

A revision of the genus *Anginon* (Apiaceae)

Izelle Allison and Ben-Erik van Wyk

Allison, I. & Van Wyk, B-E. 1997. A revision of the genus *Anginon* (Apiaceae). – Nord. J. Bot. 17: 561-577. Copenhagen. ISSN 0107-055X.

Anginon, a hitherto poorly known genus of woody Apiaceae endemic to southern Africa, is revised. Field studies over several years have shown that 12 species can be recognised, of which five are newly described: *A. ternatum*, *A. fruticosum*, *A. pumilum*, *A. tenuior* and *A. intermedium*. The new combination *A. streyi* is made to transfer *Sonderina streyi* to *Anginon*, with which it shares the woody habit and heavily cutinised outer cell walls of the fruit epidermis. A formal taxonomic treatment is presented, including a key to the species, correct nomenclature, typification, descriptions and distribution maps.

I. Allison & B-E. van Wyk, Department of Botany, Rand Afrikaans University, P. O. Box 524, Auckland Park 2006, Johannesburg, Republic of South Africa.

Introduction

Anginon Raf. is a poorly known genus of woody Apiaceae endemic to southern Africa. In the Flora Capensis, Sonder (1862) originally included two species in his new genus *Rhyticarpus*, but Burt (1988) reinstated the older generic name and listed (Burt 1991) seven species in his checklist of southern African Apiaceae. The woody habit, highly modified phyllodinous leaves and peculiar fruit structure have been discussed by Briquet (1897a, b), Wolff (1910), Burt (1991) and in more detail by Van Wyk et al. (1997). These characters are generally useful to distinguish the genus, but the identification of the species presents much difficulty to herbarium taxonomists without field experience. As a result of extensive studies over a period of several years, the species are now much better known and our revision is presented in this paper. Twelve species are recognised, of which five are described as new. In view of the relatively small size of the genus, formal infrageneric groups are not considered necessary, but in the revision below, the species are arranged according to the results of a cladistic analysis (Fig. 13 in Van Wyk et al. 1997).

Anginon Raf.

Good Book Amenit. Nat. Philad.: 56 (1840) [reimp. Scad. Gen. Omb. Pl. 56 (Amer. Midl. Nat. Repr. No. 3, 1913), original not seen]; Merrill, Index Rafinesquianus: 178 (1949); B. L. Burt in Hilliard & Burt, Notes R. Bot. Gard. Edinburgh 45: 90 (1988); B. L. Burt in Edinb. J. Bot. 48,2: 172 (1991); Pimenov & Leonov, the genera of the Umbelliferae: 20 (1993). – Type species: *A. rugosum* (Thunb.) Raf.

= *Rhyticarpus* Sond. in Harvey & Sonder, Fl. Cap. 2: 540 (1862); Briq. in Bull. Herb. Boiss. 5: 450 (1897); Wolff in Engl., das Pflanzenreich IV. 228: 175 (1910). – Lectotype species (designated by Burt 1991): *R. rugosus* (Thunb.) Sond.

= *Rhyticarpus* Sond. sect. *Bupleurastrum* Briq. in Bull. Herb. Boiss. 5: 450 (1897); Wolff in Engl., das Pflanzenreich IV. 228: 175 (1910). – Type species: *Rhyticarpus difformis* (L.) Briq.

= *Rhyticarpus* Sond. sect. *Rhyticarpus* (as “*Rhyticarpellus*”) Briq. in Bull. Herb. Boiss. 5: 450 (1897); Wolff in Engl., das Pflanzenreich IV. 228: 175 (1910). – Type as for *Rhyticarpus*.

Robust to slender, sparse or much-branched (rarely un-

branched) woody shrubs or shrublets, 0.7-4 m high (including inflorescences); mature parts (stems, leaves or at least inflorescences) conspicuously glaucous in some species. Stems rigid, mostly branched, rarely single at the base and branched higher up, leafy from the base, from the middle or only in upper parts of plant (juvenile leaves may persist at the base), rarely with persistent petioles; bark variable, old parts grey to black and mostly rough due to remains of leaf bases, younger parts light brown to dark brown and youngest parts frequently reddish brown and more or less smooth. Leaves phyllodinous and arranged spirally in groups on short or long shoots, relatively uniform or variable; basal leaves biternate to triternate, with the leaflets rarely entire, mostly toothed; upper leaves laminate to needle-like, sometimes totally reduced to the petiole and/or rachis (junciform), undivided to much divided, with or without lamina, 16-346 mm long; petiole and rachis mostly adaxially grooved, without a groove in some species; glabrous or rarely with sparse papillate hairs along the margins and midrib. Inflorescences mostly apical on long shoots, rarely on short shoots, with primary, secondary or tertiary racemes; internodes short (then with the inflorescence short and compact) or long (then with the inflorescence long and sparsely branched); upper racemes terminate in compound umbels; lateral racemes terminate in compound or simple umbels; scale-leaves occasionally sterile and condensed, forming small groups within the inflorescence, or more usually dispersed and subtending the racemes and umbels, somewhat caducous, triangular to linear-triangular, 2-10 mm long; rays 7-82 mm long; involucre bracts triangular to linear-triangular, 1.0-4.6 mm long; involucre bracts similar in shape, 0.8-3.1 mm long. Flowers small, yellow, invariably bisexual; pedicels 1.0-10.7 mm long; calyx teeth triangular, 0.3-0.7 mm long; petals widely to very widely ovate, 0.6-1.7 × 0.6-1.3 mm, inflexed part 0.3-1.0 mm long; resin ducts single or branched; filaments 0.7-2.2 mm long, the uppermost 0.1-0.3 inflexed in bud and rapidly narrowed to a fine point; anthers 0.5-1.0 mm long; ovary 0.5-1.6 mm long; stylopodium 0.8-1.7 mm wide, 0.3-0.9 mm high; style 0.1-0.5 mm long. Fruit variable, ovate to widely depressed ovate, rarely widely obovate; mericarps usually rugose, rarely tuberculate or with small translucent dots (substomatal cavities) on a smooth surface, 1.6-6.3 mm long, 0.6-2.4 mm broad; resin ducts mostly 6 in each mericarp, 2 ventral (one in each corner of the commissure), 4 dorsal (in furrows between the ridges), rarely (6-) 8-12 in each mericarp, then variously distributed around the endocarp. Chromosome number: 2n = 22!

Notes. All the species are woody shrubs or shrublets with basal leaves that differ markedly from the upper (mature) leaves. The basal leaves have wide laminas,

while the laminas of the upper leaves are reduced to various degrees, so that in most species the petioles and/or rachises alone remain as terete, needle-like structures. The genus *Anginon* can thus be distinguished by the combination of a woody habit, reduced leaves (usually phyllodinous and often junciform) and fruit without ridges or wings. It also differs from all other genera (except *Glia*) in the heavily cutinized outer walls of the fruit epidermis (see Van Wyk et al. 1997).

Distribution. The species of *Anginon* are widely distributed in the south-western part of southern Africa, including the eastern, southern, western and north-western parts of the Cape Province, and the southern part of Namibia (Figs 1 - 4).

