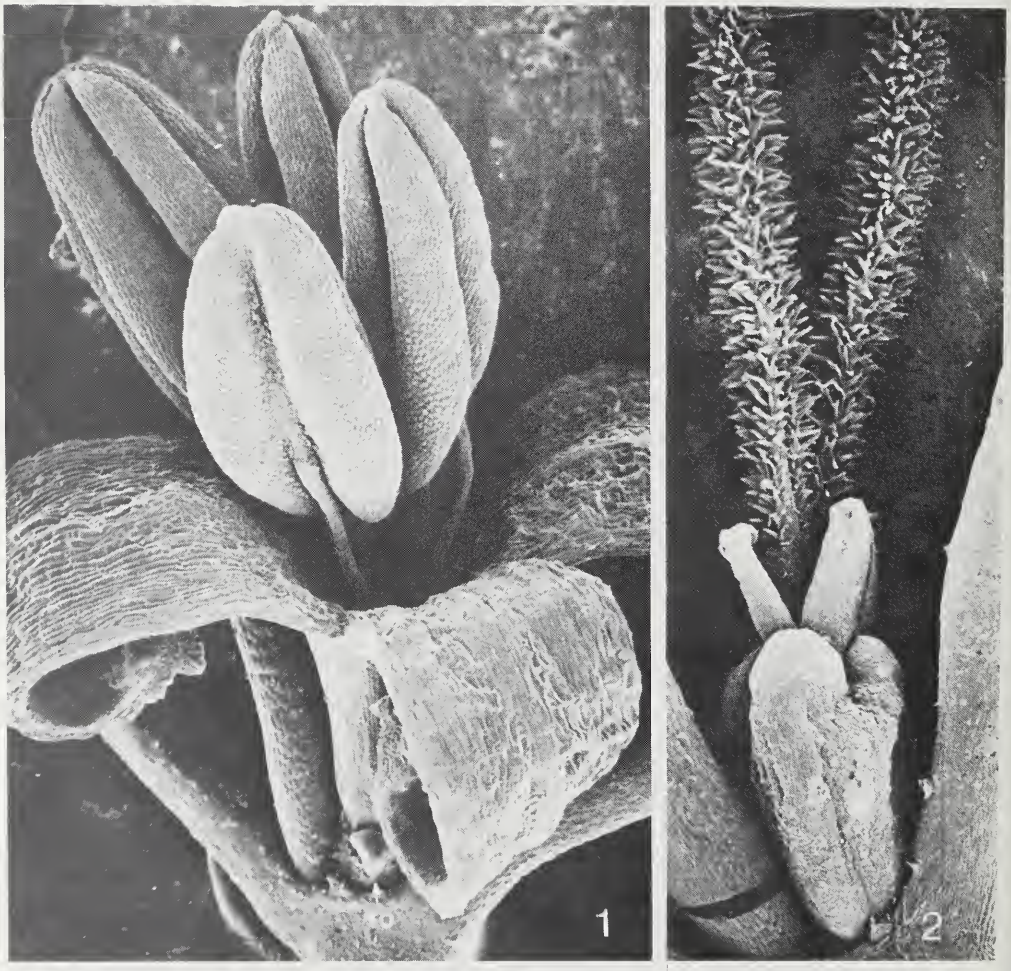


FIG. 7.—**Nenax divaricata:** 1, ♂ flower (ro: rudimentary ovary), × 20; 2, ♀ flower, × 20 *(Puff* 790712-2/1) (SEM-graphs).

5. **Nenax divaricata** *Salter* in Jl S. Afr. Bot. 3: 113 (1937). Type: Cape, Worcester distr., near Tulbaghskloof, *Ecklon & Zeyher* 2319 (or '1.9') (SAM, holo.!; E!; FI!; GOET!; LY!; M!; MO!; NBG!; PRE!; S!; US!; W!; WU!).

Ambraria acerosa Sond. in F.C. 3: 34 (1865), pro parte (♂)[1].

N. acerosa sensu Eckl. & Zeyh., Enum. 368 (1836), non Gaertn.

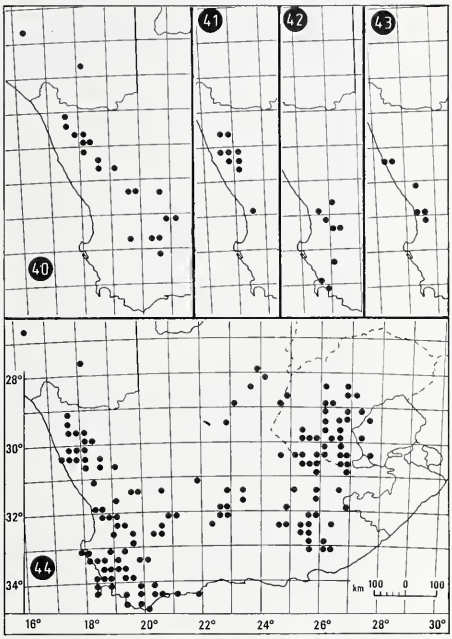
Dwarf shrub, usually divaricately branched, rounded to ± cylindrical, c. (0,15–) 0,3–0,6(–1) m tall. *Stems* erect to ascending, much branched; principal branches usually opposite, held at c. 45°. *Leaves* decussate; blades (3–)3,5–8(–9,5) × 0,4–0,5 mm, linear, needle-like, semiterete to ± triangular in section, glabrous except for ± papillate margins. *Flowers* mostly single at nodes, sometimes also terminal and overtopped by short lateral shoots arising below; corolla 4-merous, yellowish green, often purplish or purplish brown tinged or streaked outside. ♂: tube (0,8–)1–1,5 mm long, funnel-shaped, lobes 2,7–3,2 × 0,7–1 mm; anthers 1,4–1,7 mm long. ♀: tube 0,2–0,3 mm long, lobes 0,3–0,5 × 0,1–0,2 mm; stigmas 3,4–4,6 mm long, purplish red to dark purple; ovary 0,7–1,2 × 0,4–0,8 mm, with 4 small calyx lobes. *Fruit* tardily dehiscent, supported by a small carpophore, reddish brown, greyish to dark grey; mericarps (2,4–)2,7–3,4 × 1,2–1,7 mm, ± obovate, glabrescent to densely papillate, with 2 rounded to ± triangular calyx lobes c. 0,3–0,4 mm long. *Chromosome number*: 2n=22. Fig. 6: 4 & 5; 7; 8g.

Endemic to the (south-)western Cape; occurring from Sir Lowry's Pass north to the southern Vanrhynsdorp and Calvinia distr. Growing in sandy to gravelly soil, primarily in dry Mountain Fynbos. Map 42.

Vouchers: *Acocks* 17445, 17458 (K; PRE); *Esterhuysen* 8145 (BOL); *Thompson* 2090 (K; PRE; STE).

N. divaricata should not be confused with dioecious *Anthospermum* species (*A. spathulatum* in particular, 'Forms' of which may resemble *N. divaricata* in having shoots with similarly regular, opposite branches). Vegetatively *N. divaricata* is distinguished from any of these by its distinctly needle-like leaves (semiterete to ± triangular in section).

[1] An investigation of the specimens studied by Sonder (now in herbarium S) revealed that the description of *Ambraria acerosa* Sond. is based on ♂ *N. divaricata* (bei Brakfontein, *Ecklon* s.n., S!) and ♀ *N. acerosa* Gaertn. (Tulbaghskloof, *Ecklon & Zeyher* '77-9', S!). Salter (op cit.) had apparently only seen *Ecklon & Zeyher* 2319 or '1.9', ♂ collections quoted by Sonder, when pointing out that *Ambraria acerosa* Sond. is a very different species from *N. acerosa* Gaertn.



MAPS 40–44:—40. **Nenax cinerea**
41. **Nenax namaquensis**
42. **Nenax divaricata**
43. **Nenax arenicola**
44. **Nenax,** all taxa

Some collections from the southernmost locality, Sir Lowry's Pass (e.g. *Acocks* s.n., S!), tend to be much more densely leafy and more branched than 'typical' *N. divaricata* from further north. More field observations and additional herbarium material would be needed to determine whether these forms deserve taxonomic recognition.

6. **Nenax elsieae** *Puff, sp. nov., fructibus lanatis et lobis calycis relative magnis a speciebus* Nenacis *fructibus dehiscentibus haud inflatisque* (N. namaquense, N. coronata, N. divaricata) *praeclare distinguitur.*

Type: Cape, Worcester distr., Bonteberg, Eikenbosch Hoek, 1070–1220 m, *Esterhuysen* 3656 (BOL, holo.!).

Low dwarf shrub, rounded to ± cylindrical, with thick woody root. *Stems* c. 80–200 (–300) mm long, ascending to erect, much branched; branches usually single at nodes, ± erect. *Leaves* decussate, sometimes ± pseudo-

verticillate; blades 3–5 × 0,5–0,8(–1) mm, linear(-lanceolate), needle-like, semiterete to ± triangular in section, margins often papillate, midrib sometimes reddish brown below. *Flowers* usually single at nodes; corolla 4-merous, yellowish green. ♂: tube c. 0,8–1 mm long, (broadly) funnel-shaped, lobes (1,7–)2–3 × 0,8–1 mm; anthers 1,7–2 mm long; rudimentary ovary usually crowned by 4 conspicuous calyx lobes. ♀: tube 0,2–0,5 mm long, lobes 0,3–0,8 × 0,2–0,3 mm; stigmas 3,4–4,4 mm long, (dark) purplish red; ovary 1–1,4 × 0,7–0,8 mm, hairy, with 4 conspicuous calyx lobes. *Fruit* dehiscent, supported by a minute carpophore, reddish brown; mericarps 2,7–3,5 × 1,8–2,2 mm, obovate, densely covered with (±) curled whitish hairs c. 0,2–0,5 mm long, with 2 glabrous, broad, rounded to ± trapeziform calyx lobes c. 0,5–0,7 × 0,5–0,9 mm. Fig. 8 e & f.

Endemic to the interior of the south-western Cape; only known from the Worcester and Ceres distr. Growing on rocky slopes amongst rocks in very dry Fynbos. Map 35.

Vouchers: *Puff* 790913-6/1 (WU); *Taylor* 5874 (PRE; STE).

This apparently quite rare species is well distinguished by its dehiscent fruits with longish ± curled hairs and relatively large calyx lobes. ♂ *N. elsieae* should not be confused with *Anthospermum comptonii*; the leaves of *N. elsieae* are ± linear and needle-like (semiterete to ± triangular in section), those of *A. comptonii* are much broader (although the margins are often revolute so that the blades may appear ± terete).

7. **Nenax hirta** *(Cruse) Salter* in Jl S. Afr. Bot. 3: 113 (1937), in Adamson & Salter, Fl. Cape Penins. 735 (1950). Types: Cape, *Mund(t) & Maire* s.n. (B, syn. †), at base of Lion's Mt. towards Drieanckerbay, *C. W. Bergius* s.n. (B, syn. †); slopes of Signal Hill above Three Anchor Bay, *Salter* 6407 (BOL, neo. & topo.!).

Ambraria hirta Cruse, Rub. Cap. 17 (1825), in Linnaea 6: 19 (1831); Sond. in F.C. 3: 34 (1865).

Two subspecies are recognized:

7 (a). subsp. **hirta.**

Dwarf shrub, rounded to ± cushion-forming, diffusely branched, to c. 0,3 m tall and 0,3–0,5 m in diam. *Stems* ascending, prostrate or ± erect, much branched; branches usually single at nodes, shortly hairy. *Leaves* in whorls of 3, pseudoverticillate; blades (1,2–)1,5–3,5 × 0,4–0,9 mm, linear(-lanceolate) (often longer, to 6,4 mm, on new growth), margins and sometimes also midrib below with whitish ± straight hairs c. 0,1–0,2(–0,4) mm long. *Flowers* usually in clusters of 3 at nodes, inflorescence sometimes ± conspicuous in fruiting ♀; corolla 4-merous, yellowish (green), sometimes a little hairy outside. ♂: tube 0,7–1,2 mm long, broadly funnel-shaped, lobes (1,5–)1,7–2,1 × 0,6–0,9 mm; anthers 1–1,7 mm long. ♀: tube 0,3–0,4 mm long, lobes (0,3–)0,5–1 × 0,1–0,3 mm; stigmas (2,2–)2,5–4,8 mm long, purplish red; ovary 1–1,2 × 0,6–1 mm, hairy, with 4 conspicuous calyx lobes. *Fruit* indehiscent, hard, not supported by a carpophore, 2–2,8 × (1,5–)1,7–2,2 mm, obovoidal to spheroidal, greyish, covered with whitish spreading hairs c. 0,1–0,2 mm long, with 4 glabrous rounded calyx lobes c. 0,3–0,4 × 0,4–0,5 mm. *Chromosome number*: 2n=22. Fig. 8d.

Endemic to the south-western Cape; occurring from the north end of the Cape Peninsula east and north-east to the Worcester and the Piketberg distr. Growing mostly in gravelly ground or in red, clayey soils in Coastal Renosterveld or in white sand in Coastal Fynbos. Map 38.

Vouchers: *Salter* (BM; BOL; K); *Schlechter* 10724 (BM; BOL; BR; E; G; K; MO; PRE; S; US; W); *Thompson* 2560 (PRE; STE).

Easily recognized by its small indehiscent hairy fruits, its small (♂) flowers and its small ternately arranged leaves.

7(b). subsp. **calciphila** *Puff, subsp. nov., fructibus majoribus, foliis minus congestis et habitu robustiore a subsp. typica differt.*

Type: Cape, Langebaan Peninsula, Oude Post Private Nature Reserve, *Boucher* 2964 (STE, holo.!; PRE, iso.!).

Much more robust dwarf shrub than subsp. *hirta*, c. 0,3–1 m tall, intricately branched; branches often spine-tipped (browsed). *Leaves* much less crowded than in subsp. *hirta*, ± widely spaced, mostly decussate (but some leaves occasionally in whorls of 3), less distinctly pseudoverticillate (few leafy much contracted short shoots); blades to 3,5 mm long. *Flowers* unknown. *Fruit* with somewhat shorter hairs, larger, c. 3–3,7 × 2,7 mm, not as crowded and numerous as in subsp. *hirta*.

Endemic to the western Cape; only known from the Langebaan Peninsula south to Yzerfontein. Apparently confined to exposed limestone ridges and sandy limestone soils; characteristic for *Nenax-Maytenus-Zygophyllum* Limestone Evergreen Shrubland. Map 39.

Vouchers: *Acocks* 14514; *Puff* 791226-2/1 (WU).

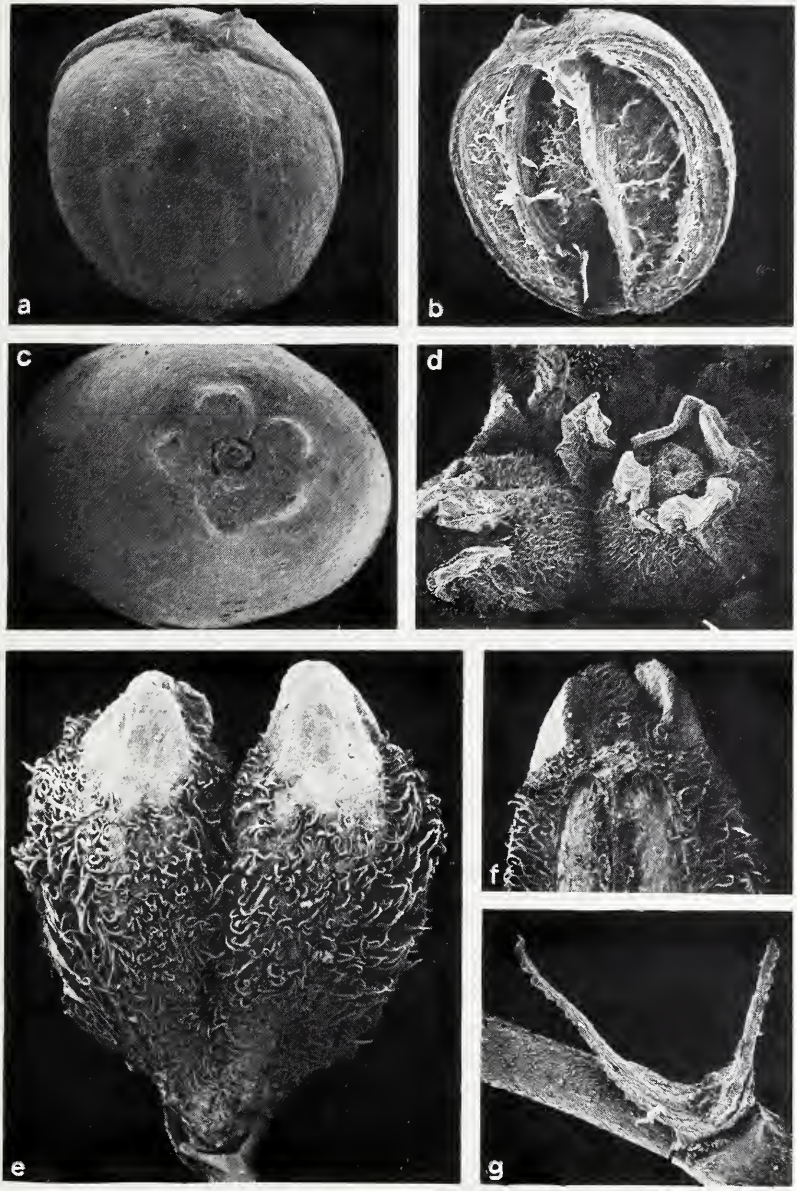


FIG. 8.—a & b. **Nenax microphylla:** a, fruit in side view showing the two mericarps, × 17,5; b, mericarp, ventral side, × 17,5 *(Puff* 790413-1/1). c, **N. arenicola,** indehiscent fruit from above, × 17,5 *(Puff* 790714-2/1). d, **N. hirta** subsp. **hirta,** indehiscent fruits with persistent calyx lobes, × 17,5 *(Bolus* 12764). e & f, **N. elsieae;** e, fruit (two mericarps) in side view, × 17,5; f, upper part of mericarp with persistent calyx lobes, × 17,5 *(Esterhuysen* 3656). g, **N. divaricata,** carpophore, × 17,5 *(Puff* 790713-1/1) (SEM-graphs).

Langebaan specimens originate from areas with heavily trampled and grazed vegetation, but trampling or grazing alone is not likely to be responsible for the characteristic growth form of subsp. *calciphila* (obviously browsed specimens of subsp. *hirta* differ markedly in habit).

Acocks 14523 from c. 12 km NE of Yzerfontein is ± intermediate between the two subspecies.

8. **Nenax acerosa** *Gaertn.*, Fruct. 1: 165, t. 32, f. 7 (1788); Salter in Jl S. Afr. Bot. 3: 112 (1937), in Adamson & Salter, Fl. Cape Penins. 734 (1950). Type: Cape, *Masson* s.n. in herb. Banks (BM, holo.!).

Cliffortia acerosa MS.

Ambraria glabra Cruse, Rub. Cap. 17 (1825), in Linnaea 6: 18 (1831); Sond. in F.C. 3: 33 (1865). *Nenax glabra* (Cruse) Kuntze, Rev. Gen. 3: 121 (1898). Type: Cape, *Bergius* s.n. (B, holo. †).

Ambraria glabra Cruse var. *papillata* Sond. in F.C. 3: 34 (1865). Type: none cited, but almost certainly 'Capfläche', 1841, *Ecklon* s.n. (S, holo.!) [label bearing Sonder's handwriting].

Ambraria glabra Cruse var. *tulbaghica* Sond. in F.C. 3: 34 (1865). Type: Cape, waterfall, Tulbagh, no collector cited but without doubt *Pappe* s.n. (S, holo.!; K, iso.!) [label bearing Sonder's handwriting].

Ambraria acerosa Sond. in F.C. 3: 34 (1865), pro parte (♀; see also *N. divaricata*, footnote).

Two subspecies are recognized:

8 (a). subsp. **acerosa.**

Synonyms as above.