Key to the species of *Anginon*

- 1 Mature parts green, never glaucous; total height of the plant (excluding the inflorescence) more than 0.8 m 2
- 1 Mature parts (stems, leaves or at least the inflorescences) glaucous (with a white wax layer); (if only partly or indistinctly glaucous then total height of the plant (excluding the inflorescence) less than 0.8 m 8
- 2 Mature leaves needle-like, junciform or divided (laminas absent), petals with branched resin ducts . 3
- 2 Mature leaves predominantly terminating in flat laminas (if somewhat needle-like then at least some of the leaves with flat laminas); petals with unbranched (single) resin ducts 5
- 3 Mature leaves ternate, invariably divided into three nearly equal slender junciform segments; known only from two localities (Gifberg and Heerenlogementsberg) in the north-western Cape 2. *A. ternatum*
- 3 Mature leaves not ternate, either unequally divided or if nearly equally divided, then at least with some leaves undivided and junciform 4
- 4 Mature leaves with an adaxial groove, usually divided into two or more segments of unequal size (almost invariably junciform in a few populations); plants usually densely branched 3. *A. fruticosum*
- 4 Mature leaves terete, without an adaxial groove, invariably undivided and junciform; plants usually sparsely branched 1. *A. difforme*
- 5 Branch ends thin, less than 1.5 mm in diameter; uppermost leaves with 3 flat entire linear leaflets; only from Pella Mountain in the northern Cape 12. *A. jaarsveldii*

- 5 Branch ends thick, more than 2 mm in diameter; uppermost leaves with more than 3 leaflets (or if only 3, then not flat, entire and linear; widely distributed (or if branch ends somewhat thin, then known only from the Rehoboth region) 6
- 6 Mature leaves slender, uppermost leaves (i.e. those directly below the inflorescence) almost or totally needle-like (junciform) 11. *A. intermedium*
- 6 Mature leaves invariably laminate 7
- 7 Inflorescences with the lateral racemes invariably terminating in simple umbels; fruit 3 to 5 mm long 10. *A. verticillatum*
- 7 Inflorescences with the lateral racemes predominantly terminating in compound umbels; fruit \pm 2 mm long 9. *A. streyi*
- 8 Plant height (excluding the inflorescence) less than 0.3 m high; primary stems unbranched, growing from a horizontal subterranean rhizome; known only from the Bredasdorp region (limestone areas) 4. *A. pumilum*
- 8 Plant height (excluding the inflorescence) usually more than 0.5 m high; primary stems rarely unbranched, without a subterranean rhizome; not from the Bredasdorp region 9
- 9 Petioles persistent; plant small, sparsely branched; known only from the Montagu area; upper leaves only slightly divided, with the divisions very short and restricted to the apex of the rachis 5. *A. tenuior*
- 9 Petioles not persistent; plants large, robust (rarely small); not restricted to the Montagu area; upper leaves undivided or if divided, then the divisions long and not restricted to the apex of the rachis ... 10
- 10 Mature leaves terete, not adaxially grooved; widely distributed in the Little Karoo, from Worcester in the west to Uniondale in the east.. 6. *A. swellendamense*
- 10 Mature leaves adaxially grooved; not in the Little Karoo (north-western Cape or eastern Cape) 11
- 11 Mature (apical) leaves 3-pinnate; total height of the plant (including the inflorescence) up to 1.5 m; eastern Cape (Port Elizabeth to Grahamstown); fruit broadly ovate, \pm as long as wide 8. *A. rugosum*
- 11 Mature (apical) leaves 4- to 5-pinnate; total height of the plant (including the inflorescence) usually more than 1.8 m; north-western Cape (Olifants River Valley, from Citrusdal northwards to the Matsikamma Mountain); fruit oblong, distinctly longer than wide 7. *A. paniculatum*

1. *Angion difforme* (L.) B. L. Burtt

In Hilliard & Burtt, Notes R. Bot. Gard. Edinb. 45: 90 (1988); B. L. Burtt in Edinb. J. Bot. 48,2: 172 (1991). – Type: South Africa, Cape Province, Robinson Pass, Allison 50 (PRE, neotype, designated here; NBG, K, isotypes).

Note. For a detailed discussion of the typification of *A. difforme* see Burtt (1991), note on page 255. As he pointed out, there are three possibilities: 1, To choose the Linnaeus specimens (cult. hort. Uppsala, LINN 335.28!; see drawing in Burtt 1991, p. 255), even if these are most unsatisfactory as types; 2, To choose the Burman plate (Burman, 1739, tab. 71, Fig.1) as iconotype, even though there are no fruit on this specimen; 3, To select a neotype. LINN 335.28 is most likely *A. difforme*, but some doubt remains. Our study of seedling leaves and juvenile leaves of the various species showed that they are rarely diagnostically different (Van Wyk et al. 1997). The inflorescence and flowers on this sheet may have been added later. The Burman plate almost certainly depicts *A. difforme*, but here again we are not absolutely sure, because *A. fruticosum* at some localities closely resembles the plant in the plate. In our opinion, the most practical solution was to avoid any possible confusion by choosing a neotype (Fig. 5).

\equiv *Bupleurum difforme* L., Sp. Pl.: 238 (1753), ed. 2: 344 (1763); Murray, Syst. Veg. ed. 13: 226 (1774), ed. 14: 284 (1784); Lam., Encycl. 1(2): 520 (1785); Willd., Sp. Pl. 1(2): 1378 (1798); Sond. in Fl. Cap. 2: 541 (1862). – Type as above.

\equiv *Buprestis difformis* (L.) Spreng. in Mag. Ges. Naturf. Fr. Berlin, 6(3): 259 (1813). – Type as above.

\equiv *Tenoria difformis* (L.) Spreng., Pl. Umbell. Prodr.: 32 (1813); Spreng. in Roem. & Schultes, Syst. Veg. 6: 375 (1820). – Type as above.

\equiv *Rhycarpus difformis* (L.) Briq. in Bull. Herb. Boiss. 5: 450 (1897); H. Wolff in Pflanzenr. Heft 43: 13, fig. 3, 175 (1910). – Type as above.

\equiv *Sium difforme* (L.) Hiroe, Umbell. World: 1149 (1979). – Type as above.

\equiv *Oenanthe exaltata* Thunb., Prodr.: 50 (1794). – Lectotype (chosen by Burtt 1991): Cape, s. loc., Thunberg s.n. (UPS 7088!)

\equiv *Lichtensteinia exaltata* (Thunb.) Koso-Poljansky in Bull. Soc. Natur. Moscou 30: 284 (1917). – Type as above.

\equiv *Bupleurum difforme* var. *burmannianum* Eckl. & Zeyh., Enum.: 342 (1837). – Lectotype (chosen by Burtt 1988): Cape, Witsenberg, near Tulbagh, Ecklon & Zeyher 2202 β (S!).

Slender, sparsely branched, woody shrub, 1-3 m high; mature parts green, not glaucous. Stems usually