Dwarf shrub, erect to ± diffuse or, if burnt regularly, subshrubby and often with massive, woody base and numerous, thin aerial stems. *Stems* c. (0,1–)0,15–0,3(–0,4) m long, unbranched to ± much branched, branches ascending to erect, glabrous to ± densely papillate, reddish (brown) and shiny above. *Leaves* decussate, pseudoverticillate; blades (5–)8–12 (–15) × 0,5–1 mm, linear, ± needle-like and ± triangular in section or (on long shoots) sometimes linear-lanceolate and shallowly concave above, glabrous or margins with whitish hairs c. 0,1–0,2 (–0,3) mm long, upper surface and midrib often dark brown. *Flowers* in clusters of 6–2 at nodes, inflorescence spike-like, ± conspicuous, especially in fruiting ♀; corolla 5-merous (in ♂ very rarely, in ♀ occasionally also 4-merous), greenish yellow to creamy yellow, often reddish purple tinged, occasionally a little hairy near tip. ♂: tube 0,7–1,5 mm long, broadly funnel-shaped, lobes 2,4–3,7 × 0,8–1 mm; anthers 1,4–2 mm long. ♀: tube 0,3–0,7 mm long, lobes 0,5–1 × 0,2–0,3 mm; stigmas c. 3,4–6,3(–7) mm long, purplish red or, less commonly, greyish or greyish green; ovary c. 1,4–2 × 0,9–1,5 mm, sometimes obscurely ribbed below 5 small calyx lobes. *Fruit* indehiscent, hard, not supported by a carpophore, c. 3,2–5,5 × 2–3,4 mm, obovoidal to ellipsoidal, reddish brown, glabrous or ± papillate, with 5 trapeziform, ± obovate to triangular calyx lobes c. 0,5–0,9 × 0,7–0,8 mm. *Chromosome number*: 2n=44. Fig. 6: 6 & 7.

Endemic to the south-western Cape; occurring from the Cape Peninsula north-east to the Worcester and Ceres distr., and east to the Bredasdorp distr. Growing in sandy to gravelly flats, sometimes in sand over clay, mostly in ± dry habitats. Map 36.

Vouchers: *Esterhuysen* 26583 (BOL; WU); *Schlechter* 9747 (BM; BOL; BR; E; G; K; MO; PRE; S; US; W); *Van Breda* 169 (BOL; PRE).

Two collections from around Faure (3418–BB; *Esterhuysen* 11932, BOL; *Compton*15998, NBG) and a collection from near Ratel River mouth (3419–DA?; *Bolus* 21875 ex parte, BOL) are very condensed, distinctly woody, much branched low dwarf shrubs with unusually small (less than 3 × 2 mm) but seemingly mature shortly hairy fruits. They may represent an odd state of subsp. *acerosa* (or a new taxon?).

8(b). subsp. **macrocarpa** *(Eckl. & Zeyh.) Puff*, comb. et stat. nov. Type: Cape, on the Breederivier, Swellendam, *Mund(t)* s.n. sub Ecklon & Zeyher 2318β (SAM, holo.!; S, iso.!).

Ambraria hirta Cruse var. *macrocarpa* Eckl. & Zeyh., Enum. 368 (1836).

Dwarf shrub, often ± rounded or low, ± cushion-forming, c. 0,1–0,5 m tall and to c. 0,5 m in diam., often with thick, woody root. *Stems* c. 0,2–0,5 m long, ascending to ± prostrate or erect, mostly much branched, ± densely papillate, mostly greyish or greyish brown above. *Leaves* often distinctly dimorphic; blades 2–6 × 0,4–1 mm, narrowly ovate-lanceolate and oblong to ± elliptic in section on old long shoots, linear-lanceolate to linear, needle-like, relatively longer and ± round in section on short shoots and/or new growth, glabrous except for ± papillate margins. *Flowers* paired (seldom in clusters of 4–6) at nodes, inflorescence sometimes ± conspicuous in ♀; corolla 4–5-merous (in ♀ more commonly 4-merous), glabrous. ♂: tube 0,7–1,2 mm long, lobes 2,1–3 × 0,8–1 mm; anthers 1,7–2,1 mm long. ♀: tube ± 0 or 0,2–0,3 mm long, lobes 0,5–1 × 0,2–0,3 mm; stigmas 3–5 mm long; ovary 1,2–1,6 × 1–1,4

mm, shortly hairy, with 5 small calyx lobes. *Fruit* c. 3–5 × 2,8–3,5 mm, greyish or greyish brown, densely covered with short whitish spreading hairs (if ± glabrescent, fruits ± subglobose), with 5 triangular to ± rounded calyx lobes c. 0,5–1 × 0,4–0,7 mm. *Chromosome number*: 2n=(c.)44.

Endemic to the south-western Cape; from the Caledon distr. east to the Riversdale distr. and north to the southern Clanwilliam distr. Growing on hillsides, in sandy flats or in Coastal Fynbos over sand; also in limestone areas. Map 37.

Vouchers: *Acocks* 23998; *Compton* 11898 (NBG); *Puff* 800920-2/2 (WU).

The relatively small but broad long shoot leaves are similar in shape to those of *N. namaquensis* (no. 3) or *N. cinerea* (no. 2). Specimens without mature fruits in which none of the longer, ± needle-like short shoot leaves are developed may be difficult to identify.

From the eastern Bredasdorp distr. to the Riversdale distr. the separation of the two subspecies can become problematic (e.g. *Van der Merwe* 1007 from Windhoek Plateau is ± intermediate).

Collections from near The Fisheries (=Gouritsmond, 3421–BD; *Acocks* 21559; *Puff* 790910-4/1, 800927-2/1, WU) are difficult to place; their fruits do not fully match either of the subspecies (± subglobose, relatively small and less distinctly hairy than 'typical' subsp. *macrocarpa*). The habit of these collections, moreover, is highly variable: low, intricately branched, ± cushion-shaped, with small leaves in abandoned fields and on hard-packed, trampled(?), sandy soil; rounded bushes with widely spaced longer and narrower leaves in undisturbed Coastal Fynbos on calcareous sand.

9. **Nenax arenicola** *Puff, sp. nov., fructibus majoribus solitariis vel paribus oppositis et late dispersis, et habitu dissimili a* N. acerosa *differt.*

Type: Cape, c. 3 km south-east of Graafwater-Lambert's Bay rd., on road to Leipoldtville, *Puff* 800915-2/1 (WU, holo.!; BOL; NBG; PRE, iso.!).

Dwarf shrub, intricately branched, often rounded, c. 0,3–0,5 m in diam. and c. 0,2–0,75(–1) m tall, frequently with thick, woody root. *Stems* ascending to erect, ± much branched; branches typically paired at nodes, spreading to ascending, branching very irregular if browsed. *Leaves* decussate, sometimes pseudoverticillate; blades (5–)7–13(–16) × 0,5–1 mm, linear, often shallowly concave above and convex below or ± semiterete in section, glabrous or margins ± papillate. *Flowers* paired or single at nodes, widely spaced; corolla 4(–5)-merous, greenish yellow, sometimes purplish tinged. ♂: tube 0,4–0,8 mm long, broadly funnel-shaped, lobes 2–2,9 × 0,6–0,8 mm; anthers 1,6–1,9 mm long. ♀: tube ± 0 or 0,1–0,3 mm long, lobes 0,5–1(–1,3) × 0,1–0,3 mm; stigmas 3–5,4 mm long, purplish red or whitish grey tinged purplish; ovary c. 2,2–2,9 × 1–1,4 mm, with 4–5 small calyx lobes. *Fruit* indehiscent, hard, not supported by a carpophore, 5–8 × 2–3,5 mm, ellipsoidal, reddish brown to dark grey, glabrous, with 4–5 often ± indistinct rounded calyx lobes to c. 0,4–0,5 mm long. *Chromosome number*: 2n=44. Fig. 8c.

Endemic to the western Cape; occurring from the south-western Namaqualand distr. south to the western Clanwilliam distr. Growing in sandy coastal plains and occasionally in heavier, stony soils of the adjacent foothills. Map 43.

Vouchers: *Acocks* 14936 (K; PRE); 19635 (K; M; PRE; SRGH); *Van der Westhuizen* 114.

Allied to *N. acerosa* (no. 8) but easily distinguished by its less leafy appearance, a different habit, more reduced inflorescences and a more north-western distribution range.

10. **Nenax** sp. **A**

Cape, Laingsburg distr., (farm) Cabidu [north of Konstabel, 3320–AB], *Compton* 22209 (NBG).

Dwarf shrub with greyish stems, ± much branched; branches mostly paired at nodes, ± ascending. *Leaves* decussate, widely spaced; blades of long shoot leaves ovate-lanceolate to linear-lanceolate, c. 2–3 × 1 mm, those of short shoot leaves narrower and to 6(–8) mm long. *Flowers* unknown. *Fruit* indehiscent, ± soft, easily squashed between two fingers, not supported by a carpophore, c. 3,5–4,5 mm in diam., subglobose, greyish to greyish brown, shortly hairy, crowned by minute to subobsolete calyx lobes.

Allied to the other indehiscent-fruited *Nenax* species (no. 7–9 and 11) and vegetatively similar to *N. acerosa* subsp. *macrocarpa* (no. 8b). Probably a good new species but so far only known from the collection cited above.

11. **Nenax** sp. **B**

Cape, Zonder Einde Mts (=Riviersonderend Mts), Boesmanskloof [3419–BA], *Levyns* 9200 (BOL).

Dwarf shrub with reddish stems, ± much branched; branches mostly paired at nodes, ± spreading. *Leaves* decussate, pseudoverticillate; blades c. 4–6 × 0,5 mm, ± needle-like, glabrous, shiny. *Flowers* unknown. *Fruit* indehiscent, hard, not supported by a carpophore, c. 2–2,5 mm in diam., subglobose, shiny red or reddish brown, obscurely ribbed, crowned by minute calyx lobes.

Probably allied to *N. acerosa* (no. 8). Most likely a good new species but so far only known from the collection cited above.

8435 GALOPINA

Galopina *Thunb.*, Nov. Gen. Pl. 1: 3 (1781); Cruse, Rub. Cap. 18 (1825); Sond. in F.C. 3: 26 (1865); Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 139 (1873); K. Schum. in Pflanzenfam. 4,4: 128 (1891); R.A. Dyer, Gen. 1: 622 (1975); Compton, Fl. Swazild 586 (1976). Type species: *G. circaeoides* Thunb.

Oxyspermum Eckl. & Zeyh., Enum. 365 (1836). Type species: *O. asperum* Eckl. & Zeyh.

Phyllis sensu Cruse in Linnaea 6: 19 (1831).

Perennial herbs with branched, often ± woody rhizomes or rootstocks, ♂, ♂ + ♀, ♀, or occasionally ♂, ♂ + ♂, ♂ + ♂ + ♀, ♂ + ♀. *Leaves* decussate, broadly ovate to lanceolate, distinctly petiolate, with stipular sheaths bearing 3–5(–7) setae on either side. *Inflorescence* terminal, paniculate to thyrso-paniculate, bracteate. *Flowers* ♂, ♀ or ♂, 4(–5)-merous. *Calyx* obsolete. ♂, ♂: *Corolla*: tube (very) short, broadly funnel-shaped to campanulate, lobes recurved, ± lanceolate; *anthers* yellowish to whitish, exserted, dangling on long slender filiform filaments. ♀: *corolla* much smaller, tube cylindrical, sometimes ± 0, lobes erect to spreading, ± linear. *Ovary* biovulate; style 0; stigmas 2, long exserted, in ♂ often shorter and thinner than in ♀, hairy, greyish white, yellowish grey or greenish. *Fruit* dehiscent, not supported by a carpophore; mericarps ± glabrous, tuberculate or covered with long hairs, dorsal side convex, ventral side plane to concave. *Chromosome number*: 2n=22.

A small south-east African genus. One of the four species is more widely distributed and extends to both the south-western Cape and to Zimbabwe, Mozambique and southern Malawi.

1a Ovary and fruit villous; stems typically without short shoots ..... 4. *G. crocyllioides*

1b Ovary and fruit smooth, wrinkled or tuberculate, without hairs; stems often with leafy short shoots:

2a Inflorescence ± narrowly cylindrical; peduncles and pedicels not conspicuously divergent in fruit; fruiting pedicels (0,8–)1–2(–3) mm long; short shoot leaves conspicuous, often almost as long as long shoot leaves; petioles to 2(–3) mm long ..... 3. *G. aspera*

2b Inflorescence ellipsoidal to ± spheroidal; peduncles and pedicels divergent in fruit; fruiting pedicels(2–)3–26 (–37) mm long; short shoot leaves much smaller than long shoot leaves; petioles to 14 mm long:

3a Peduncles and pedicels (2–)3–6(–7) mm long in fruit, ± stiff; inflorescence pyramidal to ellipsoidal; leaves typically ± densely tomentose, blades (27–)35–50(–62) × (15–)20–35mm, broadly ovate-lanceolate or ovate ..... 2. *G. tomentosa*

3b Peduncles and pedicels (7–)12–26 (–37) mm long in fruit, filiform and slender; inflorescence lax, broadly pyramidal to ± spheroidal; leaves glabrous or sparsely hairy, blades (28–)40–80(–105) × (8–)12–30(–37)mm, ±lanceolate to ovate-lanceolate ..... 1. *G. circaeoides*

1. **Galopina circaeoides** *Thunb.*, Nov. Gen. Pl. 1: 3 (1781); Cruse, Rub. Cap. 18 (1825); Sond. in F.C. 3: 26 (1865); Brenan in Mem. N.Y. bot. Gdn 8: 454 (1954); Compton, Fl. Swazild 586 (1976). Type: Cape, in sylvis Hautniquas, Groot Vaders-Bosch, aliisque. *Thunberg* in herb. Thunberg (sheet 23313, UPS, holo.!), in herb. Montin (S!) and in herb. Gasström (S!).

G. circaeoides Thunb. var. *glabra* Kuntze, Rev. Gen. 3,2: 120 (1898). Types: Cape, Swellendam, *Kuntze* s.n. (K, lecto.!), Perie-Wald, *Kuntze* s.n. (K!).

G. circaeoides Thunb. var. *pubescens* Kuntze, Rev. Gen. 3,2: 120 (1898). Type: Cape, Cathcart, *Kuntze* s.n. (K, holo.!; US sub 554842!).

Anthospermum galopina Thunb., Prod. 1: 32 (1794). *Phyllis galopina* (Thunb.) Cruse in Linnaea 6: 20 (1831). Type: as for *G. circaeoides*.

Perennial herb, several- to many-stemmed, ♂, ♂ + ♀, ♀ or occasionally ♂.+ ♂ or ♂ + ♀ + ♀. *Stems* (0,3–)0,4–1,2(–1,5) m long, ascending to erect or occasionally decumbent and rooting at nodes, glabrous or occasionally sparsely hairy; often with much-contracted short shoots bearing small leaves. *Leaves*: blades (28–)40–80(–105) × (8–) 12–30(–37) mm, ± lanceolate to ovate-lanceolate, narrowed to base, acute at apex, glabrous or with some short whitish spreading hairs along midrib and principal veins and/or scattered on both surfaces; petioles (3–)4–14 mm long; stipular sheath with 3 or 5 (–7) setae, free portion of the longest (3,5–)4–8(–10,8) mm. *Inflorescence* broadly pyramidal to ± spheroidal, lax, c. (190–)150–300 × (80–)130–280 mm; peduncles and pedicels filiform, slender, glabrous, strongly divergent in fruit, elongating to

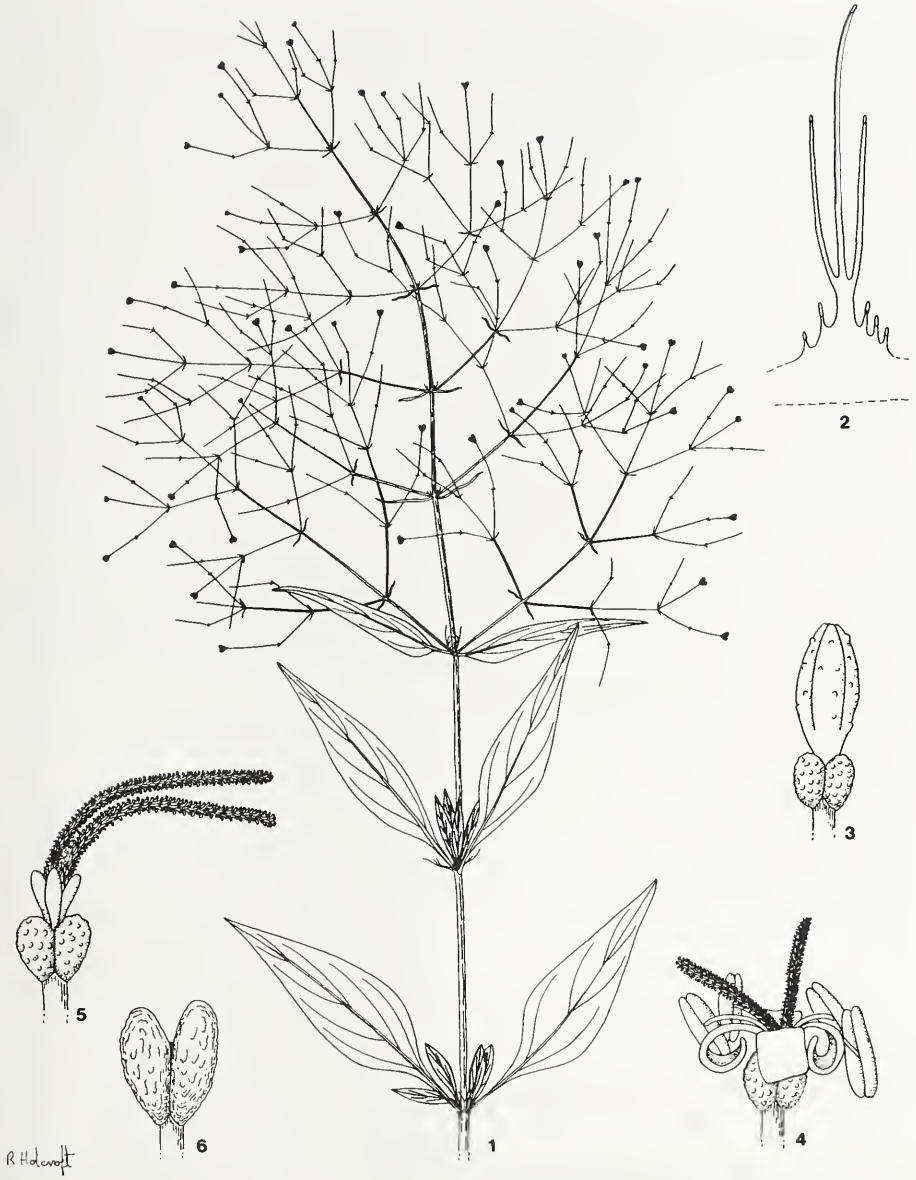
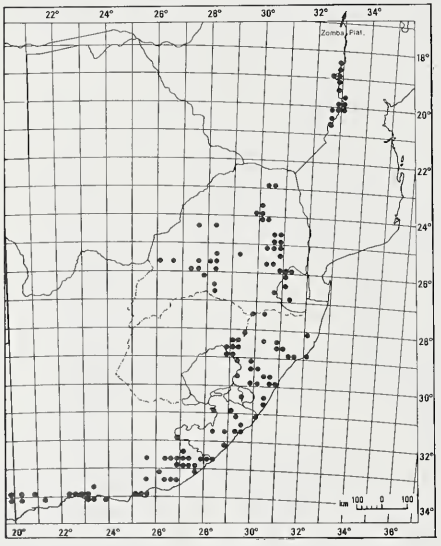


FIG. 9.—**Galopina circaeoides:** 1, part of plant with fruiting inflorescence, × 0,6; 2, part of stipular sheath with setae, × 11; 3, ♂ bud, × 11; 4, ♂ flower, × 11; 5, ♀ flower, × 11; 6, fruit (two mericarps) in side view, × 11 (1 & 2: *Jacobsz* 1598; 3–5: *Puff* 781203-1/1; 6: *Puff* 780326-2/1).

(7–)12–26(–37) mm. *Flowers*: corolla whitish, creamy white, yellowish or greenish, occasionally reddish purplish tinged outside, glabrous or papillate. ♀, ♂: tube 0,3–0,5(–0,6) mm long, lobes (1,1–)1,3–1,7(–1,9) × (0,3–)0,4–0,6 mm; anthers 1,1–1,6 mm long. ♀: tube ±0–0,2(–0,3) mm long, lobes 0,6–0,8(–1) × 0,1–0,2(–0,3) mm; stigmas (2,3–)3–5(–6,5) mm long; ovary c. 0,5–0,8(–1) × (0,5–)0,8–1,3 mm, ± densely warty. *Fruit* blackish to black; each mericarp c. 1,5–2 × (0,7–)1–1,4 mm, oblong to ± obovate, ± densely warty. Fig. 9.