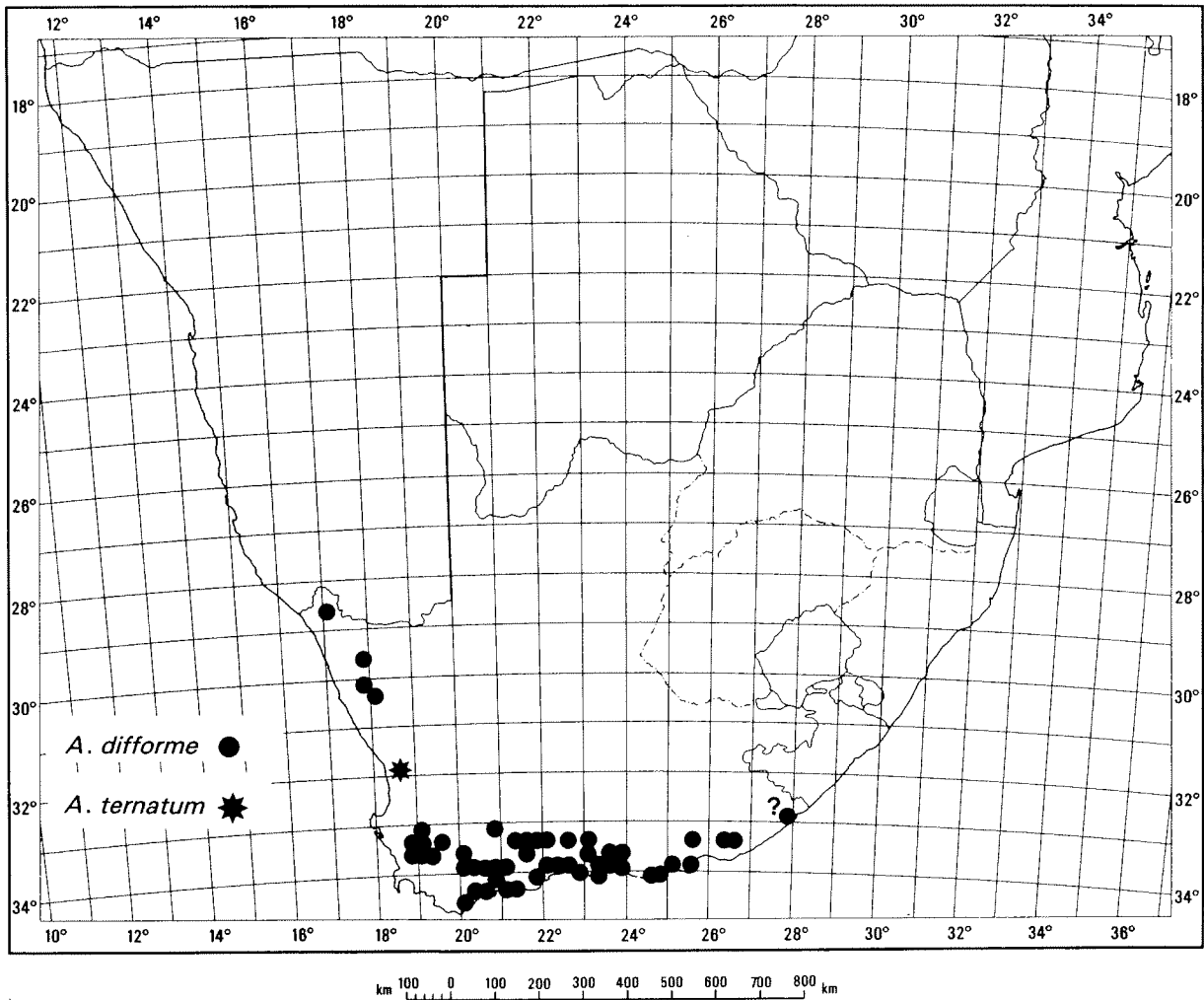


Fig. 1. The known geographical distribution of *Anginon difforme* and *A. ternatum*.

branched at the base, usually slender and leafless except for the upper parts of plant. Leaves relatively uniform; basal leaves biternate with toothed leaflets; upper leaves junciform, almost invariably totally reduced to the petiole and/or rachis, (59-) 121-210 (-325) mm long; petiole and rachis adaxially without a groove; lamina totally absent. Inflorescences apical on long shoots, sparse or congested, rarely with only primary racemes, mostly with secondary racemes; lateral racemes terminate in compound umbels, mostly with numerous condensed, sterile scale-leaves; scale-leaves 2-5 mm long; rays (10-) 15-26 (-46) mm long; involucre bracts (1.0-) 1.2-2.7 (-4.6) mm long; involucre bracts (0.8-) 1.0-1.9 (-3.1) mm long. Flowers with pedicels (2.5-) 3.8-5.4 (-6.3) mm long; calyx teeth (0.3-) 0.4-0.5 (-0.6) mm long; petals very widely ovate, (0.8-) 0.9-1.1 (-1.7) × (0.7-) 0.9-

1.1 (-1.2) mm, inflexed part 0.5-0.7 (-0.9) mm long; resin ducts branched; filaments 0.9-1.4 (-1.9) mm long, the uppermost 0.1 (-0.2) mm inflexed in bud; anthers (0.6-) 0.7 (-0.8) mm long; ovary (0.8-) 0.9-1.1 (-1.4) mm long; stylopodium (0.9-) 1.0-1.5 (-1.6) mm wide, (0.3-) 0.5-0.7 (-0.8) mm high; style (0.1-) 0.2 (-0.3) mm long. Fruit widely obovate, with pedicel somewhat intruding at the base; mericarps usually tuberculate, (2.2-) 3.4-4.8 (-5.7) mm long, (1.1-) 1.3-1.9 (-2.4) mm broad; resin ducts (6-) 8-12. Chromosome number: $2n = 22!$ (voucher: Van Wyk 2950).

Notes. This relatively common species is easily recognized by the invariably undivided, junciform mature leaves (Fig. 5). The plants are usually sparsely branched and the mature parts (leaves, stems and inflorescences)

are green, never glaucous. *A. difforme* is widely distributed in the Cape Province (Fig. 1) and is mostly found in sandstone and quartzite areas, usually on steep rocky slopes.

Material examined. 2817 (Vioolsdrif): Summit of the Ploegberg complex (-CA), Viviers 2113 (JRAU). -2917 (Springbok): top of Nababiepsberg (-DB), Allison 183, 184 (JRAU), 185 (PRE), 186 (NBG), 187 (GRA). -3017 (Hondekliptaai): Sneeuwkop (-BB), Pearson 5783 (GRA, NBG). -3018 (Kamiesberg): Kamiesberg Pass (-AC), Allison 129 (JRAU), 130 (PRE), 131 (NBG), Van Wyk 3098 (JRAU); Kamiesberg (-AC), Pearson 6264 (BOL), Snijman 436 (NBG); Rooiberg Mountain (-AC), Le Roux & Ramsey 820 (STE). -3318 (Cape Town): mountain slopes above Riebeeck Kasteel, farm Remhoogte (-BD), Marsh 1020 (STE); Paardeberg (-DB), Gordon & Adamson 3668 sheet 1 & 2 (BOL), Hugo 3012 (PRE, STE), Pillans 6321, 7642 (BOL), Rycroft 2962 (NBG), Salter & Leighton s.n. sub. BOL 45234 (BOL); Paarl Mountain (-DB), Marloth 3478 sheet 1 & 2 (PRE); Prior s.n. sub. PRE 48191 (PRE). -3319 (Worcester): Roodesandberg (-AA), Adamson 1020 (BOL, PRE), Compton 7108 (NBG), Compton et al. s.n. sub. NBG 1914/36 (NBG); Saron (-AA), Thode 4841 (STE); Witsenberg (-AC), Ecklon & Zeyher 2202 β (S); Tulbagh, Elandsrivier Mountain (-AC), Jackson s.n. sub. BOL 45258 (BOL); mountains near Tulbagh Kloof (-AC), Stokoe s.n. sub. SAM 68032 sheet 1 & 2 (PRE); Nieuwekloof (-AC), Schlechter 7523 (BOL); Vogelvllei Mountains near Gouda (-AC), Esterhuysen 18839a (BOL, PRE); Worcester, near Hex River Valley (-BD), Thode s.n. sub. NH 16326 (NH); Hex River Valley (-BD), Tyson 1881 (GRA); Bain's Kloof (-CA), Grant 2214 (BOL); Audensberg (-CB), Esterhuysen 3415 (BOL, NBG). -3320 (MONTAGU): Montagu, Baden (-CA), Walgate s.n. sub. BOL 24028 (BOL), Compton 18439 (NBG), Lewis 1794 (NBG); Kochmanskloof (-CC), Levyns 107 (BOL); Wolwekloof west of Swellendam (-CD), Taylor 9254 (STE); Tradouw Pass (-DC), Allison 200 (JRAU), 201 (PRE), Bond 203 (NBG); Zuurbraak Mountain (-DC), Galpin s.n. sub. PRE 4094 (PRE); Langeberg near Heidelberg (-DD), C.M. van Wyk 2628 (PRE); Langeberg, Witbooisriver (-DD), Burger 46 (STE). -3321 (Ladismith): Seven Weeks Poort (-AD), Adamson 3683 sheet 1 & 2 (BOL), Bohnen 689/2 (PRE, STE), Compton 4025 (BOL); Elandsberg, Ladismith (-AD), Wurb 1089 (NBG); Gamka Mountain (-BC), Boshoff P81 (STE); Swartberg, Groenfontein (-BD), Vlok 48 (PRE); Garcia's Pass (-CC), Esterhuysen 17032 (BOL), Levyns 2307 (BOL), Steyn 314 (NBG); Gysmanshoek Pass (-CC), C.M. van Wyk 703 (PRE, STE); top of Rooiberg Pass (-DA), Allison 69, 70 (JRAU), 71, 110 (PRE), 111, 112 (SAM). -3322 (Oudtshoorn): Cango valley (-AC), Britten 1735

(GRA), Moffett 208 (STE), 581 (PRE, STE), Hugo 34 (PRE, STE); Meiringspoort (-BC), Van Wyk 2965 (JRAU); Uniondalepoort (-CA), Allison 207 (PRE); Robinson Pass (-CC), Allison 49 (JRAU), 50 (K, NBG, PRE); Paardepoort (-CD), Allison 102, 103, (NBG), 104 (JRAU), 108 (BOL); George (-CD), Mitchell s.n. sub. BOL 16093 (BOL), s.n. sub. PRE 48275 (PRE); Outeniqua Pass (-CD), Lewis 4866 (PRE, SAM); Langkloof (-CD), Le Roux 71 sheet 1 & 2 (PRE); Kleinplaat (-DC), Morze 2232 (PRE, STE); Wilderness (-DC), Compton 15557 (NBG). -3323 (Willowmore): Slyps-teenberg (-AC), Esterhuysen 6322 (BOL); De Hoop (-CA), Van Wyk 2950 (JRAU); George to Oudtshoorn road (-CD), Allison 59 (JRAU), 60 (PRE); near Misingund (-CD), Fourcade 4261 (BOL, STE), Goldblatt 6793 (PRE, STE); Lang Kloof, E. of Keurbooms River (-CD), Fourcade 2501 (BOL, STE); De Vasselot near Grootbanke (-CD), Geldenhuys 550 (BOL, PRE); The Crags (-CD), Compton 23598 (NBG); Joubertina, Voorkloof, Kouga-Dwarsriver (-DA), Manson 245 (PRE, STE); Kouga Mountain, Hoeree (-DB), Oelofsen 21 (PRE); Duine Field, Groot River (-DC), Fourcade 2460 (BOL); near Joubertina (-DD), Acocks 20016 (PRE), Allison 41-43 (JRAU), 45, 46 (PRE), 100, 101 (JRAU), Esterhuysen 21220 (BOL), Van Wyk 2944 (JRAU). -3325 (Port Elizabeth): Zuurberg National Park, Brandrug (-BC), Allison 36, 37 (JRAU), 38, 39 (PRE), 40, 97, 98 (NBG); 99 (GRA); Zuurberg National Park, Lot 16 (-BC), B-E. & M. van Wyk 35, 1235 (JRAU); Zuurberg (-BC), Holland 20 (GRA); Van Stadens Mountain (-CC), Zeyher 2675 sheet 1 & 2 (PRE); Port Elizabeth Valley (-DC), Paterson 2210 (GRA). -3326 (Grahamstown): Grahamstown (-BC), Barker 550 (NBG), Britten s.n. sub. GRA 7373 (GRA), Dyer 423 (GRA), MacOwan 455 (GRA), s.n. sub. BOL 1124 (BOL); Paradise Kloof (-BC), Salisbury 346 (GRA); Rabbit Wood (-BC), Bayliss 6078 (NBG). -3420 (Bredasdorp): De Hoop (-AD), Allison 152 (JRAU), Lewis 5129 (NBG); Duiwehoks River (-BB), Lewis 5942 (NBG); near Malgas (-BC), Bayliss BRI. B. 915 (PRE); near the Potteberg (-BC), Esterhuysen 23299 (BOL); Potteberg (-BC), Maguire 2608 (NBG), Burgers 2017 (STE); Bredasdorp, farm Bronkvlei (-CA), Van Breda 1634 sheet 1 & 2 (PRE); Nachwacht (-CA), Smith 4249 sheet 1 & 2 (PRE). -3421 (Riversdale): Vermaaklikheid (-AC), Bohnen 5872 (PRE, STE); Stillbay, Olive Grove Farm (-AD), Bohnen 581.1 (STE); Gouritz Bridge (-BB), Compton 23531 (NBG, STE), Lewis 2518 (BOL, NBG). -3422 (Mossel Bay): Belvedere (-BB); Duthie 726 (GRA, STE). -3423 (Knysna): Plettenberg hill (-AB), Phillips s.n. sub. SAAS 1060 (PRE). -3424 (Humansdorp): Kromme River bridge (-BA), Fourcade 5981 (BOL, STE); Humansdorp (-BB), Rogers 3005 (GRA). Without precise locality: Burt-Davy 11911 (PRE); Doubtful locality: East London, Pearson 1518 (NBG).