Occurs from Transvaal to the south-western Cape; also in eastern Zimbabwe and adjacent parts of Mozambique and in southern Malawi. Growing mostly in kloof or gallery forests, in scrub along streams or in bushclumps. Map 45.



MAP 45.—**Galopina circaeoides**

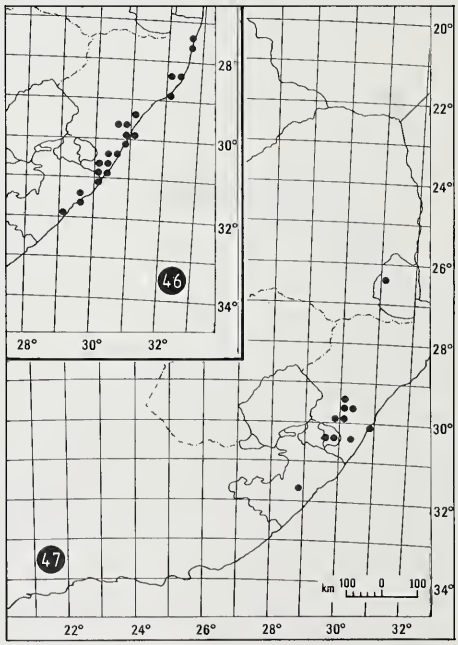
Vouchers: *Bayer & McClean* 62 (BOL; GRA; PRE); *Galpin* 8124; *Scheepers* 548 (M; MO; PRE; SRGH).

Variable in stem and leaf indumentum and leaf size and shape, but easily distinguished from its nearest ally, *G. tomentosa* (below), by its lax, broad and extensive inflorescence and its less dense and shorter indumentum.

2. **Galopina tomentosa** *Hochst.* in Flora 27: 555 (1844). Type: Natal, nr. Umlaas R., *Krauss* 52 (BM!; G!; K!; M!; MO!; W!).

G. hirsuta E. Mey. in Drège in Flora 26, Bes. Beigabe 186 (1843), nom. nud.

Perennial herb, few- to many-stemmed, ♀, ♀ + ♀, ♀ or occasionally ♂, ♀ + ♂ or ♂ + ♀ + ♀. *Stems* (0,3–)0,4–0,8(–1) m long, ascending to ± erect or ± prostrate and rooting at nodes, mostly densely covered with longish whitish or yellowish white hairs; often with short shoots bearing small leaves. *Leaves*: blades (27–)35–50(–62) × (15–)20–35 mm, broadly ovate-lanceolate or ovate, cuneate, truncate or ± subcordate at base, subacute to ± obtuse at apex, both surfaces (particularly midrib and prominent lateral veins) ± densely covered with longish yellowish to whitish spreading hairs, very rarely glabrescent; petioles (3–)4–6(–9) mm long; stipular sheath with 3(–5) setae, the longest (1,5–)2–4(–5) mm. *Inflorescence* pyramidal to ellipsoidal, (60–)100–200(–250) × (40–)70–150(–200) mm; peduncles and pedicels thin but ± stiff, hairy to subglabrous, divergent in fruit, elongating to (2–)3–6(–7) mm. *Flowers*: corolla greenish, greenish yellow or creamy yellow, sometimes reddish brown tinged outside, glabrous or papil-



MAPS 46–47:—46. **Galopina tomentosa**
47. **Galopina crocyllioides**

late near tip. ♀, ♂: tube ± 0–0,4(–0,5) mm long, lobes 1,1–1,5(–1,7) × 0,4–0,6(–0,9) mm; anthers 0,9–1,2 mm long. ♀: tube 0–0,2(–0,3) mm long, lobes 0,6–0,9 × 0,1–0,2(–0,3) mm; stigmas (2,2–)3–4,5(–5) mm long; ovary c. 0,6–0,9 × 0,8–1,3 mm, ± wrinkled to ± warty. *Fruit* greenish brown, brown to brownish black; each mericarp (1–)1,2–1,8(–2) × 0,8–1,4(–1,6) mm, obovate to elliptic, ± smooth, wrinkled or ± warty.

Occurs from Natal (Tongaland) to Transkei (Wild Coast); growing mostly at the edge of (coastal or dune) scrub or forest, occasionally also in open grassland. Map 46.

Vouchers: *Rudatis* 332 (BM; E; G; K; PRE; S; STE; W); *Strey* 9561 (BR; NH; PRE; S); *Ward* 5488 (NH; NU; PRE).

Some collections from coastal areas of Tonga- and Zululand are atypical (less densely hairy or even glabrescent) and approach *G. circaeoides* (above) somewhat.

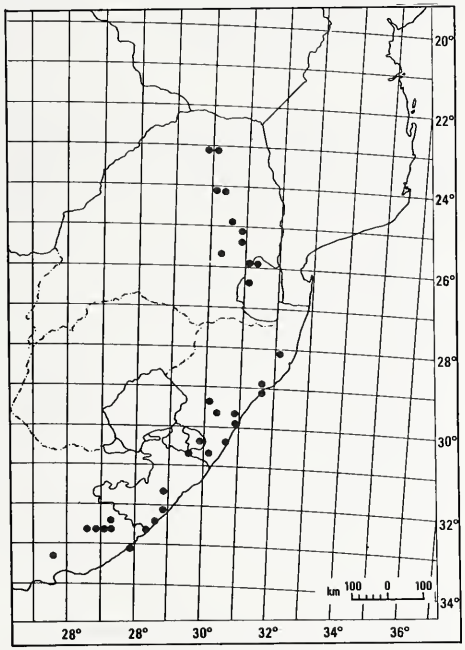
3. **Galopina aspera** *(Eckl. & Zeyh.) Walp.*, Repert. 2: 462 (1843), pro *'Galopina ?aspera'*. Type: Cape, Katriviersberg, above Philipstown (Ceded Territory), and on Chumiberg (Kafferland), *Ecklon & Zeyher* 2305 (SAM, holo.!; FI; G; GOET; M; MO; S; W, iso.!).

Oxyspermum asperum Eckl. & Zeyh., Enum. 365 (1836). *G. aspera* (Eckl. & Zeyh.) Sond. in F. C. 3: 26 (1865).

G. oxyspermum Steud., Nom. Bot. edn 2,1: 662 (1841), nom. illeg.

Perennial herb, single- to several-stemmed, ♂, ♀, ♂ + ♀, ♀ or occasionally ♂ + ♀ + ♀ or (very rarely) ♂ + ♀. *Stems* (0,3–)0,5–1,2(–1,4) m long, ± erect to ascending, mostly unbranched, usually shortly hairy; often with contracted short shoots bearing relatively large leaves. *Leaves:* blades (25–)30–45(–50) × (8–)12–25(–30) mm, ovate, elliptic or ovate-lanceolate, ± cuneate or ± truncate at base, subacute to obtuse at apex, both surfaces (particularly midrib and prominent lateral veins) ± densely covered with very short whitish to yellowish spreading hairs or seldom ± papillate or subglabrous; petioles 0,5–2(–3) mm long; stipular sheath with 5 or 3(–4) setae, the longest c. 3–4(–4,5) mm. *Inflorescence* ± narrowly cylindrical, c. (80–)150–300(–380) × (20–)40–80(–100) mm; peduncles and pedicels thin but stiff, hairy to subglabrous, not conspicuously divergent in fruit, peduncles elongating to c. (1,5–)2,5–5(–6) mm, pedicels to (0,8–)1–2(–3) mm. *Flowers:* corolla greenish, greenish yellow, purplish or brownish red tinged, often densely papillate outside. ♂, ♀: tube (0,1–)0,2–0,5 mm long, lobes 1–1,5(–1,6) × (0,4–)0,5–0,6(–0,7) mm; anthers (0,5–)0,7–1,1(–1,2) mm long. ♀: tube 0–0,2 mm long, lobes (0,5–)0,6–1 × (0,1–)0,2–0,4 mm; stigmas (2–)2,5–4(–4,5) mm long; ovary c. 1–1,5 × 0,8–1 mm, densely tuberculate. *Fruit* brownish; each mericarp 1,5–2 × (0,7–)1–1,2(–1,5) mm, conspicuously and densely warty-tuberculate.

Known from Transvaal (along Drakensberg escarpment), Swaziland, Natal, Transkei and eastern Cape; growing mostly at the edge of forest or scrub in ± sunny places. Map 48.



MAP 48.—**Galopina aspera**

Vouchers: *Acocks* 9431; *Schlechter* 4549 (BM; BOL; G; K; PRE; W; WU); *Strey* 6472 (NH; PRE).

Characterized vegetatively by its conspicuous leafy short shoots (short shoot leaves often almost as long as long shoot leaves).

4. **Galopina crocyllioides** *Bär ex Schinz* in Vjschr. naturf. Ges. Zürich 68: 437 (1923); Hilliard & Burtt in Notes R. bot. Gdn Edinb. 32: 387 (1973). Types: Natal, Howick, *Junod* 238 (Z, lecto.!); Station Dumisa, Umgaye Flats, *Rudatis* 867 (BM!; E!; K!; S!; W!).

Perennial herb, few- to single-stemmed, ♂, ♂ + ♀, ♀ or occasionally ♂ + ♂. *Stems* (0,5–)0,6–1(–1,2) m long, erect, unbranched, glabrous or younger parts ± papillate; usually without short shoots. *Leaves*: blades (35–)40–60(–70) × 12–25(–30) mm, ovate, ovate-lanceolate to ± lanceolate, narrowed at base, ± obtuse to subacute at apex, glabrous or ± papillate; petioles (0,5–)1–2(–2,5) mm long; stipular sheath with (2–)3–4(–5) setae, the longest 2,5–5 mm. *Inflorescence* ± narrowly cylindrical, c. (70–)100–300 × 15–50(–70) mm; peduncles and pedicels thin but stiff, not divergent in fruit, peduncles elongating to c. (1–)2–4(–5) mm, pedicels to 0,7–1,5 (–2,5) mm. *Flowers*: corolla greenish yellow or tinged brownish, usually hairy outside. ♂, ♀: tube 0–0,5 mm long, lobes 1–1,5 × 0,4–0,7 mm; anthers 0,5–0,8(–1) mm long. ♀: tube ± 0, lobes c. 0,5 × 0,1–0,2 mm; stigmas 2–3(–3,5) mm long; ovary c. 0,8–1,2 × 0,7–1 mm, densely hairy. *Fruit* reddish brown to blackish; each mericarp 1,3–2,2(–2,6) × 0,8–1,2 mm, densely covered with whitish spreading hairs c. (0,3–)0,5–0,8 mm long.

Centred in the Natal Midlands and Coastal Regions; also in Swaziland and in the Transkei. Growing mostly among tall grass in grassland or in forest edge scrub. Map 47.

Vouchers: *Compton* 25527 (NBG; PRE); *Hilliard & Burtt* 8072 (E; K; MO; NBG; NU; PRE; S); *Flanagan* 2848.

Well distinguished by its villous ovaries and fruits and by the absence of leafy short shoots.

8443 CARPACOCE

Carpacoce *Sond.* in F.C. 3: 32 (1865); Hook. f. in Benth. & Hook. f., Gen. Plant. 2: 141 (1873); K. Schum. in Pflanzenfam. 4,4: 130 (1891); Salter in Jl S. Afr. Bot. 3: 113 (1937), in Adamson & Salter, Fl. Cape Penins. 733 (1950); R. A. Dyer, Gen. 1: 623 (1975). Type species: *Anthospermum scabrum* Thunb., i.e. *Carpacoce scabra* (Thunb.) Sond.

Lagotis E. Mey. in Drège in Flora 26, Bes. Beigabe 197 (1843), nom. nud.

Dwarf shrubs, rarely perennial herbs, ♂, ♀ or occasionally ♂, ♂ + ♀, ♂ + ♂. *Leaves* decussate or (rarely) in whorls of 3, often ericoid, ± pungent, acuminate or acute at apex, (sub)sessile, with cup- or funnel-shaped stipular sheaths bearing minute setae or (less commonly) longer bristles on either side. *Inflorescence* frequently very inconspicuous, made up of flowers paired or solitary at nodes, or of mostly few-flowered cymes. *Flowers* ♂, ♀ or occasionally ♂. *Calyx* 3–5(–6)-merous, lobes leaf-like, often unequal in size. *Corolla* 4–7-merous, tube cylindrical to ± narrowly funnel-shaped, lobes linear to ± lanceolate, hooded (Fig. 11a–d, f), spreading to spreading-recurved (♂, ♂) or ± erect (♀); ♂, ♂: corolla much larger than in ♀. *Stamens* 4–7, anthers purplish red to dark purplish brown, exserted, dangling on long slender filiform filaments. *Ovary* with 1(2) fertile ovule(s); style 0; stigmas 1(2), long exserted, hairy, purplish red, greenish grey, greyish or whitish. *Fruit* 1(–2)-seeded, crowned by persistent calyx lobes; exocarp dehiscing into valves, releasing endocarp with enclosed seed*. *Chromosome number*: 2n=22.

A small genus of 7 species endemic to the south-western Cape; only one species extends east to the Bathurst and Albany distr. Map 58.

Note: In several *Carpacoce* species, flowers 'transitional' between ♂ and 'pure' ♀ may be found occasionally. Such 'transitional' flowers have corollas *intermediate in size* between ♂ and ♀ and are characterized by the presence of small but clearly discernible, (±) pollenless *anther rudiments*; 'pure' ♀ with small corollas have no rudimentary anthers.

1a Leaves (35–)50–70(–80) mm long; fruits crowned by 3 calyx lobes ..... 2. *C. gigantea*

1b Leaves smaller, 3–30(–50) mm long; fruits crowned by 4–6 calyx lobes:

2a Leaves lanceolate or ovate-lanceolate, to 5(–8) mm wide, not distinctly ericoid:

* Endocarp plus enclosed seed (see Fig. 12 f–k) are referred to as 'diaspore' (dispersal unit) in the following descriptions.

3a Stipular sheath with a single minute seta, or seta absent; leaf blades rigid, conspicuously recurved, (4–)6–10(–12) mm long; corolla and calyx always 4-merous ..... 3. *C. curvifolia*

3b Stipular sheath with numerous bristles, 1–2,5(–3) mm long; leaf blades ± membranaceous, not conspicuously recurved (except for tips), 10–30(–35) mm long; corolla and calyx mostly 5-merous:

4a Plants slender, lax; partial inflorescences few- to 1-flowered; fruiting pedicels 3–12(–20) mm long; widely distributed, east to the Heidelberg distr. ..... 1(a). *C. spermacocea* subsp. *spermacocea*

4b Plants more robust, distinctly woody at least near base; partial inflorescences several- to ± many-flowered; fruiting pedicels 1–3 mm long; from the Mossel Bay distr. eastwards ..... 1(b). *C. spermacocea* subsp. *orientalis*

2b Leaves ericoid, often ± needle-like, linear, linear-lanceolate or narrowly ovate-lanceolate, not wider than 2 mm:

5a Stipular sheath broadly cup-shaped, (4–)5–7 mm wide, 3–5 mm long; fruits crowned by 4 calyx lobes; corolla tube (♂) 3–5,5 mm long ..... 7. *C. heteromorpha*

5b Stipular sheath funnel-shaped or cup-shaped, small; fruits crowned by 5–6 calyx lobes; corolla tube (♀, ♂) 1–2,5 mm long:

6a Stipular sheath funnel-shaped, (1,5–)2–3(–4) mm long; fruits (4–)5–7,5 × 2–3 mm ..... 6. *C. vaginellata*

6b Stipular sheath cup-shaped, not longer than 0,5–1,2 mm; fruits 2–4 × (2,5–)3–3,5 mm:

7a Flowers with 1 stigma; fruits 1-seeded; leaves small, 3–7(–9) × 0,7–1(–2) mm ..... 5. *C. burchellii*

7b Flowers with 2 stigmas; fruits 2-seeded; leaves (3–)5–15(–18) × (0,6–)0,8–2 mm:

8a More or less erect dwarf shrubs, internodes (except near shoot tips) frequently longer than leaves; fruiting pedicels c. 1–7 mm long ..... 4(a). *C. scabra* subsp. *scabra*

8b Decumbent, ± much branched dwarf shrubs, internodes mostly shorter than leaves; fruiting pedicels to c. 1 mm long ..... 4(b). *C. scabra* subsp. *rupestris*

1. **Carpacoce spermacocea** *(Reichb. f.) Sond.* in F.C. 3: 33 (1865); Salter in Jl S. Afr. Bot. 3: 116 (1937), in Adamson & Salter, Fl. Cape Penins. 734 (1950). Type: none cited; a specimen from 'C.B.S.'. Neotype: *'Reich. [enbach]* 63.9' (E!; LY!; WU!)[1].

Anthospermum spermacoceum Reichb. f. in Sprengel, Syst. Veg. 4: 338 (1827); Cruse in Linnaea 6: 17 (1831), in Linnaea 7: 134 (1832).

Lagotis spermacocea (Reichb. f.) E. Mey. in Drège in Flora 26, Bes. Beigabe: 197 (1843), nom. non valide publ.

Anthospermum foetidum Eckl., nomen.

Two subspecies are recognized:

1(a). subsp. **spermacocea.**

Synonyms as above.

Perennial herb, ♂, ♀ or occasionally ♂ + ♀, lax, straggling or scrambling, few- to several-stemmed, with rhizomes or ± woody base, (strongly) fetid. *Stems* c. 0,2–0,6(–0,9) m long, sometimes rooting at lower nodes, branching irregular, branches to 300 mm long, often with leafy short shoots. *Leaves* decussate; blades 10–18(–23) × (1,5–)2–3(–4) mm, narrowly ovate-lanceolate to linear-lanceolate, ± spreading, membranaceous, glabrous or margins faintly scabrid; stipular sheath cup-shaped, with 3–5 (or sometimes more) bristles c. 1–2(–2,5) mm long. *Flowers* in groups of few to 1, lateral and/or terminal, mostly on short lateral branches, fruiting pedicels elongated, 3–12(–20) mm long; calyx (4–)5–6-merous, lobes (1–)2,5–5 mm long, linear-lanceolate, 1 or 2 often much larger than the others, erect to spreading, or apices or upper thirds recurved; corolla (4–)5(6–)-merous, greenish, greenish yellow or dark purplish brown to blackish. ♂: tube 1–2 mm long, lobes 2–3,5 × 0,7–1,2 mm; anthers 1,5–2,2 mm long; stigma often shorter than in ♀. ♀: tube 0,8–1,2 mm long, lobes 0,7–1,5 × 0,2–0,4 mm; stigma 1, 5–13 mm long; ovary c. 1,5–2 mm long. *Fruit* green, turning dark brown, c. 2–3,5(–4) × 1–1,5 mm, ± obovate to cylindrical, often ± ribbed, 1-seeded; diaspore c. 2–3(–4) × 1–1,5 mm, greyish to black, ± cylindrical, hollowed out at base (hollow sometimes filled with easily removable 'plug' of spongy tissue), ± rugose, occasionally indistinctly ribbed. *Chromosome number*: 2n=22.

Occurring from the Cape Peninsula north-east to the Tulbagh distr. and east to the Heidelberg distr. Growing in wet or damp, often shady and sheltered localities (scrub near streams, edge of kloof forests, base of cliffs, etc.). Map 50.

[1] These specimens are almost certainly duplicates of *Ecklon & Zeyher* 2312 or '63.9' (from 'below Constantia, Tafelberg and in the Caledon and Swellendam Provinces') which must have been available to and studied by Reichenbach.