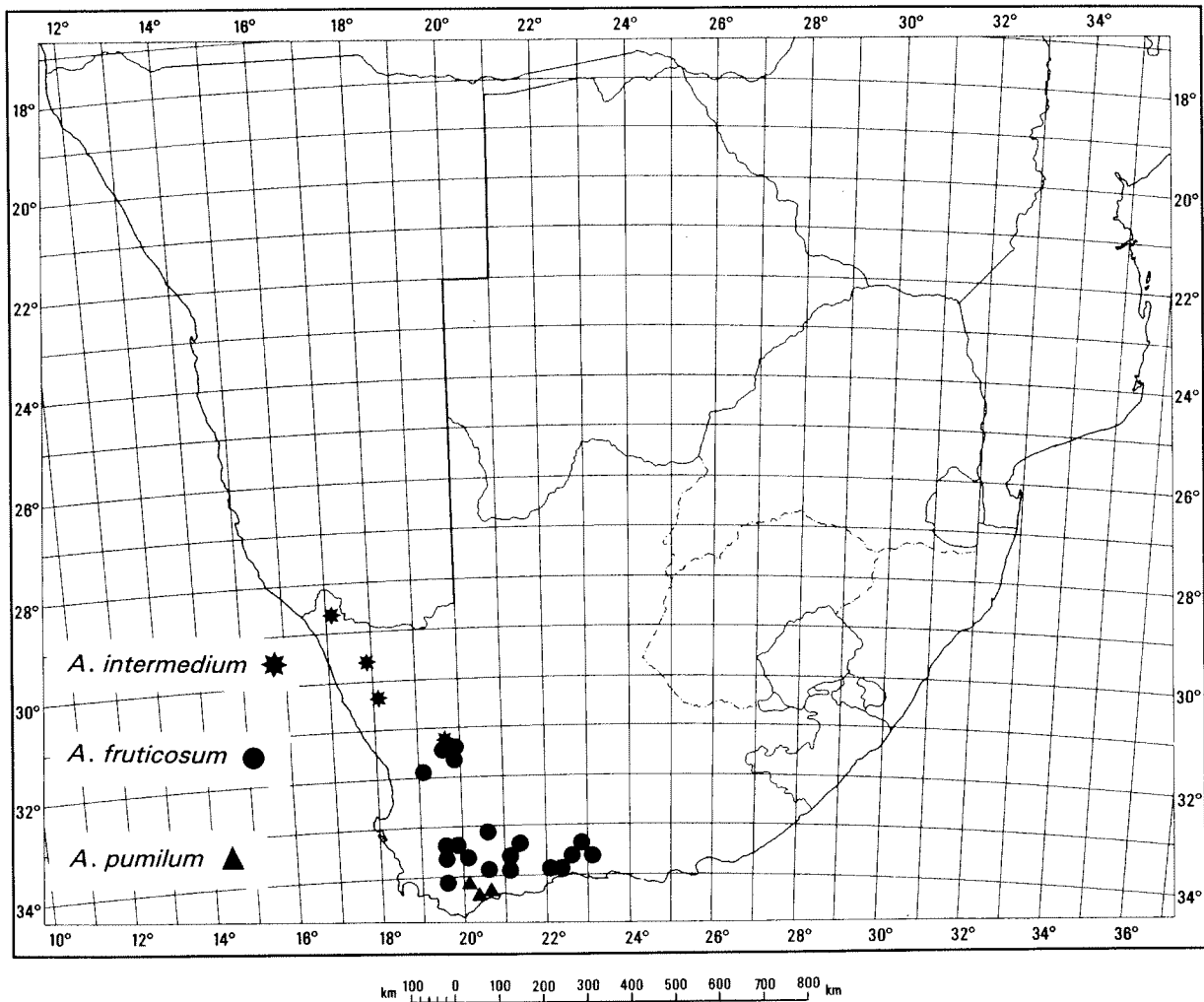


Fig. 2. The known geographical distribution of *Anginon fruticosum*, *A. pumilum* and *A. intermedium*.

2. *Anginon ternatum* Allison & Van Wyk, sp. nov.

Anginon diffirmi arcte affinis, sed habitu robustiore et foliis ternatis multo longioribus plerumque in segmenta tria fere aequalia acicularia divisus (in *A. diffirmi* foliis maturis plerumque indivisis) differt. – Typus: South Africa, Cape Province, Vanrhynsdorp distr., Gifberg Pass, Van Wyk 3028 (PRE, holo.; NBG, iso.).

Robust, sparsely branched, woody shrub, up to 4 m high; mature parts green, not glaucous. Stems usually branched at the base, slender and leafless except for the upper parts of plant. Leaves relatively uniform; basal leaves biternate with toothed leaflets; upper leaves needle-like, divided into 3 almost equal, slender junciform

segments, (186-) 239-318 (-346) mm long; petiole and rachis adaxially grooved; lamina totally absent. Inflorescences apical on long shoots, with congested primary and/or secondary racemes; lateral racemes terminate in compound umbels, mostly with numerous condensed, sterile scale-leaves; scale-leaves 2-3 mm long; rays (10-) 13-19 (-22) mm long; involucre bracts 1.5-2.5 mm long; involucre bracts (1.3-) 1.4-1.8 (-2.1) mm long. Flowers with pedicels (2.7-) 3.2-4.3 (-5.2) mm long; calyx teeth (0.3-) 0.4-0.6 mm long; petals very widely ovate, 1.0-1.2 (-1.3) × 0.9 (-1.3) mm, inflexed part (0.5-) 0.6-0.8 (-0.9) mm long; resin ducts branched; filaments (1.0-) 1.1-1.5 (-1.9) mm long, the uppermost 0.1-0.2 mm inflexed in bud; anthers (0.7-) 0.8-0.9 mm long; ovary (0.9-) 1.0-1.3 (-1.4) mm long; stylopodium (1.2-) 1.3-1.6 (-1.7) mm wide, (0.5-) 0.6-0.8 (-0.9) mm high; style

(0.1-) 0.2 (-0.3) mm long. Fruit widely obovate; mericarps more or less tuberculate, (2.8-) 2.9-3.7 (-4.0) mm long, (1.0-) 1.2-1.6 (-1.9) mm broad; resin ducts (6-) 8-12.

Notes. *Anginon ternatum* is closely related to *A. difforme*, but can readily be distinguished by the more robust habit and the mature leaves which are much longer, adaxially grooved and invariably divided into three nearly equal slender needle-like segments (Fig. 6). The mature leaves are always without a groove and invariably undivided and junciform in *A. difforme*. This new species is known only from two localities in the north-western Cape (Gifberg Pass and Heerenlogementsberg; see Fig. 1).

Material examined. 3118 (Vanrhynsdorp): Vanrhynsdorp (-DA?), Acocks 14168 (PRE); Gifberg Pass (-DC), Allison 91 (E), 92 (JRAU), 93 (NBG), 128 (PRE), 198 (GRA), Van Wyk 3028 (NBG, PRE); Giftberg, along the escarpment on the west side (-DC), Esterhuysen 22138 (BOL); Heerenlogementsberg (-DC), Hugo 1048 (PRE, STE).

3. *Anginon fruticosum* Allison & Van Wyk, sp. nov.

Anginon difformi similis, sed foliis maturis adaxialiter sulcatis (in *A. difformi* teretis) et plerumque in segmenta duo vel plura staturae inaequalis (in *A. difformi* fere plerumque acicularibus) differt. Species etiam *A. intermedio* similis, sed inflorescentiarum structura, ramis lateralibus in umbellis compositis terminantibus (in *A. intermedio* in umbellis simplicibus terminantibus) et petalis canalibus resiniferis ramosis (in *A. intermedio* non ramosis) differt. – Typus: South Africa, Cape Province, Hex River Pass, near top, B-E. van Wyk 3050 (PRE, holo.).

= *Anginon* sp. near *A. difforme*, B. L. Burt in Edinb. J. Bot. 48,2: 173 (1991).

= *Rhyticarpus swellendamensis* Auct. non Eckl. & Zeyh.: Briq., Bull. Herb. Boiss. 5: 437, Fig. 5 (1897a); Briq. in Bull. Herb. Boiss. 5: 447, Figs 2, 3 B & C (1897b); Wolff, in Engl., das Pflanzenreich IV. 228: 13, Fig. 3 C, E & F (1910).

Much-branched, woody shrub, 1-3 m high; mature parts green, not glaucous. Stems branched at the base, leafy mostly from the base upwards. Leaves relatively uniform; basal leaves biternate with toothed leaflets; upper leaves needle-like, undivided and junciform, or with a few short unequal divisions, (16-) 24-86 (-174) mm long; petiole and rachis adaxially grooved; lamina totally absent. Inflorescences apical on long shoots, mostly

with congested primary racemes, rarely with secondary racemes, lateral racemes terminate in compound umbels, often with numerous condensed sterile scale-leaves; scale-leaves 4-7 mm long; rays (9-) 11-20 (-27) mm long; involucre bracts (1.8-) 2.2-3.2 (-3.7) mm long; involucel bracts (1.2-) 1.4-1.9 (-2.3) mm long. Flowers with pedicels (1.0-) 1.9-3.8 (-5.8) mm long; calyx teeth 0.3-0.5 (-0.6) mm long; petals very widely ovate, (0.8-) 0.9-1.2 (-1.3) × (0.7-) 0.9-1.1 (-1.2) mm, inflexed part (0.4-) 0.6-0.8 (-0.9) mm long; resin ducts branched; filaments 0.9-1.3 (-1.6) mm long, the uppermost 0.1 (-0.2) mm inflexed in bud; anthers (0.5-) 0.6-0.8 mm long; ovary (0.6-) 0.7-0.9 (-1.1) mm long; stylopodium 1.1-1.5 (-1.7) mm wide, (0.5-) 0.6-0.8 (-1.0) mm high; style 0.1-0.3 mm long. Fruit very widely ovate; mericarps rugose, (2.0-) 2.2-2.9 (-3.5) mm long, (0.6-) 1.1-1.6 (-2.1) mm broad, resin ducts 6. Chromosome number: 2n = 22! (voucher: Van Wyk 3050).