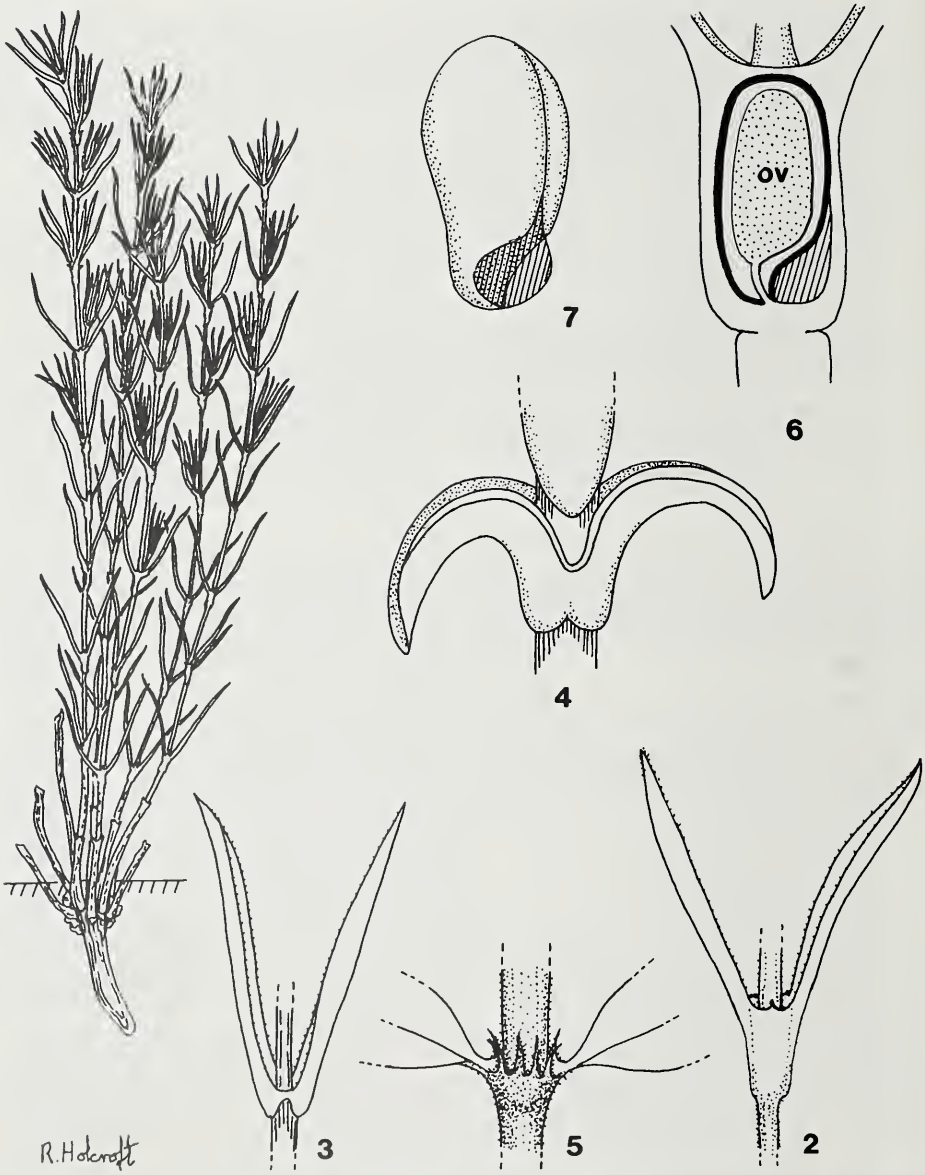


FIG. 10.—1 & 2, **Carpacoce vaginellata:** 1, recently burnt plant, × 1; 2, leaf pair with stipular sheath, × 4,5 *(Stokoe* s.n. sub SAM 64194). 3, **C. scabra** subsp. **scabra,** leaf pair with stipular sheath, × 4,5 *(Story* 4360). 4, **C. curvifolia,** leaf pair, × 4,5 *(Esterhuysen* 27529). 5–7, **C. spermacocea** subsp. **orientalis:** 5, stipular sheath, × 4,5 *(Esterhuysen* 27492); 6, longitudinal section of ovary showing ovule (ov) in endocarp case and spongy tissue at base (hatched), × 12; 7, diaspore, note hollowed out base and 'plug' of spongy tissue (hatched), × 12 *(Puff* 790909-5/2).

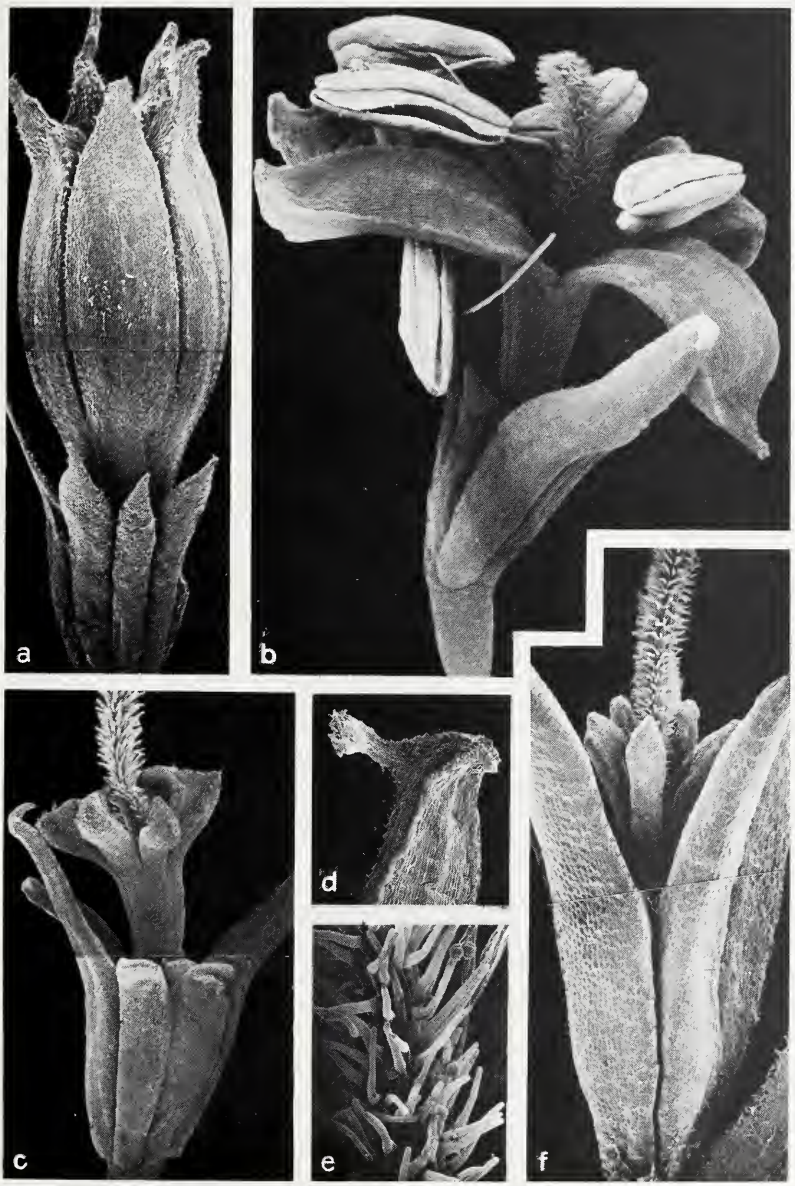


FIG. 11.—a–e, **Carpacoce spermacocea** subsp. **orientalis:** a, ♀ (or ♂?) bud, note apical appendages of petals, × 17,5; b, ♀ flower (upper part of stigma broken off), × 17,5; c, ♀ flower, × 17,5; d, apical appendage of petal (♀), × 17,5; e, detail of stigmatic hairs (note pollen grains), × 67 *(Puff* 790909-5/2). f, **C. vaginellata,** ♀ flower, × 17,5 *(Puff* 790912-1/1) (SEM-graphs).

Vouchers: *Boucher* 1144 (PRE; STE); *Schlechter* 9225 (BM; BOL; BR; E; G; K; MO; PRE; S; US; W); *Taylor* 3550 (PRE; STE).

1(b). subsp. **orientalis** *Puff, subsp. nov., habitu robustiore, floribus pluribus majoribusque et saepe fructibus longioribus a subsp. typica differt.*

Type: Cape, Montagu Pass, *Puff* 790909-5/2 (WU, holo.!; BOL; GRA; NBG; PRE; STE, iso.!).

Perennial herb with woody base or distinct dwarf shrub, ♂, ♀, occasionally ♂ + ♀ or (seldom) ♂ + ♂, often quite robust, straggling, scrambling or sometimes ± erect, few-to several-stemmed, (strongly) fetid. *Stems* c. (0,1–)0,2–1,5 m long, branching often quite regular, branches usually not more than 200 mm long, ascending to ± spreading, often ± densely leafy. *Leaves*: blades (15–)20–30(–35) × (2–)3–5(–8) mm, narrowly ovate-lanceolate to linear-lanceolate. *Flowers* in groups of ± 8 or less, ± sessile, fruiting pedicels not longer than c. 1–3 mm; calyx 5–6-merous, lobes 2–5 mm long; ♂ (♂): corolla tube 0,8–1,5(–2) mm long, lobes 2–3,5(–4) × 0,8–1,2 mm; anthers 1,7–2,5 mm long; ♂: stigma shorter than in ♀; ♂: small rudimentary ovary present. ♀: tube 0,6–1 mm long, lobes 0,6–1(–1,5) × 0,2–0,4 mm; stigma 1, 5–12 mm long; ovary c. 1,5–2,5 mm long. *Fruit* c. (3–)3,5–5 × 1,5–2,5 mm; diaspore c. 3–3,5(–4) × 1,2–1,7 mm. *Chromosome number*: 2n=22. Fig. 10: 5–7; 11a–e; 12 a & e.

Occurring in the eastern part of the Cape Floristic Region from the Mossel Bay distr. to the Uitenhage and Port Elizabeth distr. Habitat as for subsp. *spermacocea*. Map 51.

Vouchers: *Acocks* 21177 (K; M; PRE); *Esterhuysen* 27493 (BOL; PRE); *Thode* A 856 (K; MO; NH; PRE).

The two subspecies cannot always be satisfactorily separated morphologically; their distribution ranges, however, do not overlap. Overall, subsp. *orientalis* tends to be more robust, is generally larger and has more flowers; it is, furthermore, often distinctly woody. Odd luxurious forms of subsp. *spermacocea* (e.g. *Williams* 2604; K; NBG; PRE) approach subsp. *orientalis* in leaf size and in having more flowers per partial inflorescence than usual.

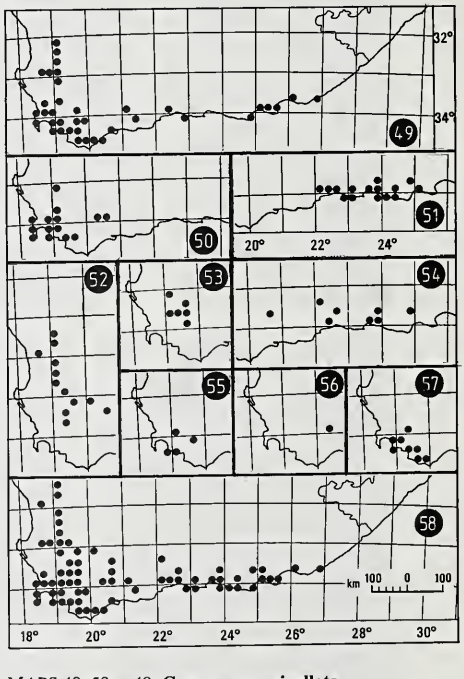
Within subsp. *orientalis* two ± distinct 'Forms' (ecotypes) can be distinguished: (1) 'typical' *orientalis*: luxuriant, straggling or scrambling plants with stems to 1,5 m long. (2) Erect, ± stunted, distinctly dwarf shrubby and rather densely leafy plants to 0,5 m tall; they appear to be confined to the mountains (750 m and above) where they occur in wet, rocky areas (base of cliffs, etc.).

C. spermacocea should not be confused with *Anthospermum herbaceum*. *C. spermacocea* is distinguished by its nauseating odour, flowers with hooded corolla lobes (Fig. 11 a–d) and 1 stigma and fruits with 1 or 2 enlarged calyx lobes.

2. **Carpacoce gigantea** *Puff, sp. nov., foliis multo longioribus et fructibus lobis calycis persistentibus foliaceis tribus coronatis a ceteris speciebus* Carpacocis *praeclare distinguitur.*

Type: Cape, 'in the ascent of the Craggy Peak in the Great Range at Swellendam' [Langeberg north of Swellendam], *Burchell* 7320 (K, holo.!).

Shrub, ♂ or ♀, ± erect. *Stems* to 0,9 m long, ± much branched, densely leafy. *Leaves* decussate; blades (35–)50–70(–80) × (2–)3 (–7) mm, linear-lanceolate, glabrous, margins



MAPS 49–58:—49. **Carpacoce vaginellata**
50. **Carpacoce spermacocea** subsp. **spermacocea**
51. **Carpacoce spermacocea** subsp. **orientalis**
52. **Carpacoce scabra** subsp. **scabra**
53. **Carpacoce scabra** subsp. **rupestris**
54. **Carpacoce curvifolia**
55. **Carpacoce burchellii**
56. **Carpacoce gigantea**
57. **Carpacoce heteromorpha**
58. **Carpacoce**, all taxa

flat to slightly revolute; stipular sheath cup-shaped. *Flowers* solitary on short lateral branches, mostly hidden amongst foliage, pedicels to 4 mm long; calyx 3-merous, lobes (6–)8–12 mm long, ± erect, sometimes ± unequal in size; corolla 5(–6)-merous. ♂: tube 4–5,5 mm long, lobes 4–4,5 × 0,7–1 mm; anthers 3–3,5 mm long. ♀: tube 2,5 mm long, lobes 0,7 × 0,1–0,2 mm; stigma 1, c. 10–15mm long; ovary 2–2,5 mm long. *Fruit* grey, 2,5–5 × 1,2–2 mm, ± ellipsoidal to cylindrical, 1-seeded; diaspore (2–)2,5–3 × 1,5 mm, greyish to black, elliptic to ± rectangular in outline, rugose.

Only known from the mountains above Swellendam; growing on moist, well drained mountain slopes. Map 56.

Voucher: *Taylor* 4241 (PRE; STE).

A very distinct species (large leaves; fruits crowned by 3 calyx lobes) but possibly extinct. Extensive searches for the plants in recent years were unsuccessful.

3. **Carpacoce curvifolia** *Puff, sp. nov., foliis rigidis nitidis conspicue recurvisque a ceteris speciebus* Carpacocis *facile distinguitur.*

Type: Cape, Uniondale distr., Tsitsikamma Mts near Joubertina, *Esterhuysen* 27334 (BOL, holo.!; WU, iso.!).

Perennial herb with woody base or dwarf shrub, ♂ or ♀, many-stemmed, decumbent, seldom ± erect. *Stems* c. (0,1–)0,15–0,5 (–0,6) m long, ± sparsely to much branched. *Leaves* decussate or (rarely) in whorls of 3; blades (4–)6–10(–12) × (1–)2–4 mm, lanceolate to ovate-lanceolate, usually strongly re-03curved, rigid, shiny, glabrous or margins faintly scabrid; stipular sheath cup-shaped. *Flowers* single or paired at nodes, ± sessile, largely hidden in stipular sheaths or, if terminal, with pedicels up to 4 mm long; calyx 4-merous, lobes (0,8–)1–2,4 mm long, lanceolate to triangular, ± spreading, 2 often up to twice as long as the others; corolla 4-merous. ♂: tube (1–)1,5–2(–3) mm long, lobes c. 2–3 × 0,8–1 (–1,5) mm; anthers 0,8–1,5(–1,7) mm long. ♀: tube 0,5–1 mm long, lobes 0,5–1 × 0,3 mm; stigma 1, 4–6 mm long; ovary 1–1,2 mm long. *Fruit* greyish brown, c. 2–2,5 × 1–1,5 mm, ± obovate, lower half often laterally compressed and hidden in stipular sheath, 1-seeded; diaspore c. 1,2–2 × 0,8–1,2 mm, black, ellipsoidal, base often with an appendage of (easily removable) spongy tissue, ± rugose. Fig. 10: 4.

Occurring on the mountains in the eastern part of the Cape Floristic Region, from the Uitenhage to the Ladismith district (Anysberg). Growing on steep rocky slopes, on ledges and in crevices; appears to favour moist, sheltered situations. Map 54.

Vouchers: *Esterhuysen* 27093; 27529; 28043 (BOL; PRE).

Easily distinguished by its rigid, shiny, recurved leaves and small fruits crowned by relatively small broad calyx lobes.

Esterhuysen 25973 (BOL; WU) from the Anysberg, the westernmost, ± isolated locality, appears to be a rather atypical, depauperate form.

4. **Carpacoce scabra** *(Thunb.) Sond.* in F.C. 3: 33 (1865); Salter in Jl S. Afr. Bot. 3: 115 (1937). Syntypes: Cape, *Thunberg* (sheets 23317, 23318, UPS!).

Anthospermum scabrum Thunb., Prodr. 1: 32 (1794), Fl. Cap. 1: 573 (1813), Fl. Cap., edn Schultes 158 (1823); Cruse, Rub. Cap. 14 (1825), in Linnaea 6: 14 (1831).

4 (a). subsp. **scabra.**

Dwarf shrub, ♂, ♀ or occasionally ♂ + ♀, ♂ + ♂ or ♂, many-stemmed, often rounded to ± cylindrical, sometimes slightly fetid. *Stems* (80–)150–400(–450) mm long, sparsely to ± much branched, branches ascending to ± spreading, not densely leafy. *Leaves* decussate; blades (3–)5–15(–18) × (0,6–)0,8–2 (–2,5) mm, linear(-lanceolate), ascending to erect, ericoid, often shallowly concave above or semiterete in section, scabrid at least on margins; stipular sheath cup-shaped. *Flowers* solitary or paired, ± sessile to shortly pedicellate, fruiting pedicels sometimes elongating to c. 7 mm; calyx 5(–6)-merous, lobes (2,5–)4–6 mm long, linear-lanceolate, subequal, spreading to ± erect; corolla 5(–6)-merous, yellowish green, often with reddish brown or brownish purple streaks. ♂, ♂: tube 1,5–2,5 mm long, lobes 2,5–4 × 1–2 mm; anthers 2–2,5(–3) mm long; ♂: gynoecium as in ♀; ♂: small rudimentary ovary and stigmas present. ♀: tube 0,3–0,6 mm long, lobes 0,5–1,2 × 0,4–0,5 mm; stigmas 2, (4–)5–9 mm long; ovary c. 1,5–2 mm long. *Fruit* green, turning grey-brown, c. 2–3 × (2,5–)3–3,5 mm, ± turbinate to subglobose, 2-seeded; diaspore c. 1,5–2,5 × 1–1,5 mm, greyish white to dark grey, ± elliptical to obovate in dorsal view, dorsal side convex, ventral side plane to slightly concave, ± rugose and ribbed. *Chromosome number*: 2n=22. Fig. 10: 3; 12: b, f, j & k.

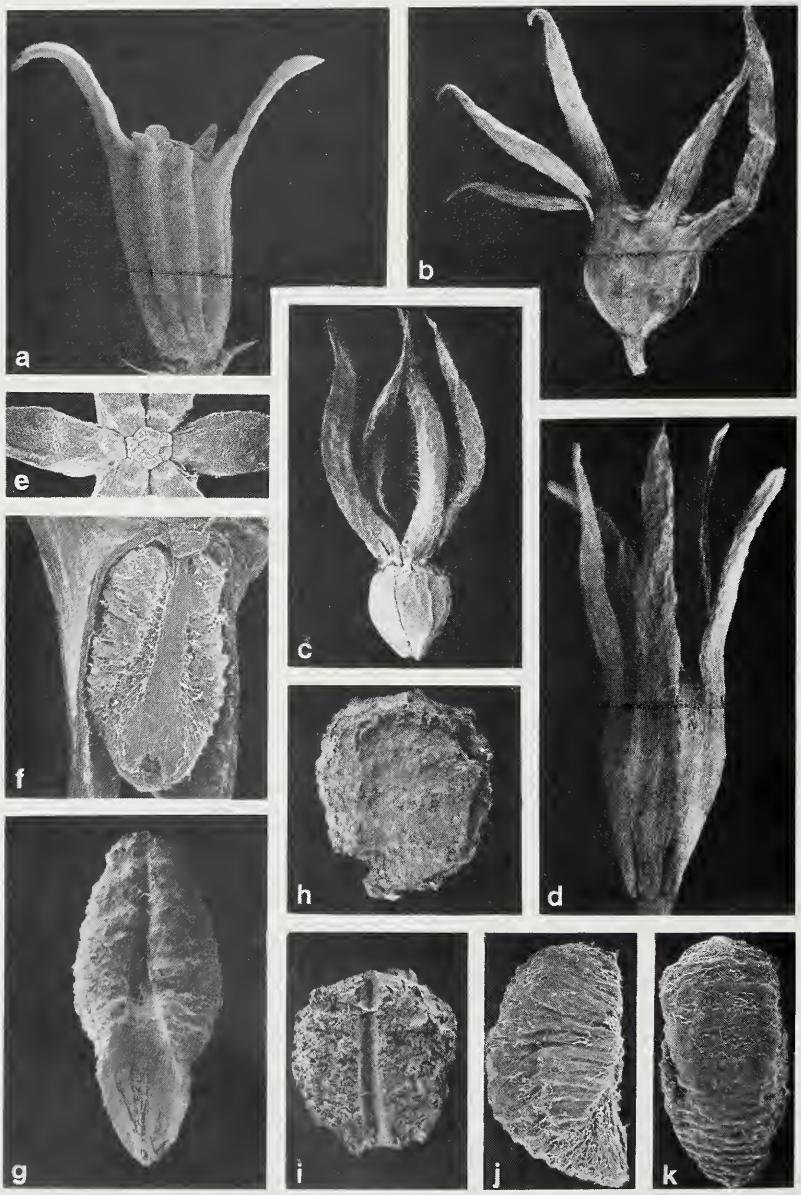


FIG. 12.—Fruits (a–e) and diaspores (f–k) of **Carpacoce** species: a & e, **C. spermacocea** subsp. **orientalis:** a, fruit, × 9; e, fruit from above, × 9 *(Puff* 790909-5/2). b, f, j & k, **C. scabra** subsp. **scabra:** b, fruit, × 9; f, diaspore, ventral side, and two exocarp valves, × 17,5; j, diaspore in side view, × 17,5; k, diaspore, dorsal side, × 17,5 *(Esterhuysen* 10961). c, h & i, **C. heteromorpha:** c, fruit, × 9; h, diaspore in side view, × 17,5; i, diaspore, ventral side, × 17,5 *(Puff* 800917-4/1). d & g, **C. vaginellata:** d, fruit, × 9; g, diaspore, ventral side, × 17,5 *(Puff* 790912-1/1) (SEM-graphs).