Notes. This species is similar to *Anginon difforme*, but the mature leaves are adaxially grooved and not terete and ungrooved as in *A. difforme*. The mature leaves are usually divided into two or more small segments of unequal size (Fig. 7), while they are almost invariably junciform in *A. difforme*. The habit is distinctly different, with a densely branched appearance. It is also similar to *A. intermedium*, but the lateral racemes terminate in compound umbels and petals have branched resin ducts. In *A. intermedium*, the lateral racemes terminate in simple umbels and the petals have a single median resin duct. *A. fruticosum* is a common species and is widely distributed at low altitudes in dry flat areas (usually on heavy soils along river beds), from the southern Cape northwards to the Calvinia district (Fig. 2). The habitat is very different from that of *A. difforme* and the two species do not co-occur at any of the localities known to us.

Material examined. 3119 (Calvinia): 16,5 miles [26.5 km] NW of Calvinia (-BC), Acocks 14406 (PRE); slope of Hantam Mountains (-BD), Smith 2470 sheet 1 & 2 (PRE); Hantam Mountains, farm VanRhynshoek (-BD), Batten 1018 sheet 1 & 2 [seedling] (JRAU); Akkerendam Nature Reserve (-BD), Allison 94, 95 (NBG), 96 (PRE), 133 (JRAU); banks of Doorn River, south of Brakriver (-CC), Pearson 3887 (BOL, NH, PRE); S. side of Rebonie (-DB), Hanekom 2493 (PRE). -3319 (Worcester): 31,4 km from Ceres to Touwsriver (-BC), Van Wyk 3019 (JRAU); top of Hex River Pass (-BD), Acocks 14109 sheet 1 & 2 (PRE), Allison 85 (JRAU), 86 (NBG), 87, (PRE), 121 (K), Van Wyk 2911 (E), 3017 (PRE), 3050 (PRE); Hex River Valley, Groote Tafelberg (-BD), Rehmann 2779 (PRE); near Verkeerdelei (-BD), Van Wyk 3018 (JRAU); Farm Doringkloof, S. foothills of Voetpadsberg (-DA), Van der Koo-

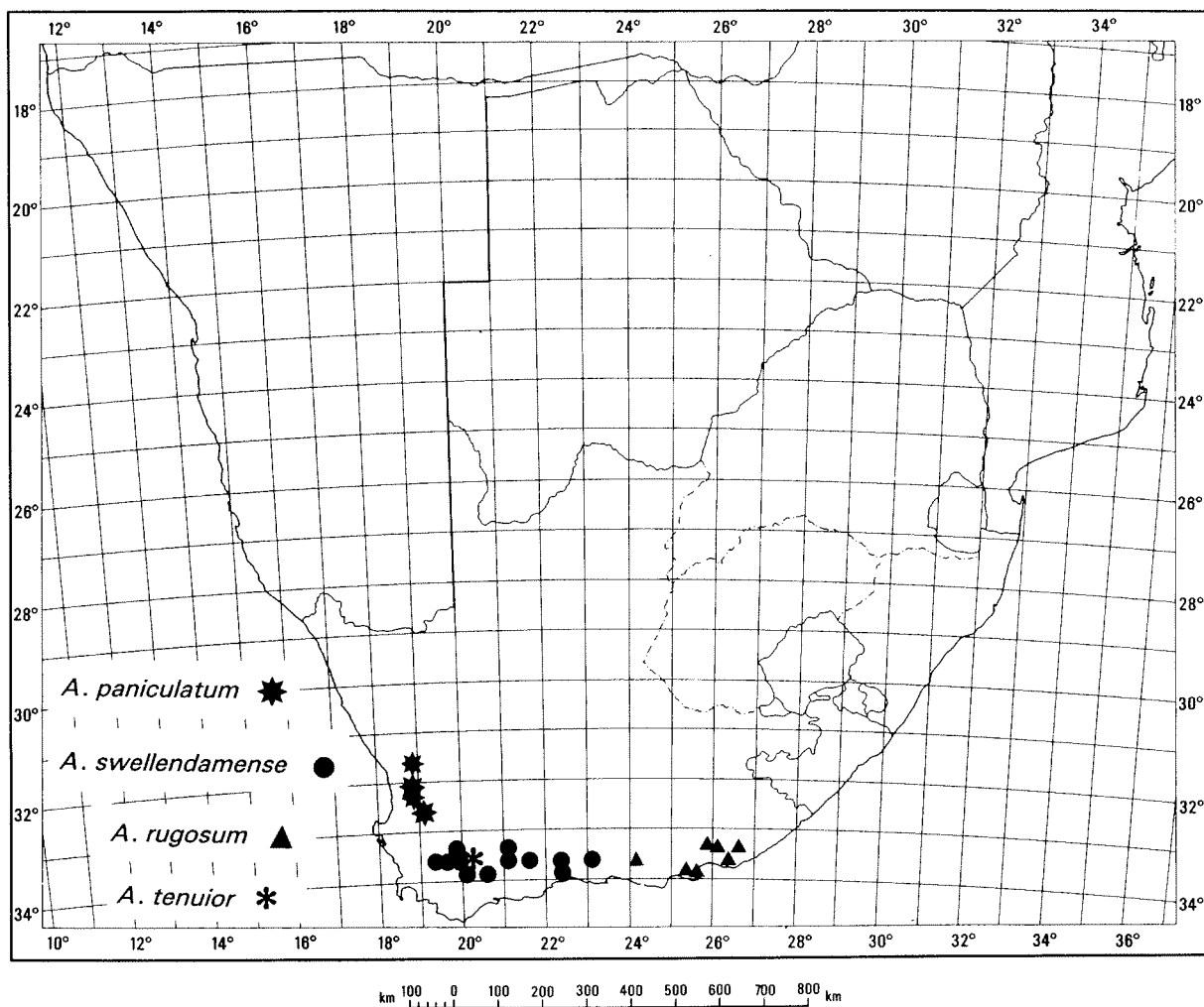


Fig. 3. The known geographical distribution of *Anginon tenuior*, *A. swellendamense*, *A. paniculatum* and *A. rugosum*.

ij 6 (PRE, STE), C.M. van Wyk 2389, pro parte (STE). -3320 (Montagu): Matjiesfontein (-BA), Compton 6760 (NBG, STE), Thoday & Delf 44 (STE); Witteberg Kloof (-BA), Compton 2765 (BOL); Ladismith, road between Touwsriver and Montagu (-CA), Viviers & Vlok 444 (JRAU); between Pypsteelfontein & Grootfontein, Waboomsberge (-CA), Moffett & Steensma 4123 (STE); Pypsteelfontein (-CA), Allison 75 (JRAU), 76 (PRE), 77 (NBG); 13 miles [20.9 km] W by S of Barrydale (-DC), Acocks 20336 (PRE); ca. 19 km from Barrydale to Montagu (-DC), Allison 113 (JRAU), 114, 115 (STE). -3321 (Ladismith): Sand River, near N. end of Seven Weeks Poort (-AD), Moffett & Steensma 3925 (STE); at entrance road to Klein Swartberg catchment area (-AD), Allison 202 (JRAU), 203 (PRE), 204 (SAM); Witteberg hills (-CA), Adamson 3677 (BOL);

Springfontein between Barrydale and Garcia's Pass (-CC), Hugo 93 sheets 1-3 (PRE). -3322 (Oudtshoorn): Swartberg (-BD), Vlok 2288 (JRAU); Outeniqua Mountains, near Zebrafontein (-CC), Allison 53 (BOL), 54 (JRAU), 55 (NBG), 56 (PRE), 57 (SAM); Klein Moeras River (-CC), Vlok 1448 (PRE); turn-off to Oudtshoorn on Uniondale road (-CD), Allison 205 (JRAU); Aangenaam, De Rust (-DA), Dahlstrand 2397 (PRE, STE). -3323 (Willowmore): 7.5 km NNW of Uniondale (-CA), Van Wyk 3253 sheet 1 & 2 (JRAU). -3419 (Caledon): Genadendal (-BA), Schlechter 10338 (BOL).