In drier inland areas, from the Calvinia distr. southeast and south to the Laingsburg and Worcester distr. Growing mostly in sandy areas on mountain slopes or on ridges and amongst rocks; confined to arid Fynbos types. Map 52.

Vouchers: *Acocks* 17377 (K; PRE); 23705; *Bolus* 9054 (BOL; K; NBG; PRE).

4(b). subsp. **rupestris** *Puff, subsp. nov., habitu decumbenti, internodiis plerumque foliis brevioribus et pedicellis in fructu usque ad 1 mm longis a subsp. typica differt.*

Type: Cape, Ceres-Tulbagh distr., Swartgat Peak, Witzenbergen, *Esterhuysen* 27930 (BOL, holo.!; WU, iso.!).

Dwarf shrub, ♂, ♀ or occasionally ♂ + ♀ or ♀ + ♂, several-stemmed, decumbent or sometimes cushion-forming. *Stems* 100–200 (–250) mm long, ± much branched, densely leafy. *Leaves*: blades (6–)8–12(–15) × 0,8–1,5(–2) mm, linear-lanceolate to narrowly oblanceolate, ± erect, ± triangular in section or ± flat and with a prominent midrib below. *Flowers* solitary, ± sessile, fruiting pedicels elongating to c. 1 mm; calyx lobes 2,5–4 mm long; ♀, ♂: tube 1–2(–2,5) mm long, lobes 2,5–4(–5) × 0,8–1,2 mm; anthers 1,5–2,5 mm long. ♀: tube 0,3–0,5(–1) mm long; lobes 0,5–0,8 × 0,2–0,3(–0,5) mm, often hidden between calyx lobes; stigmas 2 (rarely 1), 5–9 mm long; ovary c. 1–1,5(–2) mm long. *Fruit* 2–3,5 × (1,5–)2–3,5 mm, ± obovate, 2- (rarely 1-) seeded; diaspore c. 1,5–2,5 × 1,2–1,5 mm, black.

In the mountains of the Worcester distr. and on the Witsenberg range. Growing on rocky slopes amongst rocks, on ledges, etc.; only found on the upper parts or tops of the highest mountains, c. 1 200–2 000 m. Map 53.

Vouchers: *Esterhuysen* 26491 (BOL); 31146 (BOL; WU); *Taylor* 6567 (PRE; STE).

5. **Carpacoce burchellii** *Puff, sp. nov., habitu* C. scabrae *similis sed ovariis/fructibus ovulo/semine fertili solitario differt.*

Type: Cape, Caledon distr., south slopes of Riviersonderend Mts near Greyton, *Esterhuysen* 20782 (BOL, holo.!).

Dwarf shrub ♂ or ♀, many-stemmed, ± erect and cylindrical. *Stems* c. (50–)80–300 mm long, unbranched to sparsely branched. *Leaves* decussate; blades 3–7(–9) × 0,7–1(–2) mm, linear, ericoid, glabrous or margins slightly scabrid; base of blades ± sac-like, stipular sheath cup-shaped. *Flowers* in groups of 1–4 at nodes, ± sessile, or sometimes terminal, shortly pedicellate; calyx 5-merous, lobes (1,5–)2–3,5 mm long, 1 often distinctly larger than the others; corolla 5-merous. ♂ tube 1–2 mm long, lobes (2–)3–4 × 0,5–1 mm; anthers 1,5–2 mm long; stigma often shorter than in ♀. ♀: tube 0,3–0,6 mm long, lobes 0,4–1 × 0,2–0,3 mm; stigma 1, (4–)5,5–8 mm long; ovary (1–)1,5–2,2 × 1–1,5 mm, with 1 fertile ovule. Mature *fruit* not seen.

Only known from a few mountains in the Paarl and Caledon distr. Growing on moist, well drained mountain slopes, occasionally in marshy situations and in shady kloofs. Map 55.

Vouchers: *Burchell* 7736 (K); *Esterhuysen* 20092 (BOL; K; PRE).

In habit, *C. burchellii* can be very similar to *C. scabra* (above); it is, however, easily distinguished by its ovaries/fruits which have only *one* fertile ovule/seed.

Plants resprouting after fire produce rather long unbranched flowering shoots which bear relatively larger, wider and less distinctly ericoid leaves (e.g. *Esterhuysen* 13707, BOL; K; PRE). *Stokoe* sub Marloth 11009 (PRE) is an unusually dwarfed form with flowering shoots only a few centimetres tall.

6. **Carpacoce vaginellata** *Salter* in Jl S. Afr. Bot. 3: 113 (1937), in Adamson & Salter, Fl. Cape Penins. 734 (1950). Type: Cape Peninsula, Muizenberg Mt., *Salter* 6271 (BOL, holo.!; K; NBG, iso.!).

Dwarf shrub, ♂, ♀, or occasionally ♂ + ♂, ♂ + ♂, or ♂, many-stemmed, cylindrical to ± rounded, occasionally decumbent, sometimes faintly fetid. *Stems* (0,1–)0,15–0,4(–0,7) m long, ± much branched (unbranched or sparsely branched in plants resprouting after fire), branches ascending to ± erect. *Leaves* decussate; blades (7–)10–25(–30) × 0,7–1,5(–2) mm, linear, ± erect, ericoid, semiterete to ± triangular in section, margins scabrid or with stiff whitish hairs to 0,2 mm long; stipular sheath long and funnel-shaped. *Flowers* mostly solitary, lateral and/or terminal on branches, ± sessile or shortly pedicellate; calyx 5(–6)-merous, lobes 3–8 mm long, linear(-lanceolate), subequal, ± erect; corolla 5(–6, rarely –7)-merous, greenish yellow, reddish brown to dark purplish brown. ♂, ♂: tube (1–)1,5–2,5 mm long, lobes (3–)3,5–5(–5,5) × (0,7–)1–2 mm; anthers (1,5–)2–3(–4) mm long; ♀: stigma always shorter, ovary sometimes smaller than in ♀; ♂: small rudimentary stigma and ovary present. ♀: tube 0,5–1,5 mm long,

lobes 0,5–1,5 × 0,1–0,5 mm, usually hidden between calyx lobes; stigma 1 (very rarely 2), (6–)8–12(–17) mm long; ovary c. 2–4 mm long. *Fruit* green, turning dark grey-brown, (4–)5–7,5 × 2–3 mm, ± obovate, 1-(very rarely 2)-seeded; diaspore (3–)3,5–5 × 1,5–2 mm, grey to blackish, often laterally ± compressed, ± elliptic to obovate in dorsal view, rugose to muricate. *Chromosome number*: 2n=22. Fig. 10: 1,2; 11f; 12d & g.

Widely distributed and extending east to the Albany and Bathurst distr. Mostly growing in Coastal and Mountain Fynbos, often on sandy to rocky slopes, plateaux or flats; in the easternmost localities also in grassveld. Map 49.

Vouchers: *Acocks* 22841 (K; PRE); *Esterhuysen* 17290 (BOL; NBG; PRE); *Taylor* 7518 (K; PRE).

Specimens with 2-seeded fruits or with both 1- and 2-seeded fruits are (very) uncommon. Plants rather frequently bear 'pseudo-fruits' without well developed seeds; they are (much) smaller than fertile fruits and are often reddish at first and then brownish grey.

Superficially, *C. scabra* (no. 4) often closely resembles *C. vaginellata* but the latter is distinguished vegetatively by its long, funnel-shaped stipular sheaths [(1,5–)2–3(–4) mm vs. 0,5–1 mm long; compare Fig. 10: 2 and 10: 3].

7. **Carpacoce heteromorpha** *(Buek) L. Bol.* in J. Bot., Lond. 34: 25 (1896).Type: Cape, Caledon distr., on Babylonstorensberg, *Zwart & Marais* sub *Ecklon & Zeyher* 2421 (SAM, holo.!).

Merciera heteromorpha Buek in Eckl. & Zeyh., Enum. 387 (1837).

Dwarf shrub, ♀, single- to several-stemmed, ± cylindrical and erect to rounded. *Stems* c. 0,15–0,45 m long, ± sparsely to much branched, branches often long, ascending to ± erect, very densely leafy. *Leaves* decussate; blades 10–25(–30) × 0,8–1,5 mm, linear, spreading-recurved to strongly recurved, ± terete, semiterete to ± triangular in section, margins (lower half) with fine white hairs c. 0,2–0,4 mm long; stipular sheath broadly cup-shaped, hairy. *Flowers* solitary, lateral and/or terminal on short branches, ± sessile, mostly hidden amongst foliage; calyx 4-merous, lobes (5–)6–8 mm long, linear, subequal, ± erect, hairy on margins; corolla (5–)6–7-merous, greenish yellow to yellow, tube 3–5,5 mm long, lobes (3–)3,5–4,5(–5) × 0,5–1 mm, sometimes with a few stiff, erect bristles near tip; anthers 2–2,7 mm long; stigma 1 (very rarely 2), 8–13 mm long; ovary c. 1,5 mm long. *Fruit* ash-grey, c. 1,5–3 mm in diam., subglobose to ± turbinate, 1-(very rarely 2)-seeded; diaspore c. 1,2–2,5 × 1,2–2 mm, black or dark grey, subglobose to ± pyriform, with a distinct vertical groove, muricate or ± rugose. *Chromosome number*: 2n=22. Fig. 12c, h & i.

Occurring from the Worcester and Somerset West distr. south-east to the western Bredasdorp distr. Growing mostly in dry areas, in gravelly to sandy soil amongst rocks; in Coastal or Mountain Fynbos, less commonly in Coastal Renosterveld. Map 57.

Vouchers: *Boucher* 782 (PRE; STE); 1623; *Schlechter* 7648 (BM; E; K; PRE; US).

Forms with less distinctly recurved leaf blades should not be confused with the allied *C. vaginellata* (above). *C. heteromorpha* is easily distinguished by the rather long whitish hairs on the stipular sheaths and lower half of the leaf blades, by having flowers with unusually long corolla tubes and by its ± round fruits crowned by 4 long calyx lobes (Fig. 12c); both flowers and fruits are usually hidden amongst the dense foliage and plants give the impression of being permanently in a vegetative state.

Tribe RUBIEAE

by C. PUFF*

Herbs. *Leaves* and leaf-like stipules forming (pseudo)whorls. *Flowers* ♀, occasionally also ♂, ♀; corolla rotate to campanulate, tube mostly very short; disk present; ovary 2-locular, each locule with a single ovule affixed to septum. *Fruit* dry and dehiscing into 2 mericarps, or fleshy; one carpel occasionally aborted. *Seed* with membranous testa adhering to fruit wall, dorsal side convex, ventral side plane to concave. *Chromosome numbers*: x=11, rarely x=10 (2n=22, 44; 40 in the Flora area).

Note: In the following descriptions the morphologically more precise but awkward term "leaves and leaf-like stipules in whorls of" is abbreviated to "leaves in whorls of". Note also that leaf descriptions and measurements strictly refer to leaves from the middle region of flowering shoots; in leaf width measurements the reflexed margins are not taken into account.

Only two genera of this ± cosmopolitan tribe occur in Southern Africa:

Leaves petiolate; corolla mostly 5-merous; fruit fleshy, glabrous ..... **Rubia** (below)
Leaves (sub)sessile; corolla mostly 4-merous; fruits dry, glabrous or variously hairy ..... **Galium** (p. 1,2: 65)

8489 RUBIA

Rubia *L.*, Sp. Pl. 109 (1753), Gen. Pl. edn 5: 47 (1754); Sond. in F.C. 3: 34 (1865); R. A. Dyer, Gen. 1: 626 (1975); Verdc. in F.T.E.A. Rubiaceae 1: 380 (1976); Puff in Jl S. Afr. Bot. 50: 348 (1984). Type species: *R. tinctorum* L.

Scrambling, creeping or climbing perennial herbs, somewhat woody near the base; roots quite woody, reddish (yielding a red dye). *Stems* branched, 4-angled, ± brittle, mostly beset with recurved prickles. *Leaves* in whorls of 4–8(–12), petiolate†, blades cordate or broadly ovate, ovate-lanceolate to linear, rounded to ± cordate at base or narrowed to base, with 1–5(–7) prominent veins. *Flowers* in axillary and/or terminal cymes, ♀, 5(rarely 4 or 6)-merous. *Calyx*: lobes obsolete. *Corolla* rotate to subcampanulate, greenish, yellowish green to yellow; lobes ± triangular, (long-)acuminate. *Anthers* exserted. *Ovary* 2-locular, one ovule in each chamber, crowned by a minute disk; style branches 2, joined below; stigmas capitate. *Fruit* fleshy, glabrous, consisting of 2 round mericarps, each with a single seed, round on dorsal side, plane to convex on ventral side; one mericarp often aborted. *Chromosome number*: 2n=22 (in the Flora area).

A widely distributed genus (Europe, Asia and Africa) of c. 60(?) species; only few (3, or 4?) species occur in Africa south of the Sahara.

In Southern Africa, *Rubia* is easily distinguished from *Galium* (fleshy vs. dry fruits, petiolate vs. epetiolate leaves), but elsewhere the distinction between the two genera may be highly problematic [see comments in Verdcourt in F.T.E.A., Rubiaceae 1: 381 (1976)].

1a Leaves in whorls of 4 (very rarely 3 or 5), blades with 5 (7; very rarely 3) prominent veins ..... 1. *R. cordifolia* subsp. *conotricha*

1b Leaves in whorls of 6–8(–12), blades with 3 prominent veins or only midvein distinct:

2a Leaf blade length to width ratio less than 3:1; blades with 3 prominent veins, to 25(–30) mm long and 5–15 mm wide, cordate or ovate-lanceolate to broadly ovate, rounded to cordate at base ..... 2. *R. petiolaris*

2b Leaf blade length to width ratio more than 3:1; blades with only midvein prominent, to 50(–70) mm long and 1–8(10) mm wide, lanceolate to linear, narrowed the base; blades occasionally difficult to distinguish from petiole ..... 3. *R. horrida*

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* University of Vienna, Austria.

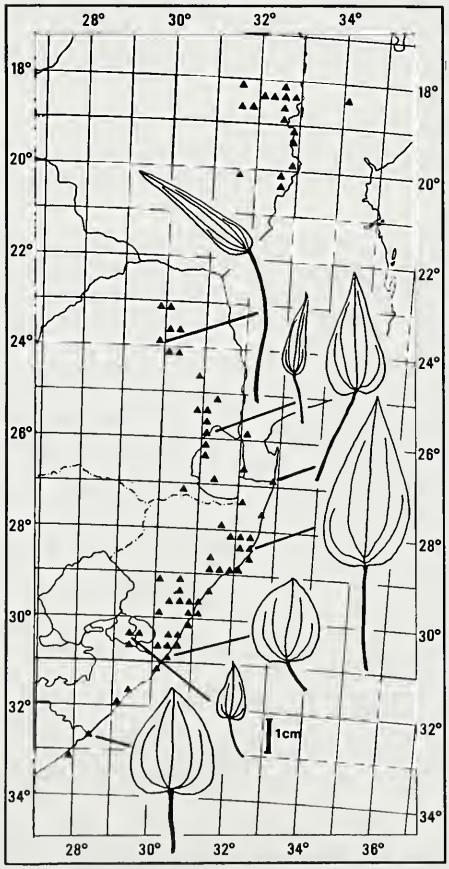
† The European species *R. peregrina* L. (with *sessile* leaves) is included in *Flora Capensis* (Sonder, op.cit.). A *Thunberg* collection of a plant supposedly introduced to the Cape is cited. As I have not been able to trace this or any other collection of *R. peregrina* from South Africa, this species is not included here.

1. **Rubia cordifolia** *L.*, Syst. Nat., edn 12,3 (App.) 229 (1768), Mant. Alt. 197 (1771); DC., Prodr. 4: 588 (1830). Type: Majorca, *L. Gérard* (ubi?).

subsp. **conotricha** *(Gand.) Verdc.* in Kew Bull. 30: 323 (1975), in F.T.E.A. Rubiaceae 1: 381, fig. 57 (1976); Puff in Jl S. Afr. Bot. 50: 349 (1984). Type: [East Griqualand], near Umzimhlawa R., *Schlechter* 6550 (LY, holo.; BM!; K!; S!).

R. conotricha Gand. in Bull. Soc. bot. Fr. 65: 35 (1918).

R. longipetiolata Bullock in Kew Bull. 1932: 497 (1932). Type: Kenya, Mt Elgon, *Lugard* 204 (K, holo.!; EA).



MAP 59.—**Rubia cordifolia** subsp. **conotricha**

R. cordifolia sensu Sond. in F.C. 3: 35 (1865), non L.

Stems to c. 5 m long, distinctly 4-ribbed, with recurved prickles on ribs, occasionally with longish white hairs between ribs, at least around nodes. *Leaves* in whorls of 4 (very rarely 3 or 5); blades 27–55 × (3–)6–32 mm, (narrowly) lanceolate to broadly ovate, rounded to cordate at base, acute to acuminate at apex, with 5 (7, very rarely 3) prominent veins; margins and veins below with recurved prickles, upper surface ± glabrous to scabrid, lower surface ± glabrous or sparsely to ± densely covered with longish white hairs, blades rarely glabrous; petioles (10–)15–60(–75) mm long, mostly with recurved prickles and occasionally also hairy. *Inflorescence* several- to many-flowered, ± lax to rather dense; peduncles and pedicels 1–8,5 mm long, glabrous, somewhat pubescent or with small prickles; ultimate bracts c. 1–2 mm long or sometimes absent. *Flowers* 5 (very rarely 6)-merous; corolla 3–5,7 mm in diam.; filaments to 1 mm, anthers to 0,5 mm long; ovary 0,4–0,8 mm long. *Fruit* dark purple to black, each mericarp 2,7–3,9 mm in diam. *Chromosome number*: 2n=22.

Known from Transvaal (Soutpansberg distr. and along Drakensberg escarpment), Swaziland, Natal, Transkei and eastern Cape (to East London distr.); extending to tropical East Africa and also in Angola. Grows at forest edges, in clearings, scrub etc. ("typical" *conotricha* and "Soutpansberg-Drakensberg Escarpment Form") or in coastal (sand dune) scrub or dune forest ("Coastal Form"). For details on ecotypes ("Forms") see Puff in Jl S. Afr. Bot. 50: 350 (1984). Map 59.

Vouchers: *Puff* 790415-6/1 (BR; J; NU; WU); *Scheepers* 973 (K; PRE); *Strey* 8103 (K; PRE).

2. **Rubia petiolaris** *DC.*, Prodr. 4: 588 (1830); Puff in Jl S. Afr. Bot. 50: 353, fig. 2a (1984). Type: Cape, around Krakakamma, *Burchell* 4561 (K, iso.!).

R. petiolaris var. *isophylla* Sond. in F.C. 3: 35 (1865). Syntypes: Cape, Zwartkopsrivier, *Zeyher* 2721 (S, lecto.!); Algoa Bay, Port Elizabeth, *Ecklon & Zeyher* 2320 (S!; SAM!: 2 sheets, one mixed with *R. cordifolia* subsp. *conotricha*); Port Elizabeth, *Drège* s.n. ("*R. petiolaris* DC."; K!; S!; SAM!); 'CBS', *Thunberg* rs.n. ("*R. cordifolia* L."; S!: several sheets).