4. *Anginon pumilum* Allison & Van Wyk, sp. nov.

A congeneribus habitu multo minore et minus ligneo (usque ad 0.7 m alto) etiam caulibus horizontalibus subterraneis plantis aliis connectis differt. Species *Anginon fruticoso* similis, sed fructu multo majore et caulibus primariis non ramosis (in *A. fruticoso* plerumque dense ramosis) differt. — Typus: South Africa, Cape Province, Bredasdorp distr., De Hoop Nature Reserve, southern slope, on limestone, Allison 159 (PRE, holo.; K, NBG, iso.).

Slender, unbranched, woody shrublet, up to 0.7 m high, mature parts (leaves, stems or at least the inflorescences) usually distinctly glaucous. Stems unbranched, leafless at the base, often connected to each other by a horizontal subterranean rhizome. Leaves relatively uniform; basal leaves triternate with toothed leaflets; upper leaves slender, invariably divided, 2-pinnate, (38-) 61-99 (-115) mm long; petiole and rachis adaxially grooved; lamina inconspicuous, the segments slender. Inflorescences terminal, sparse, mainly with primary racemes; lateral racemes terminate in compound umbels; scale-leaves 5-10 mm long; rays (18-) 21-32 (-38) mm long; involucre bracts (1.8-) 1.9-2.2 (-2.3) mm long, involucre bracts (1.3-) 1.5-2.0 (-2.1) mm long. Flowers with pedicels (1.8-) 2.3-4.4 (-6.1) mm long; calyx teeth (0.3-) 0.4-0.6 (-0.7) mm long; petals very widely ovate, (0.9-) 1.0-1.2 (-1.3) × 1.0-1.1 (-1.2) mm, inflexed part 0.6-0.8 (-0.9) mm long; resin ducts branched; filaments (1.0-) 1.1-1.5 (-1.9) mm long, the uppermost 0.1-0.2 mm inflexed in bud; anthers 0.7 (-0.8) mm long; ovary (1.0-) 1.1-1.3 (-1.4) mm long; stylopodium (1.1-) 1.2-1.5 (-1.6) mm wide, (0.5-) 0.6-0.8 (-0.9) mm high; style 0.2 (-0.3) mm long. Fruit widely depressed ovate; mericarps more or less rugose, (1.9-) 2.0-2.5 (-2.8) mm long, (1.2-) 1.3-1.5 (-1.6) mm broad, resin ducts 6.

Notes. This species (Fig. 8) differs from all other species in the much smaller and less woody habit (up to 0.7 m high), as well as the presence of horizontal subterranean rhizomes between the subshrubs. *Anginon pumilum* is somewhat similar to *A. fruticosum*, but differs in the dwarf habit, larger fruit and the much smaller and unbranched primary stems. It is known only from limestone areas in the De Hoop region near Bredasdorp (Fig. 2).

Material examined. 3420 (Bredasdorp): Goereesoe (-AA), Acocks 22673 (PRE); De Hoop road, 2 km from turn-off to Ouplaas (-AD), Allison 153 (GRA), 154 (JRAU), 155 (PRE), road to De Hoop, ca. 3 km from main road (-AD), Allison 157 (NBG); De Hoop Nature Reserve, near entrance gate (-AD), Allison 158 (BOL),

159 (K, NBG, PRE); 2.5 miles [4 km] SW of Wydgelegen Post Office (-AD), Acocks 23003 (PRE); De Hoop Provincial Farm (-AD), Lewis 5145 (NBG); Windhoek Provincial Nature Reserve (-AD), Van der Merwe 843 (PRE); Oulande (-AD), C.M. van Wyk 2254 (STE); De Hoop, Potberg, ca. 1 km from Elandspad homestead (-BC), Morley 132 (STE); Dist. Bredasdorp (-AD), Van der Merwe "1915 or 1904" (STE).

5. *Anginon tenuior* Allison & Van Wyk, sp. nov.

Anginon swellendamensi affinis, sed habitu minore sparsiore, petiolis persistentibus, foliis brevioribus segmentis brevibus rhachidis apicem restrictis et in petalis canalibus resiniferis ramosis (in *A. swellendamensi* habitu majore et multo robustiore, petiolis non persistentibus, foliis indivisis aut si divisus nunc segmentis longis non rhachidis apicem restrictis et in petalis canalibus resiniferis non ramosis) differt. — Typus: South Africa, Cape Province, Montagu district, Oudeberg Pass, Van Wyk 3334 (PRE, holo.; K, iso.).

Slender, sparsely branched, woody shrub, up to 1.5 m high; mature parts usually distinctly glaucous. Stems branched at the base, slender and leafless except for the upper parts; petioles persistent below the leafy parts. Leaves relatively uniform; basal leaves triternate with toothed leaflets, upper leaves needle-like, but never junceiform, usually with three very short divisions near the apex only, (33-) 46-73 (-85) mm long; petiole and rachis adaxially grooved; lamina inconspicuous, the segments slender. Inflorescences apical on long shoots, very sparse, with primary and secondary racemes, lateral racemes terminate in compound umbels; scale-leaves 4-8 mm long; rays (20-) 24-30 (-33) mm long; involucre bracts 2.0-4.0 mm long; involucre bracts ± 1.5 mm long. Flowers with pedicels (3.1-) 3.4-4.7 (-5.4) mm long; calyx teeth ± 0.2 mm long; petals widely ovate, ± 0.8 × ± 0.9 mm, inflexed part ± 0.4 mm long; resin ducts branched; filaments ± 1 mm long, the uppermost ± 0.1 mm inflexed in bud; anthers ± 0.8 mm long; ovary ± 0.6 mm long; stylopodium ± 0.9 mm wide, ± 0.5 mm high; style ± 0.3 mm long. Fruit widely depressed ovate; mericarps more or less rugose, (2.4-) 2.6-3.2 (-3.7) mm long, (1.4-) 1.6-1.9 (-2.1) mm broad; resin ducts 6.

Notes. This species is similar to *Anginon swellendamense*, but differs in the smaller, sparser habit, the persistent petioles, the shorter leaves with short segments which are restricted to the apex of the rachis (Fig. 9) and also in the branched resin ducts of the petals. *A. swellendamense* has a larger, more robust habit, non-persistent petioles, longer undivided or divided leaves