Stems to c. 3 m long, distinctly 4-ribbed, with recurved prickles on ribs, younger parts often with hairs below nodes, occasionally with some short whitish hairs between ribs. *Leaves* in whorls of 6–8(–9); blades 8–25(–30) × 5–15 mm, cordate or ovate-lanceolate to broadly ovate, rounded to cordate at base, acute at apex,

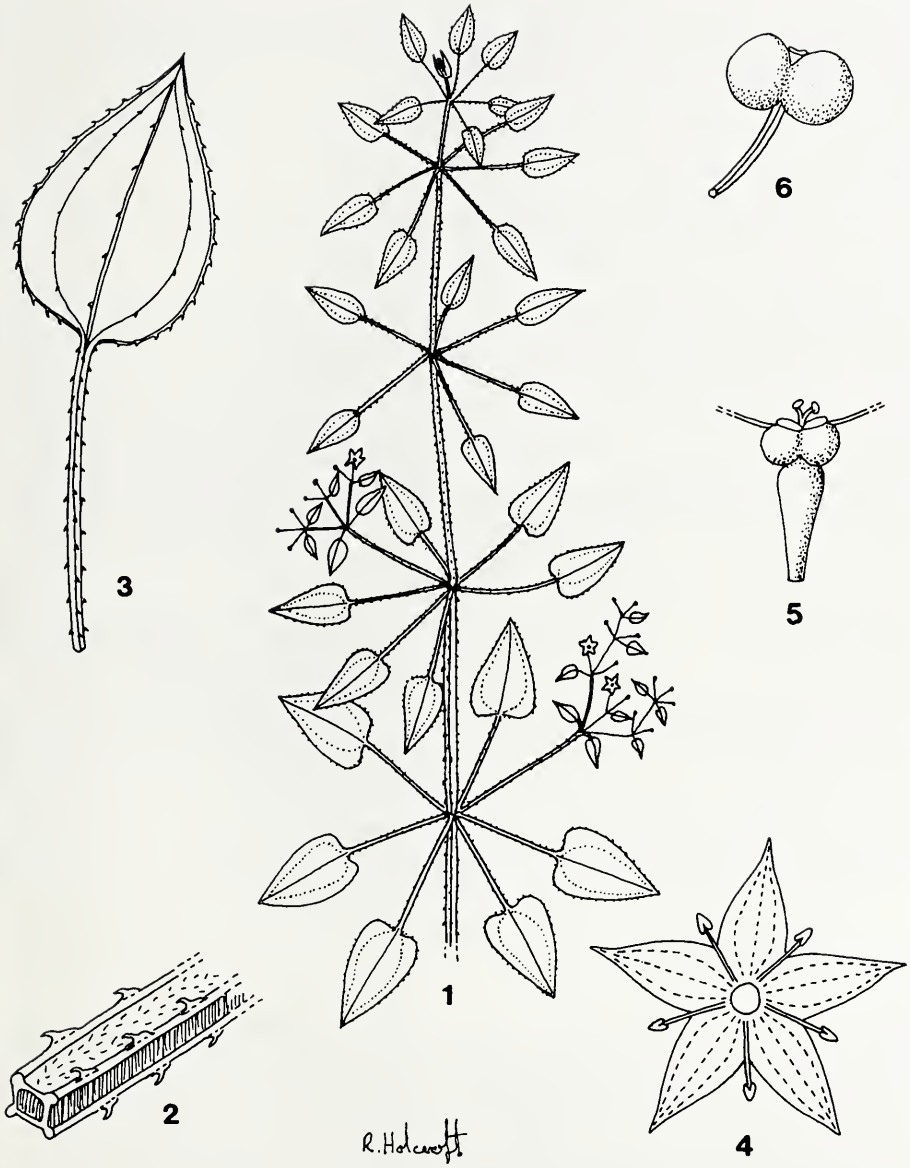
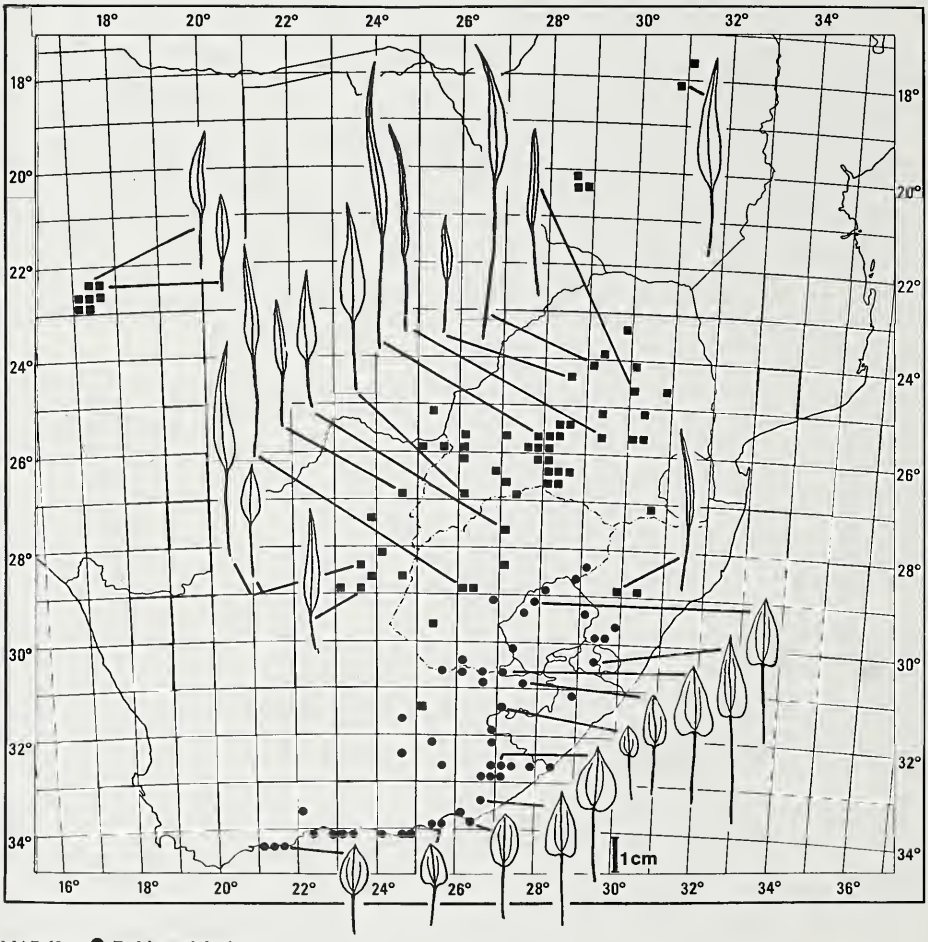


FIG. 13.—**Rubia petiolaris:** 1, part of plant, × 1; 2, enlargement of stem, × 5; 3, leaf, × 3; 4, corolla with stamens, × 10; 5, gynoecium, × 10; 6, fruit, × 3 (1–5: *Giffen* 1095; 6: *Pegler* 412).



MAP 60.— ● **Rubia petiolaris**
■ **Rubia horrida**

with 3 prominent veins; margins and at least midvein below with recurved prickles, rarely scabrid and/or with prickles above; petioles 10–30(–35) mm long, mostly with (2 rows of) recurved prickles. *Inflorescence* few- to several-flowered, rather lax; peduncles and pedicels 1–5 mm long, glabrous or (seldom) somewhat hairy; ultimate bracts c. 2–4 mm long. *Flowers* 5 (very rarely 4)-merous; corolla 3–5 mm in diam.; filaments to 0,9 mm long, anthers to 0,4 mm long; ovary c. 0,5–0,9 mm long. *Fruit* blackish, each mericarp c. 2,4–3 mm in diam. *Chromosome number*: 2n=22. Fig. 13.

Endemic. Ranges from the Orange Free State, Lesotho, south-west Natal and eastern Cape to the Riversdale distr.; growing mostly in scrub. Map 60.

Vouchers: *Dieterlen* 331b (K; NBG; PRE; SAM); *Johnson* 838; *Puff* 790112-12/1 (BR; J; W; WU).

Variable both morphologically (leaves: see Map 60!) and ecologically (coastal fynbos to afromontane areas; c. 15-2200 m!). Closely allied to *R. horrida* (below); the two species are occasionally difficult to separate in the area between the Orange River and the Graaff-Reinet and Cradock districts.

3. **Rubia horrida** *(Thunb.) Puff* in Kew Bull. 32: 432 (1978), in Jl S. Afr. Bot. 50: 357, fig. 2b,c (1984).

Galium horridum Thunb. in Hoffmanns Phytograph. Blätter 1: 16 (1803) & Fl. Cap. 1: 556 (1813); Sond. in F.C. 3: 37 (1865). Type: *Masson*, in herb. Thunberg (sheet 3323, UPS, holo.!).

R. petiolaris DC. var. *heterophylla* Sond. in F.C. 3: 35 (1865). Types: Orange Free State, on the Groot Vetrivier, *Burke & Zeyher* 774 [*Burke* s.n. (K!); *Zeyher* s.n. (S!; sub SAM 16074!); *Zeyher* 774 (BM!; K!)].

Stems to c. 2–3 m long, distinctly 4-ribbed, with recurved prickles on ribs, younger parts often with short hairs below nodes, occasionally also with some short whitish hairs between ribs. *Leaves* in whorls of 6–8(–12), blades (8–)12–50(–70) × 1–8(–10) mm, lanceolate, linear-lanceolate to linear, mostly narrowed to base, blades occasionally difficult to distinguish from faintly winged petioles, acute at apex, only midvein prominent; margins and midvein below with recurved prickles, seldom scabrid above; petioles (6–)10–35(–45) mm long, ± 3-angular in section or somewhat canaliculate, mostly with (2 rows of) recurved prickles. *Inflorescence* several- to many-flowered, rather lax to ± dense; peduncles and pedicels 1–6 mm long, glabrous or sometimes slightly hairy; ultimate bracts c. 2–5 mm long, linear. *Flowers* 5 (very rarely 4 or 6)-merous; corolla 3–5,9 mm in diam.; filaments to 0,6 mm, anthers to 0,5 mm long; ovary c. 0,4–0,8 mm long. *Fruit* blackish or dark purple, each mericarp (2,2–)2,5–3,7 mm in diam. *Chromosome number*: 2n=22.

Known from South West Africa/Namibia (Windhoek Bergland), south-east Botswana, Transvaal, Natal (Estcourt and Weenen districts), Orange Free State and Cape; also in Zimbabwe. Growing mostly in bush clumps, *Acacia* scrub, open woodland or riverbank vegetation. Map 60.

Vouchers: *Acocks* 2115 (K; KMG; PRE); *Puff* 790516-1/1 (BR; J; NU; WU); *Scheepers* 1722 (K; PRE); *Wells* 2409 (K; PRE).

Variable in leaf size and shape (see Map 60); leaf blade length to width ratios help to distinguish *R. horrida* from the closely allied *R. petiolaris*. See Puff in Jl S. Afr. Bot. 50: 360 (1984) for details.

8486 GALIUM

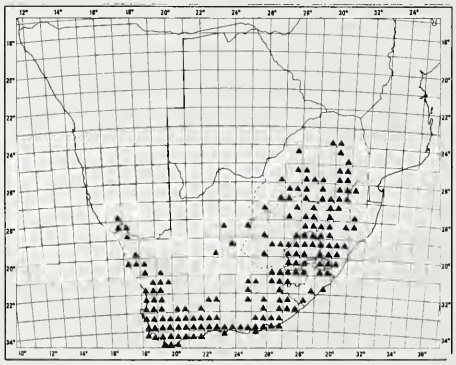
Galium *L.*, Sp. Pl. 105 (1753), Gen. Pl. edn 5: 46 (1754); Sond. in F.C. 3: 35 (1865); R. A. Dyer, Gen. 1: 625 (1975); Verdc. in F.T.E.A. Rubiaceae 1: 383 (1976); Puff in Jl S. Afr. Bot. 44: 219 (1978). Type species: *G. verum* L.

Perennial herbs or annuals. *Stems* erect, creeping or climbing, often distinctly 4-angled, glabrous, hairy or with recurved prickles. *Leaves* in whorls of 4–10, (sub)sessile, blades linear, lanceolate to (ob)ovate, mostly with a prominent midvein (1-nerved). *Flowers* in axillary and/or terminal many- to few-flowered cymes, ♀ (and protandrous), rarely ♂ and ♀, 4-merous. *Calyx*: lobes obsolete. *Corolla* mostly rotate, greenish(yellow), creamy white to bright yellow, lobes ovate to triangular, acute to acuminate. *Anthers* exserted. *Ovary* 2-locular, one ovule in each chamber, crowned by an often 2-lobed disk; style branches 2, joined below; stigmas capitate. *Fruit* dry, glabrous or variously hairy, dehiscing into 2 (sub)globose or reniform mericarps, each with a single seed, round on dorsal side, ± excavated on ventral side; one mericarp occasionally aborted. *Chromosome number*: 2n=22, 44, rarely 20 (in the Flora area).

A cosmopolitan genus of several hundred species, having its main range of distribution and highest species densities in temperate regions. Most of the taxa occurring in the Flora area are endemic but show clear affinities to tropical African and north-temperate species groups. Map 61.

1a Leaves 3-nerved, strictly in whorls of 4 ..... 1. *G. thunbergianum*
1b Leaves 1-nerved, in whorls of 4–10:
2a Inflorescences very reduced, flowers in groups of 3–1 (occasionally 4, rarely -6):
3a Leaves large, to 38(–45) mm long and 10 mm wide, with recurved prickles on margins:
4a Flowers mostly single on peduncles/pedicels (8–)12–20(–35) mm long ..... 2. *G. spurium* subsp. *africanum*
4b Flowers in groups of 3, occasionally 4 or rarely 6:
5a Ovary and fruit with hooked hairs; corolla minute, to c. 2 mm in diam. ..... '*Galium spurium-aparine* complex' (page 1,2: 67)
5b Ovary and fruit glabrous; corolla larger, to 4 mm in diam. ..... 3. *G. undulatum*
3b Leaves small, to 14 mm long and 2 mm wide, mostly without prickles on margins:
6a Leaves to 2,5 mm long ..... 8. *G. bredasdorpense*
6b Leaves (much) longer:

7a Flowers solitary, subtended by whorls of bracts ..... 12. *G. amatymbicum*
7b Flowers in groups of 3 or 2, mostly without bracts:
8a Flowers in groups of 3 ..... 9. *G. subvillosum*
8b Flowers in groups of 2:
9a Leaves (8–)10–14 mm long, linear-lanceolate to lanceolate; fruiting pedicels to over 10 mm long ..... 10. *G. mucroniferum*
9b Leaves 5–7 mm long, oblanceolate to spathulate; fruiting pedicels to 6 mm long ..... 11. *G. rourkei*
2b Inflorescences ± extensive and many-flowered:
10a Flowers ♂, ♀, plants dioecious, peduncles and pedicels villous ..... 4. *G. tomentosum*
10b Flowers ♀, peduncles and pedicels glabrous, scabrous, or with a few ± straight white hairs, but never villous:
11a Leaves obovate to obovate-oblong, (6–)8–10(–11) mm wide, often glaucous, always in whorls of 6; flowers with very short filaments, anthers almost sessile ..... 3. *G. undulatum*
11b Leaves linear, lanceolate or (narrowly) oblanceolate, (0,6–)0,8–4(–5) mm wide, never glaucous, in whorls of 6–8–10; flowers with ± long filaments, stamens c. half as long as corolla lobes:
12a Leaves with densely set recurved prickles on margins; pedicels with ± long straight white hairs or glabrous ..... 6. *G. scabrelloides*
12b Leaf margins glabrous, with ± long straight white hairs or only very few small recurved prickles; pedicels glabrous or scabrous:
13a Leaf surfaces densely covered with ± long white spreading hairs, blades 0,6–0,8(–1) mm wide; stems densely covered with short spreading hairs; corolla (1,5–)1,7–2(–2,3) mm in diam. ..... 7. *G. monticolum*
13b Leaf surfaces smooth or with small upward-directed prickles or short straight hairs, blades (0,3–)0,5–2(–2,5) mm wide; stems glabrous, with minute prickles and/or very short curled whitish hairs; corolla 2–3,5(–4) mm in diam.:
14a Leaf surfaces with small, upward-directed prickles or short straight hairs; pedicels scabrous (or subglabrous) ..... 6 (b). *G. capense* subsp. *namaquense*
14b Leaves glabrous or with a few small, mostly recurved prickles on margins only; pedicels mostly glabrous:
15a Leaves up to 12(–15) mm long; mericarps glabrous ..... 6 (a). *G. capense* subsp. *capense*
15b Leaves up to 20(–23) mm long; mericarps ± densely covered with short curled whitish hairs, occasionally (sub)glabrous ..... 6 (c). *C. capense* subsp. *garipense*

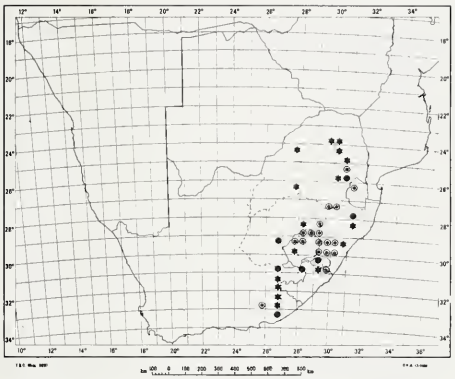


MAP 61.—**Galium**, all taxa

1. **Galium thunbergianum** *Eckl. & Zeyh.*, Eum. 369 (1836); Verdc. in F.T.E.A. Rubiaceae 1: 387 (1976); Puff in Jl S. Afr. Bot. 44: 221 (1978). Type: Cape, Katriviersberg, *Ecklon & Zeyher* 2321 (S, holo.!; SAM, iso.!).

Perennial with extensive rhizome. *Stems* climbing, suberect or procumbent, (80–)100–400(–600) mm long, glabrous or with short spreading white hairs. *Leaves* in whorls of 4, 3-nerved, (7–)10–18(–22) × (3,5–)4–8(–10) mm, ovate, elliptic or ± rhombic, ± acute or with a short hyaline point at apex, narrowed to base; glabrous or both surfaces and margins with short spreading hairs. *Inflorescence* broadly pyramidal to ± cylindrical, cymes ± many-flowered, ultimate branches with 1–2 minute bracts; pedicels 1–3(–5) mm long, slightly elongating after anthesis, glabrous or hairy, ± divaricate in fruit. *Flowers*: corolla (1–)1,5–2,5(–3) mm in diam., often somewhat hairy outside, greenish, greenish white to yellowish, lobes longer than wide, acute; stamens c. half as long as lobes; ovary c. 0,3–0,5 mm long. *Fruit* densely covered with white tuberculate hooked hairs; mericarps subglobose, each 1–1,5 mm in diam. *Chromosome number*: 2n=22.

Occurs from the Transvaal to the eastern Cape; also in afromontane areas of tropical Africa. Grows mostly in forest margin vegetation, scrub, or rocky grassland. Map 62.



MAP 62.—● **Galium thunbergianum** var. **thunbergianum**
★ **Galium thunbergianum** var. **hirsutum**
⊛ both varieties

The following two varieties are ± equally well represented in Southern Africa; they have similar distribution ranges and are often found side by side in the field. For diagnostic characters see the descriptions.

1 (a). var. **thunbergianum.**

G. rotundifolium sensu Sond. in F.C. 3: 39 (1865), non L.

G. natalense Rouy in Fl. Fr. 8: 9 (1903), ad not. Type: Natal, Drakensberge, Van Reenen Pass, *Medley Wood* 5562 LY; K: photo.!).

G. rotundifolium L. var. *normale* Kuntze, Rev. Gen. 3: 120 (1898). Type: Natal, Van Reenen Pass, *Kuntze* s.n. (K, holo.!).

Stems, leaves, peduncles and pedicels glabrous or nearly so (occasionally a few hairs at some upper nodes or along nerves of leaves).

Vouchers: *Galpin* 6650 (BOL; GRA; K; NH; PRE; SAM); 11890; *Meeuse* 10331 (PRE; S).

1(b). var. **hirsutum** *(Sond.) Verdc.* in Kew Bull. 30: 326 (1975).Type: Cape, *Masson* in herb. Thunberg (sheet 3354, UPS, holo.!).

G. rotundifolium L. var. *hirsutum* Sond. in F.C. 3: 39 (1865).

G. rotundifolium sensu Thunb., Fl. Cap. 1: 551 (1813), non L.

G. dasycarpum Schweinf., Beitr. Fl. Aethiop. 135 (1867). Type: Ethiopia, Simien, Debra-Eski, *Schimper* s.n. (B†).

G. biafrae Hiern in F.T.A. 3: 245 (1877). Syntypes: Fernando Po, *Mann* 605 Cameroun Mtn, *Mann* 1284 (K!).

Stems (mainly angles), leaves, peduncles and pedicels ± densely covered with short spreading white hairs.

Vouchers: *Hilliard & Burtt* 8036 (E; K; MO; NU; PRE; S); *Jacot Guillarmod* 799; *Schlechter* 4387 (BOL; PRE; S; SAM; W; WU).

2. **Galium spurium** *L.*, Sp. Pl. 106 (1753). Type: plant grown in Uppsala Botanic Garden (no specimen in LINN).

subsp. **africanum** *Verdc.* in Kew Bull. 30: 324 (1975), in F.T.E.A. Rubiaceae 1: 390 (1976); Puff in Jl S. Afr. Bot. 44: 271 (1978). Type: Kenya, Kiambu distr., Muguga, *Milne-Redhead & Taylor* 7147 (K, holo.!; NU, WU: photos!).

G. horridum sensu Eckl. & Zeyh., Enum. 370 (1836), non Thunb.

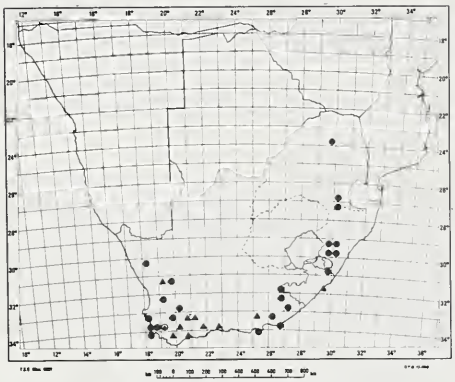
G. aparine sensu Sond. in F.C. 3: 38 (1865), non L.

Annual. *Stems* weak, prostrate to semi-erect, (0,12–)0,3–c. 2 m long, sparingly branched, with recurved prickles on angles. *Leaves* in whorls of 6–8, 1-nerved, (8–)15–38(–45) × (1,5–)3–6(–7) mm, linear-lanceolate to obovate, with a distinct ± filiform acumen at apex, narrowed to base; upper surface glabrous or with a few scattered ± straight or curled hairs, midrib (beneath) and margins with coarse recurved prickles. *Inflorescence* extremely reduced, flowers single or occasionally paired on peduncles/pedicels (8–)12–20(–35) mm long when in fruit, ± arcuate, with recurved prickles or (seldom) glabrous; pedicels occasionally separated from peduncle by a small ± linear bract. *Flowers*: corolla (1–)1,2–1,8(–2) mm in diam., greenish, greenish white or creamy white, lobes longer than wide, pointed; stamens very short; ovary c. 0,5–0,8 mm long. *Fruit* covered with white non-tuberculate hooked hairs; mericarps ± globose, each (1,8–)2,5–4 mm in diam. *Chromosome number*: 2n=40.

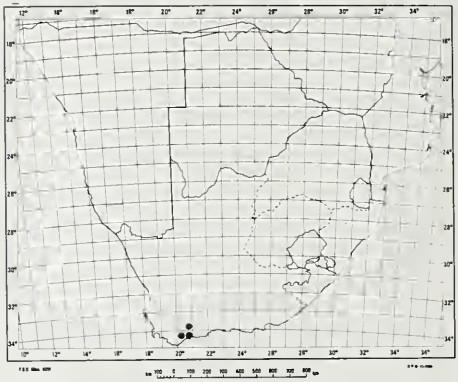
Known from Transvaal, Natal, Lesotho and Cape; extending to tropical Africa. Grows along riverbanks, at forest edges and in cultivated and disturbed ground. Map 63.

Vouchers: *Acocks* 21429; *Hoener* 1571; *Huntley* 265 (NU; PRE).

In the Cape, collections differing in having 2–4 (seldom to 6)-flowered partial inflorescences occur next to typical material of the indigenous *G. spurium* subsp. *africanum*. It is suspected that they may be introduced plants of *G. spurium* subsp. *spurium* and/or *G. aparine*(?). For reasons explained in Puff in Jl S. Afr. Bot. 44: 272 (1978), such collections can, at present, not be identified with certainty and are provisionally treated as "*Galium spurium-aparine* complex" (Map 63); vouchers: *Acocks* 22593 (K; PRE); *Olivier* 152(a).



MAP 63.—● **Galium spurium** subsp. **africanum**
▲ **Galium spurium-aparine** complex
◓ both



MAP 64.—**Galium undulatum**

Vouchers: *Ecklon & Zeyher* 2325 (PRE; S; SAM); *Esterhuysen* 10464 (BOL; K).

3. **Galium undulatum** *Puff* in Jl S. Afr. Bot. 44: 262 (1978). Type: Cape, *Lichtenstein* s.n. (GOET, holo.!).

G. uncinatum Licht. in Bartl. & Wendl., Beitr. Bot. 2: 12 (1825), nom. illeg. Type: as for *G. undulatum* Puff.

G. glabrum sensu Sond. in F.C. 3: 38 (1865), non Thunb.

Perennial with slightly woody rootstock. *Stems* ascending to erect, c. 0,3–1,5 m long, usually with few branches, glabrous or with a few recurved prickles on angles, often ± glaucous. *Leaves* in whorls of 6, 1-nerved, (15–)20–30 × (6–)8–10 mm, obovate to obovate-oblong, with a short hyaline point at apex, narrowed to base; glabrous except for ± coarse recurved prickles on margins, often glaucous. *Inflorescence* ± cylindrical, cymes 3- to ± many-flowered, ultimate branches usually ebracteate; peduncles (5–)10–22 mm long, glabrous, pedicels (3–)5–10(–20) mm long, slightly elongating after anthesis, glabrous, filiform, divaricate in fruit. *Flowers*: corolla (2,5–)3–4 mm in diam., whitish, lobes much longer than wide, acute; stamens very short, much less than half as long as lobes; ovary c. 0,5 mm long. *Fruit* glabrous, granulate; mericarps ± globose, each (2–) 2,5–3,5 mm in diam.

Endemic to the south-western Cape (more or less along Langeberg range from Swellendam eastwards); growing at forest edges, in riverbank vegetation or on damp, ± shady mountain slopes. Map 64.

4. **Galium tomentosum** *Thunb.*, Fl. Cap. 1: 551 (1813); Sond. in F.C. 3: 39 (1865); Puff in Jl S. Afr. Bot. 44: 263, fig. 21 (1978). Syntypes: Cape, *Thunberg* (sheets 3373, 3374, UPS!; NU, WU: photos!).

G. asperum Thunb., Prodr. 1: 30 (1794); Sond. in F.C. 3: 38 (1865), nom. illeg. Type: Cape, *Thunberg* (sheet 3302, UPS, holo.!; NU, WU: photos!).

G. glabrum Thunb., Fl. Cap. 1: 551 (1813). Type: Cape, *Thunberg* (sheet 3313, UPS, holo.!; K, NU, WU: photos!).

G. asperum var. *villosum* Eckl. & Zeyh., Enum. 369 (1836). Type: Cape, Clanwilliam distr., near Brakfontein, *Ecklon & Zeyher* 2323β (GOET; P; S, iso.!; WU: photo.!).

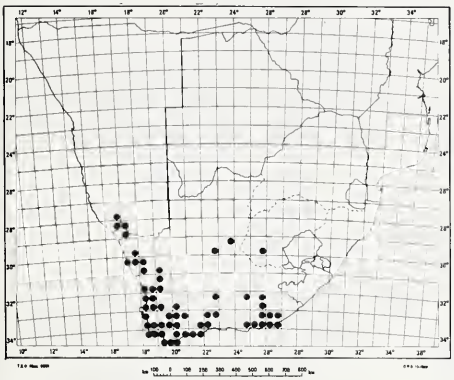
G. namaquense Schltr., nom. nud.

Rubia lanata Dinter, nom. nud.

Dioecious perennial with woody rootstock. *Stems* climbing or scrambling, c. (0,3–)0,5–2,5(–3) m long, much branched, with recurved prickles on angles or (rarely) subglabrous, upper parts of stems frequently densely villous, often purplish. *Leaves* in whorls of 6–8, 1-nerved, (12–)15–25(–30) × (2–)3–8(–10) mm, narrowly to broadly obovate, broadly ovate or ± lanceolate, often acuminate or acute at apex, narrowed to base; slightly reflexed margins and midrib beneath with densely set recurved prickles. *Inflorescence* extensive, ± broadly pyramidal, cymes many-flowered, of rather different appearance in ♂ and ♀ plants. ♂: peduncles (1–)2–3 mm long, ± thickish, subglabrous to villous, pedicels 1–2 mm long, ± filiform, hairy, strongly divaricate; ♀: peduncles (10–)15–30(–35) mm long, somewhat elongating after anthesis, villous, pedicels (20–)25–60(–90) mm long after

anthesis, ± thickish, villous, convergent. *Flowers*: ♂: corolla (2–)2,5–3,5(–4) mm in diam., occasionally somewhat hairy outside, greenish, greenish yellow to pale yellow, lobes much longer than wide, acute; stamens very short; rudimentary ovary present, disk small. ♀: corolla 3–4 mm in diam., ovary c. 0,5–1 mm long, disk larger than in ♂; rudimentary stamens usually present. *Fruit* granulate, glabrous or sometimes with a few whitish hairs; mericarps ± reniform, mostly with 3 grooves on dorsal side, each (2–)2,5–3 × (1–)1,5–2 mm. *Chromosome number*: 2n=44.

Occurs from the southern Namib to the south-western and eastern Cape; also in the Little, Great and Upper Karroo. Grows mostly in scrub on slopes, riverbanks or coastal dunes. Map 65.



MAP 65.—**Galium tomentosum**

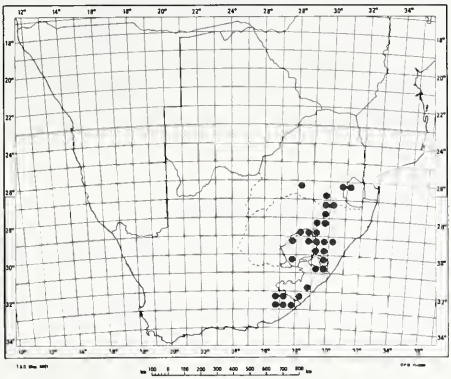
Vouchers: *Acocks* 14988 (♂); *Dinter* 8106 (♀; B; BOL; K; PRE; WIND); *Olivier* 152 (♂); *Rourke* 704 (♀; NBG; PRE; S).

Widely distributed and variable (leaf size and shape!). ♂ plants have less densely villous and less conspicuous inflorescences than ♀; ♂ forms with less hairy inflorescence branches should not be confused with *G. undulatum* (above).

5. **Galium scabrelloides** *Puff* in Jl S. Afr. Bot. 44: 250 (1978). Type: Natal, Cathedral Peak Forest Reserve, *Puff* 760314-1/2 (WU, holo.!).

Perennial with somewhat woody rootstock. *Stems* climbing or decumbent, (0,3–)0,5–1,0(–1,2) m long, often much branched, mostly with white spreading hairs at least on angles. *Leaves* in whorls of (7–)8–10, 1-nerved, (12–)15–20(–22) × (0,6–)0,8–4(–5) mm, linear to linear-lanceolate or oblanceolate, with a whitish mucro at apex, narrowed to base; both surfaces, lower surface or at least midrib below with white ± straight spreading hairs, (strongly) reflexed margins with closely set coarse recurved prickles. *Inflorescence* broadly to narrowly pyramidal, cymes many-flowered, ultimate branches with 3–1 tiny linear to lanceolate bracts; peduncles 2–3 mm long, pedicels 1–2,5(–3) mm long, ± filiform, hairy, strongly divaricate in fruit. *Flowers*: corolla 1,8–3,5(–4) mm in diam., usually somewhat hairy outside, bright yellow, creamy yellow, greenish yellow or greenish, lobes much longer than wide, acute; stamens a little less than half as long as lobes; ovary c. 0,4–0,6 mm long. *Fruit* (densely) covered with straight white spreading hairs, rarely subglabrous; mericarps subglobose to slightly reniform, each (0,7–)0,8–1(–1,2) mm in diam.; often only one mericarp developed. *Chromosome number*: 2n=22.

Occurs from Transvaal and Swaziland to the eastern Cape; growing mostly at forest edges or in scrub. Map 66.



MAP 66.—**Galium scabrelloides**

Vouchers: *Flanagan* 2858 (BOL; PRE); *Schmitz* 7481; *Trauseld* 538 (NU; PRE).

Shows considerable variability in growth form, leaf size and shape; narrow-leaved, weakish plants and atypical, ± glabrescent forms should not be confused with *G. capense* subsp. *garipense* (below). In the eastern Cape the two taxa are occasionally difficult to distinguish.

6. **Galium capense** *Thunb.*, Prodr. 1: 30 (1794); Sond. in F.C. 3: 36 (1865); Puff in Jl S. Afr. Bot. 44: 228 (1978). Type: Cape, *Thunberg* (sheet 3308, UPS, holo.!; NU, WU: photos!).

Perennial with sometimes slightly woody rootstock. *Stems* scrambling, sprawling or climbing, or ascending to erect, (80–)150–900 mm long, sparingly to much branched, glabrous, with a few minute recurved prickles or with short curled whitish hairs. *Leaves* in whorls of 6–8(–10), 1-nerved, (3–)5–20(–23) × (0,3–)0,5–2(–2,5) mm, linear to narrowly lanceolate or oblanceolate, sometimes with a brownish white mucro at apex; surface glabrous, with small upward-directed prickles or with short straight hairs, margins often reflexed, glabrous or with a few recurved prickles. *Inflorescence* broadly pyramidal to ± cylindrical, cymes many- to several-flowered, ultimate branches with (4–)3–1 small linear bracts or ebracteate; peduncles and pedicels (1–)1,5–4(–5) mm long, ± filiform, glabrous or scabrous, very rarely hairy, divaricate in fruit. *Flowers*: corolla 2–4 mm in diam., mostly (bright) yellow, creamy yellow or greenish yellow, lobes (much) longer than wide, acute or sometimes slightly acuminate; stamens c. 1/4 to 3/4 of lobe length; ovary c. 0,3–0,6 mm long. *Fruit* glabrous, ± tuberculate or granulate, or covered with short straight or curled whitish hairs; mericarps subglobose, each c. 1–2 mm in diam. *Chromosome number*: 2n=22.

G. capense is subdivided into 3 subspecies; the separation of the subspecies may become difficult where their ranges overlap; each of the subspecies is morphologically very variable.

G. capense and *G. monticolum* (below) form a closely allied pair.

6 (a). subsp. **capense.**

G. mucronatum Thunb., Prodr. 1: 30 (1794). Type: Cape, *Thunberg* (sheet 3342, UPS, holo.!; NU, WU: photos!).

G. expansum Thunb., Prodr. 1: 30 (1794). Type: Cape, *Thunberg* (sheet 3312, UPS, holo.!; NU, WU: photos!).

G. capense var. *expansum* (Thunb.) Sond. in F.C. 3: 36 (1865).

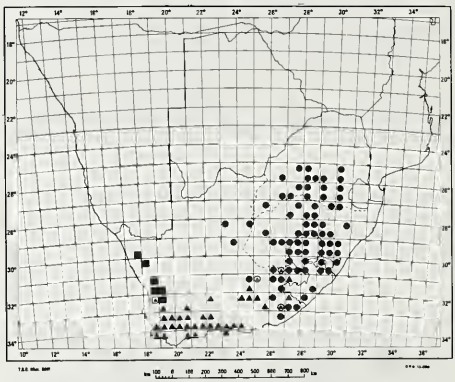
G. expansum var. *elongatum* Eckl. & Zeyh., Enum. 370 (1836). Type: Cape, between Hassaquaskloof and Breederivier, *Ecklon & Zeyher* 2326β (BOL; SAM, iso.!; WU: photo.!).

G. mucronatum var. *densiflorum* Eckl. & Zeyh., Enum. 370 (1836). Type: Cape, Vierentwintig Rivieren, *Ecklon & Zeyher* 2327β (GOET; P; SAM; W, iso.!; WU: photo.!).

G. capense var. *minus* Sond. in F.C. 3: 36 (1865). Syntypes: Cape, *Thunberg* (sheet 3342, UPS!; NU, WU: photos!); Wolvekop, *Zeyher* 773 (S!).

Stems scrambling or climbing, (80–)150–500(–700) mm long, sparingly to much branched, at least younger parts densely covered with short curled whitish hairs, often purplish. *Leaves* in whorls of (6–)8(–10), (3–)5–12(–15) × 0,5–1,5(–2) mm, linear to narrowly lanceolate or oblanceolate; surfaces often shiny, glabrous, occasionally a few small mostly recurved prickles on reflexed margins. *Peduncles* and pedicels glabrous. *Flowers*: corolla (2–)2,5–4 mm in diam., bright to pale yellow. *Fruit* glabrous, ± tuberculate or granulate; each mericarp c. 1 mm in diam. Fig. 14: 1–5.

Centred in the south-western Cape but also extending into karroid areas and to the eastern Cape; growing mostly in rocky, ± damp areas or near water courses. Map 67.



MAP 67.— ▲ **Galium capense** subsp. **capense**
■ **Galium capense** subsp. **namaquense**
● **Galium capense** subsp. **garipense**
subsp. **capense** and **namaquense**
subsp. **capense** and **garipense**

Vouchers: *Drège* 7685 (E; K; P; W); *Esterhuysen* 9187 (BOL); *Thompson* 2179 (PRE; STE).

Growth form and habit are very variable (plants weak to quite robust, inflorescences extensive and many-flowered to rather few-flowered; this is probably to a considerable extent environment-dependent). See also subsp. *garipense* (subsp. c).

6(b). subsp. **namaquense** *(Eckl. & Zeyh.) Puff* in Jl S. Afr. Bot. 44: 234 (1978). Type: Cape, near Heerelogement, *Ecklon & Zeyher* 2322 (S; SAM, iso.!; WU: photo.!).

G. namaquense Eckl. & Zeyh., Enum. 369 (1836).

G. capense var. *scabrum* Sond. in F.C. 3: 37 (1865). Syntypes: Cape, Modderfonteinsberg, *Drège* 7682 (E!; K!; P!; S!; WU: photo.!); between Pedroskloof and 'Lilly Fontein' (Leliefontein), *Drège* 7683 (K!; P!; WU: photo.!).

Stems scrambling or sprawling, (150–)300–900 mm long, usually much branched, densely covered with very short, mostly curled

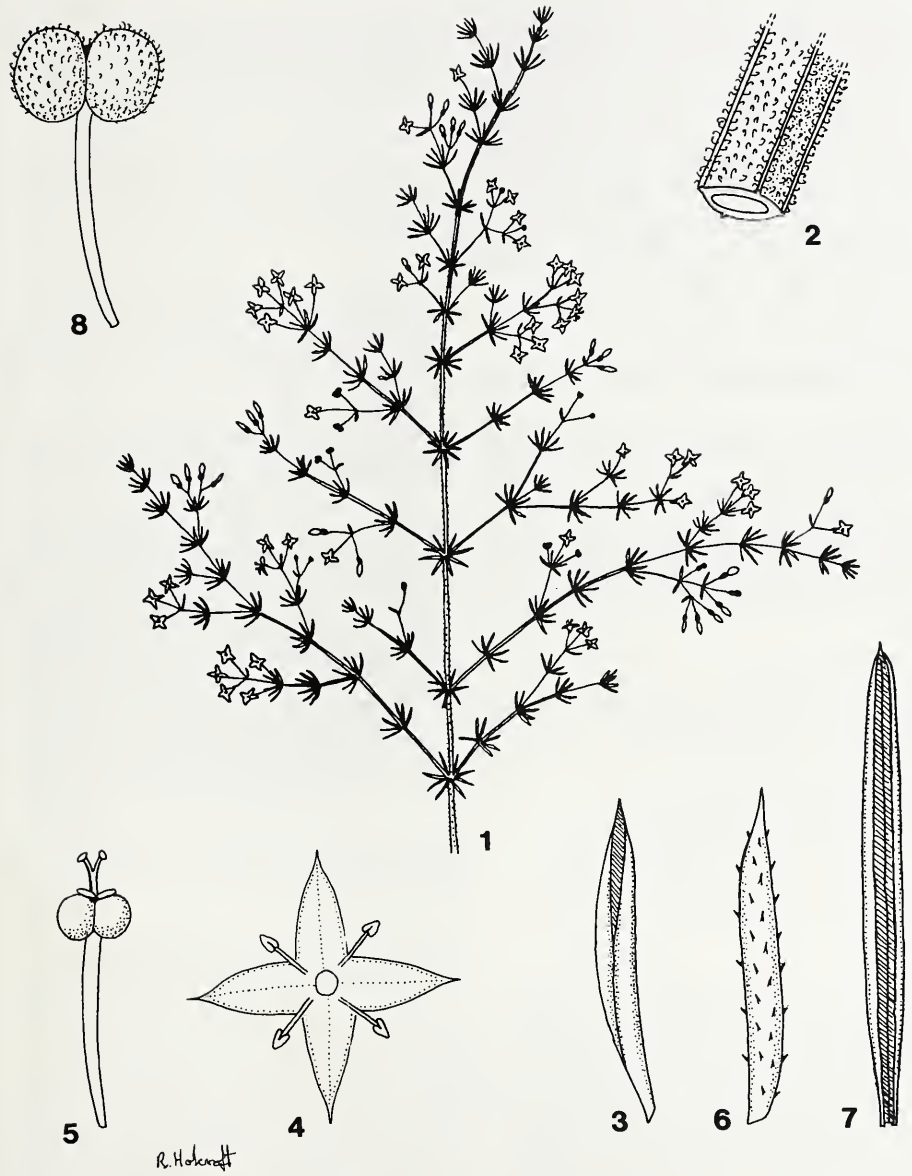


FIG. 14.—**Galium capense:** 1–5, subsp. **capense:** 1, part of plant, × 1; 2, enlargement of stem, × 5; 3, leaf with strongly revolute margins, side view, × 7; 4, corolla with stamens, × 15; 5, gynoecium, × 15 *(Thompson* 2179). 6, subsp. **namaquense,** leaf (from above), × 7 *(Taylor* 7485). 7 & 8, subsp. **garipense:** 7, leaf (from below), × 7; 8, fruit, × 10 *(Hanekom* 831).

whitish hairs, often purplish. *Leaves* in whorls of 6–8, (4–)6–8(–10) × (0,5–)1–2(–2,5) mm, linear to narrowly lanceolate or oblanceolate; upper and (sometimes) lower surface and margins (densely) covered with small, upward-directed prickles or short straight hairs, margins often reflexed. *Peduncles* and pedicels scabrous, more rarely subglabrous. *Flowers*: corolla (2–)2,5–3,5 mm in diam., yellow or greenish yellow. *Fruit* covered with short straight whitish hairs or glabrous, ± tuberculate or granulate; each mericarp 1–2 mm in diam. Fig. 14: 6.

Endemic to the western Cape; growing mostly in riverbank vegetation, in renosterveld, arid fynbos or scrub. Map 67.

Vouchers: *Acocks* 17374 (K; PRE); *Taylor* 7485 (PRE; STE).

Distinguished from subsp. *capense* primarily by its indumentum. The two subspecies are almost completely allopatric.

6 (c). subsp. **garipense** *(Sond.) Puff* in Jl S. Afr. Bot. 44: 234 (1978). Syntypes: Cape, on the Garip near Buffelvallei, *Drège* 7674 (K!; PRE!; S!; W!); Natal, Buffaloerivier, *Gerr. & M'K.* (as 'Port Natal', *Gerrard & McKen* 1340 in S!; as Natal & Zululand, *Gerrard* 1340 in K!).

G. garipense Sond. in F.C. 3: 37 (1865).

G. mucronatum var. *subglabrum* Eckl. & Zeyh., Enum. 370 (1836). Type: Cape, 'Tambukiland', on the right side of the Keyrivier, *Ecklon & Zeyher* 2327γ (GOET; P; PRE; SAM; W, iso.!; WU: photo.!).

G. wittbergense Sond. in F.C. 3: 37 (1865). Type: Cape, rocky wet places in the Wittbergen, *Drège* s.n. (in herbarium Sonder; specimen not located).

G. wittbergense var. *glabrum* Phill. in Ann. S. Afr. Mus. 16: 113 (1917). Syntypes: Lesotho, Leribe, *Phillips* 713 (K!; SAM!), *Dieterlen* 40 p.p. (SAM!).

G. capense subsp. *garipense* var. *wittbergense* (Sond.) Puff in Jl S. Afr. Bot. 44: 237 (1978).

Stems usually ascending to erect, (100–)200–500(–600) mm long, usually with ± few lateral branches, glabrous, with a few minute recurved prickles on angles and/or with ± short whitish hairs. *Leaves* in whorls of 6–8, (6–)10–20(–23) × (0,3–)0,5–1(1,5) mm, linear, glabrous, sometimes a few small, mostly recurved prickles on often ± reflexed margins. *Peduncles* and pedicels glabrous, very rarely hairy. *Flowers*: corolla 2–3,5(–4) mm in diam., bright yellow, sometimes creamy yellow or greenish yellow. *Fruit* ± densely covered with short curled whitish hairs or occasionally (sub)glabrous; each mericarp 1–1,8 mm in diam. Fig. 14: 7 & 8.

Widely distributed from the Transvaal to the eastern Cape; growing mostly along stream banks, in vleis, on ± damp slopes or in open grassland. Map 67.

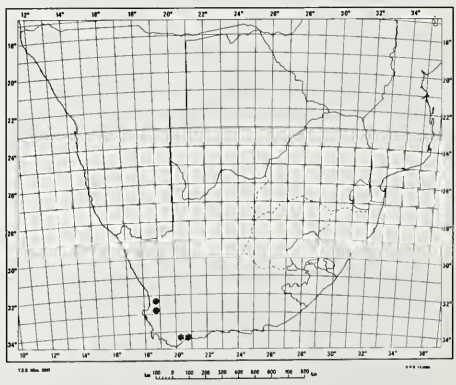
Vouchers: *Devenish* 440; 1238 (K; NH); *Flanagan* 1351 (BOL; NBG; NU; PRE; SAM); *Hilliard & Burtt* 8279 (E; K; MO; NU; PRE); *Jacobsz* 1030; 2076 (NBG).

Var. *wittbergense* is no longer retained; subsp. *garipense* is too variable to allow a certain distinction of varieties. The separation of subsp. *garipense* and subsp. *capense* can become rather troublesome in the eastern Cape, where their distribution ranges overlap. Subsp. *garipense* tends to be more robust and to have longer leaves.

Forms with ± needle-like leaves and a peculiar 'dense' habit (e.g. *Moll* 5157, NH; PRE), previously believed to be confined to western Natal and thought to possibly represent a separate taxon [see Puff in Jl S. Afr. Bot. 44: 238 (1978)], also occasionally occur elsewhere and are perhaps best included in subsp. *garipense*.

7. **Galium monticolum** *Sond.* in F.C. 3: 36 (1865); Puff in Jl S. Afr. Bot. 44: 243 (1978). Type: Cape, mountains near Cape Town, *Ecklon* 84 (S, holo.!; WU: photo.!).

Perennial with ± woody rootstock. *Stems* ascending to erect, c. 0,3–1,2 m long, usually much branched, densely covered with short spreading hairs, sometimes purplish. *Leaves* in whorls of (6–)8–10, 1-nerved, 5–8(–12) × 0,6–0,8(–1) mm, linear, with a long whitish, sometimes upturned mucro at apex, often apparently terete due to strongly reflexed margins; upper surface, midrib beneath and margins densely covered with ± long white spreading hairs. *Inflorescence* ± cylindrical, cymes several- to ± few-flowered, ultimate branches with (5–)3–1(–0) minute linear, hairy bracts; peduncles ± thickish, hairy, pedicels filiform, glabrous, both 0,8–1,5(–2) mm long, divaricate



MAP 68.— ● **Galium monticolum**
★ **Galium bredasdorpense**

after anthesis. *Flowers*: corolla (1,5–)1,7–2 (–2,3) mm in diam., colour unknown, lobes longer than wide, acuminate; stamens ca. 1/4 of lobe length; ovary c. 0,3–0,5 mm long, glabrous, ± granulate. Mature fruit not seen.

Endemic to the (south-)western Cape and apparently very rare; growing on mountain slopes. Map 68.

Voucher: *Pearson* 5177 (BOL; K; MO; PRE).

Very closely allied to *G. capense* (no. 6) and perhaps not specifically distinct; too few collections are known to allow certainty about its status.

8. **Galium bredasdorpense** *Puff* in Jl S. Afr. Bot. 44: 244 (1978). Type: Cape, Bredasdorp distr., 2 m S of Wydgelegen Post Office, *Acocks* 23175 (PRE, holo.!; WU: photo.!).

Perennial. *Stems* decumbent or suberect, 100–250 mm long, much branched, at least younger parts densely scabrous. *Leaves* in whorls of 6, 1-nerved; 1,5–2,5 × 0,7–1,2 mm, ± ovate-lanceolate, with a ± long whitish mucro at apex, glabrous, shiny, margins ± reflexed. *Inflorescence* very reduced, flowers in groups of 3–1, subtended by 4(–1) leaf-like bracts; peduncles and pedicels 0,5–2 mm long, filiform, glabrous, divaricate after anthesis. *Flowers*: corolla 1,5–2 mm in diam., yellowish, lobes much longer than wide, shortly acuminate; stamens c. half as long as lobes; ovary c. 0,2–0,4 mm long. *Fruit* glabrous, ± wrinkled; mericarps subglobose, each c. 1 mm in diam. *Chromosome number:* 2n = 22.

Endemic to the Bredasdorp district (south-western Cape); confined to limestone areas. Map 68.

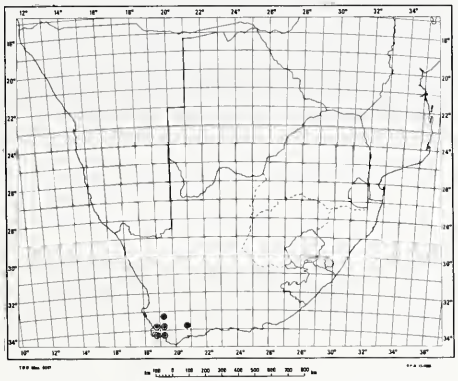
Vouchers: *Burgers* 1494; 1595.

Distinguished from all other *Galium* species occurring in the south-western Cape by its closely spaced, small leaves.

9. **Galium subvillosum** *Sond.* in F.C. 3: 38 (1865); Puff in Jl S. Afr. Bot. 44: 255 (1978). Type: Cape, Du Toitskloof, *Drège* 7687 (S; W, iso.!; NU, WU: photos!).

Perennial with ± woody rootstock. *Stems* prostrate, ascending or scrambling, 150–500 (–600) mm long, ± much branched, covered with short spreading white hairs, subglabrous or glabrous, often purplish. *Leaves* in whorls of 6, 1-nerved, (5–)6–8(–11) × (1,5–)2–3,5(–4,5) mm, oblanceolate or ± lanceolate, with a distinct hyaline point at apex; both surfaces and slightly reflexed margins with spreading white hairs, subglabrous or glabrous. *Inflorescence* ± cylindrical, very reduced, flowers in groups of 3, subtended by (0–)1–2 ± small lanceolate bracts; peduncles (4–)5–10 mm long, thickish, hairy or glabrous, pedicels (3–)4–6(–8) mm long, slightly enlongating after anthesis, thickish to ± filiform, hairy or glabrous, divaricate in fruit. *Flowers*: corolla 3–4 mm in diam., usually a little hairy outside, whitish yellow, creamy yellow or purplish, lobes longer than wide, acute; stamens nearly as long as lobes; ovary c. 0,3–0,5 mm long. *Fruit* wrinkled, covered with short straight hairs or glabrous; mericarps subglobose to ± reniform, each 2–2,5(–3) mm in diam., often only one mericarp developed. *Chromosome number*: 2n = 44.

Endemic to the mountains of the south-western Cape; growing mostly in damp to moist, ± shady places, e.g. at the base of cliffs, along watercourses, etc. Map 69.



MAP 69.— ● **Galium subvillosum** var. **subvillosum**
★ **Galium subvillosum** var. **subglabrum**
⊛ both varieties

Closely allied to *G. mucroniferum* (below) but easily distinguished by its 3-flowered cymes.

Two varieties are recognized. For diagnostic characters see the descriptions.

9 (a). var. **subvillosum.**

Stems, foliage, peduncles, pedicels (densely) covered with short spreading white hairs; occasionally also fruits hairy.

Vouchers: *Esterhuysen* 11331 (BOL; K; NBG; PRE); *Schlechter* 9184 (BOL; E: GRA; K; P: PRE; S; W).

More common and more widely distributed than var. *subglabrum* (below).

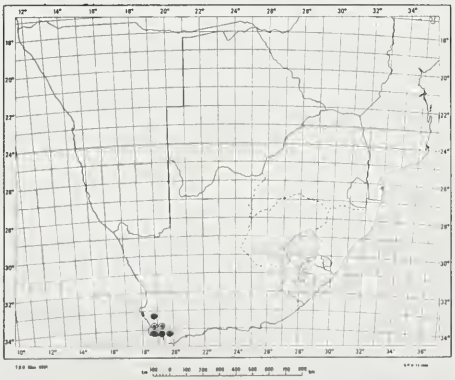
9(b). var. **subglabrum** *Puff* in Jl S. Afr. Bot. 44: 257 (1978). Type: Cape, Bains Kloof, *Compton* 18632 (NBG, holo.!).

Stems, foliage, peduncles and pedicels glabrous or nearly so.

Vouchers: *Esterhuysen* 1721 (BOL); 3512 (BOL).

10. **Galium mucroniferum** *Sond.* in F.C. 3: 37 (1865); Puff in Jl S. Afr. Bot. 44: 259 (1978). Syntypes: Cape, Du Toitskloof, *Drège* 7677 (E!; K!; WU: photo.!); near Genadenthal, *Drège* 7686 (E!; K!; P!; PRE!; S!; NU, WU: photos!); no localities given: *Drège* 7684, 7689 (S!); in 'Caffraria', *Ecklon & Zeyher* s.n. (S!).

Perennial with ± woody rootstock. *Stems* scrambling, ascending or erect, 100–550 mm long, usually much branched, glabrous, with few recurved prickles or with white straight spreading hairs on angles. *Leaves* in whorls of 6(–8), 1-nerved, (8–)10–14 × (1–)1,3–2(–2,5) mm, linear-lanceolate to lanceolate, with a long hyaline point at apex, glabrous, slightly reflexed margins with a few recurved prickles or upper surface, midrib below and margins with white straight spreading hairs, often very shiny. *Inflorescene* often narrowly cylindrical, very reduced; flowers in groups of 2, subtended by (3–)2–1(–0) minute, ± linear bracts, peduncles 5–12(–15) mm long, filiform or ± thickish, glabrous or hairy, pedicels (4–)6–10(–13) mm long, elongating after anthesis, ± filiform, glabrous or hairy, strongly divaricate in fruit. *Flowers*: corolla (2,5–)3–4 mm in diam., sometimes a little hairy outside, greenish yellow, creamy yellow or pale green, lobes much longer than wide, acute; stamens nearly as long as lobes; ovary c. 0,5–0,8 mm long. *Fruit* glabrous, ± granulate or wrinkled or covered with short straight hairs; mericarps ± globose, each (2–)2,5–3 mm in diam.; often only one mericarp developed. *Chromosome number*: 2n=44.



MAP 70.— ● **Galium mucroniferum** var. **mucroniferum**
★ **Galium mucroniferum** var. **dregeanum**
⊛ **both varieties**

Endemic to the mountains of the south-western Cape; growing mostly on rocky slopes or in ravines and other ± cool, sheltered and shady places. Map 70.

Two varieties are recognized. For diagnostic characters see the descriptions.

10 (a). var. **mucroniferum.**

Stems and leaves glabrous or with a few recurved prickles on angles and margins (but never with white spreading hairs); peduncles and pedicles glabrous; fruits occasionally with a few hairs.

Vouchers: *Parker* 4473 (BOL; K; NBG); *Schlechter* 9252 (BOL; E; K; P; PRE; S).

10 (b). var. **dregeanum** *(Sond.) Puff* in Jl S. Afr. Bot. 44: 260 (1978). Type: Cape, Du Toitskloof, *Drège* 7688 (E; K; P; S, iso.!; NU, WU: photos!).

G. dregeanum Sond. in F.C. 3: 38 (1865).

Stems (mainly angles), leaves (margins, upper surface and midrib below), peduncles, pedicels and fruits covered with white straight spreading hairs.

Voucher: *Duthie* 577 (BOL).

Much rarer than var. *mucroniferum* and only known from a few localities.

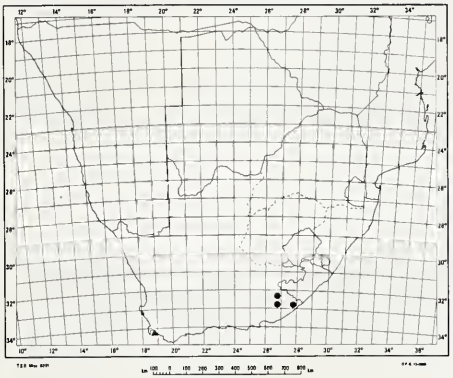
11. **Galium rourkei** *Puff* in Jl S. Afr. Bot. 49: 185 (1983). Type: Cape, Kogelberg Forest Reserve, Kuduberg, *Rourke* 1765 (NBG, holo.!; PRE!; WU, iso.!).

Perennial. *Stems* delicate, ± prostrate, c. 100–200 mm long, ± much branched, at least younger parts with curved or straight white hairs on angles. *Leaves* in whorls of 4–5(–6), 1-nerved, 5–7 × (2–)2,5–5 mm, oblanceolate to spathulate, with a distinct rigid point at apex, to 1 mm long; with ± long straight or curved hairs on upper and lower surface and margins; margins straight. *Inflorescence* very reduced; flowers in groups of 2; peduncles 1,5–5 mm long, hairy; pedicels filiform, hairy, 1,5–3 mm long at anthesis, to 6 mm long and divaricate in fruit. *Flowers*: corolla (2,5–)3–3,5(–4) mm in diam., creamy white, lobes longer than wide, acute, with a few white straight or curved hairs on margins; stamens c. 1–1,5 mm long; ovary c.

0,3–0,4 mm long. *Fruit* covered with white spreading hairs; mericarps ± globose, each c. 1,5–2 mm in diam., often only one mericarp developed.

Endemic to the south-western Cape and so far only known from the type locality; growing in permanent shade under damp rock cliffs. Map 71.

Allied to the two preceding species; easily distinguished by the shorter and broader leaves.



MAP 71.—▲ **Galium rourkei**
● **Galium amatymbicum**

12. **Galium amatymbicum** *Eckl. & Zeyh.*, Enum. 370 (1836); Puff in Jl S. Afr. Bot. 44: 245 (1978). Type: Cape, 'Tambukiland', on the right side of the 'Keyrivier', *Ecklon & Zeyher* 2328 (GOET; S; SAM, iso.!; WU: photo.!).

Perennial with ± extensive rhizomes. *Stems* weak and thin, caespitose, (50–)70–200 (–300) mm long, with many, often short lateral branches, covered with ± long white spreading hairs or glabrous. *Leaves* in whorls of 4–6, 1-nerved, 3–5(–6) × (0,7–)0,8–1 mm, linear-lanceolate to lanceolate, ± acuminate at apex, with ± long white spreading hairs on upper and lower surface or at least on margins, occasionally subglabrous. *Inflorescence* extremely reduced; flowers solitary, subtended by a whorl of bracts, axillary or terminal on short lateral branches; pedicels (0,5–)1(–2) mm long, ± thickish, hairy or glabrous, ± arcuate in fruit. *Flowers*: corolla c. 1–1,5 mm in diam., hairy outside, whitish, lobes longer than wide, acute; stamens very short. *Fruit* covered with long ± straight hairs or subglabrous and wrinkled; mericarps reniform, each c. 1–1,5 mm long.

Endemic to the eastern Cape and apparently quite rare; growing in thorn veld. Map 71.

Vouchers: *Acocks* 23930; *Rattray* 1306.

Easily recognizable by its solitary flowers and small, reniform mericarps.

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* An asterisk signifies exotic species which are not naturalized; synonyms are in italics.

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