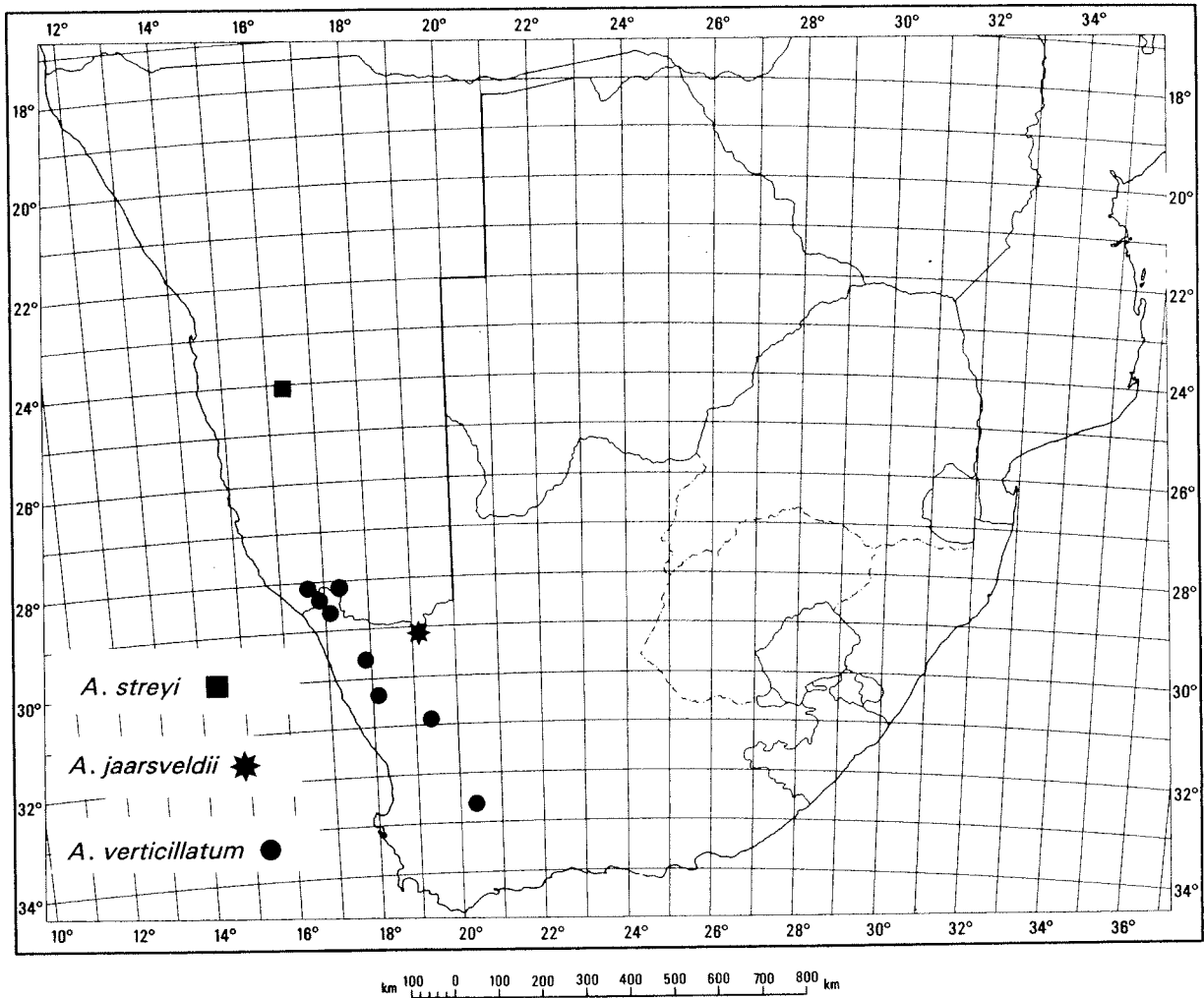


Fig. 4. The known geographical distribution of *Anginon streyi*, *A. verticillatum* and *A. jaarsveldii*.

with long segments which are not restricted to the apex of the rachis and unbranched resin ducts in the petals. This species is known only from the Montagu area (Fig. 3) and the habitat seems similar to that of *A. swellendamense*.

Material examined. 3320 (Montagu): Baden near Montagu (-CA), Levyns 8009 (BOL), Lewis 1793 (NBG); near top of Oudeberg Pass (-CA), Van Wyk 3333 (E, JRAU), 3334 (K, PRE), 3335 (NBG), 3336 (PRE), Viviers & Vlok 449 (JRAU).

6. *Anginon swellendamense* (Eckl. & Zeyh.) B. L. Burtt

In Hilliard & Burtt, Notes R. Bot. Gard. Edinburgh 45: 91 (1988); B. L. Burtt in Edinb. J. Bot. 48,2: 176 (1991). – Type: South Africa, Cape Province, Swellendam, between Kochmanskloof and Gouritz river, Ecklon & Zeyher 2194 (S!, lecto. designated here; SAM!, isolecto.).

Note. Since the most complete collection of Ecklon & Zeyher is housed in S, we choose this specimen as lectotype.

≡ *Trinia swellendamensis* Eckl. & Zeyh., Enum.: 340 (1837). – Type as above.

≡ *Rhyticarpus swellendamensis* (Eckl. & Zeyh.) Briq. in Bull. Herb. Boiss. 5: 451 (1897), pro parte; Wolff in

Engl., das Pflanzenreich IV. 228: 177 (1910), pro parte.
– Type as above.

= *Rhyticarpus ecklonis* Sond. in Fl. Cap. 2: 540 (1862), nom. illegit. – Type as for *Trinia swellendamensis*.

= [*Bupleurum acerosum* E. Mey. in Drège, Zwei Pflanzengeog. Doc. 115: 170 (1843), nom. nud.]

Robust, sparsely branched, woody shrub, 1-2 m high, mature parts invariably glaucous, with a conspicuous white wax layer. Stems usually single at the base and branched higher up, mostly leafy from the base upwards. Leaves relatively uniform; basal leaves triternate with toothed leaflets, upper leaves often divided and 2- to 3-pinnate, sometimes junciform, (42-) 91-187 (-301) mm long; petiole and rachis adaxially without a groove; lamina absent. Inflorescences apical on long shoots, exceptionally sparse and lax, with primary and secondary racemes; lateral racemes terminate in compound umbels; scale-leaves 2-5 mm long; rays (10-) 16-31 (-50) mm long; involucre bracts (2.0-) 2.4-3.7 (-4.3) mm long; involucel bracts (1.5-) 1.6-2.3 (-2.9) mm long. Flowers with pedicels (1.8-) 2.1-3.9 (-6.7) mm long; calyx teeth 0.3-0.4 (0.5) mm long; petals very widely ovate, (0.6-) 0.8-1.0 (-1.1) × (0.6-) 0.7-0.8 (-0.9) mm, inflexed part (0.4-) 0.5-0.6 (-0.7) mm long; resin ducts unbranched; filaments (0.7-) 0.9-1.3 (-1.5) mm long, the uppermost 0.1-0.3 mm inflexed in bud; anthers 0.6-0.7 (-0.8) mm long; ovary (0.5-) 0.6-0.8 (-0.9) mm long; stylopodium (0.8-) 1.0-1.3 mm wide, (0.3-) 0.5-0.7 (-0.8) mm high; style (0.2-) 0.3 (-0.4) mm long. Fruit widely ovate; mericarps more or less rugose, (2.3-) 2.8-3.5 (-4.2) mm long, (1.1-) 1.2-1.5 (-1.8) mm broad, resin ducts 6. Chromosome number: $2n = 22!$ (voucher: Van Wyk 3013).

Notes. *Anginin swellendamense* is easily recognized by the thick, robust, primary stem which is unbranched at the base but branched higher up, and the thick, divided or junciform leaves, densely arranged from the base of the plant upwards. The mature parts (stems, leaves and inflorescences) are invariably glaucous. *A. swellendamense* is similar to *A. tenuior* (q.v.) but is widely distributed, from Worcester in the west to Uniondale in the east (Fig. 3). It appears to be endemic to the Little Karoo, where it often co-occurs with *A. fruticosum* on heavy soils in dry habitats.

Material examined. 3319 (Worcester): S. foothills of Voetpadsberg (-DA), C.M. van Wyk 2389, pro parte (STE); top of Hex River Valley (-DC), Allison 88-90 (JRAU), Van Wyk 2910 (JRAU); Hex River (-BD), Bolus 1079 (BOL), 5165 sheet 1 & 2 (PRE); Worcester (-CB), Allison 119 (JRAU); Karoo Gardens, Worcester (-CB), Allison 82-84 (PRE), Bruyns s.n. sub. NBG

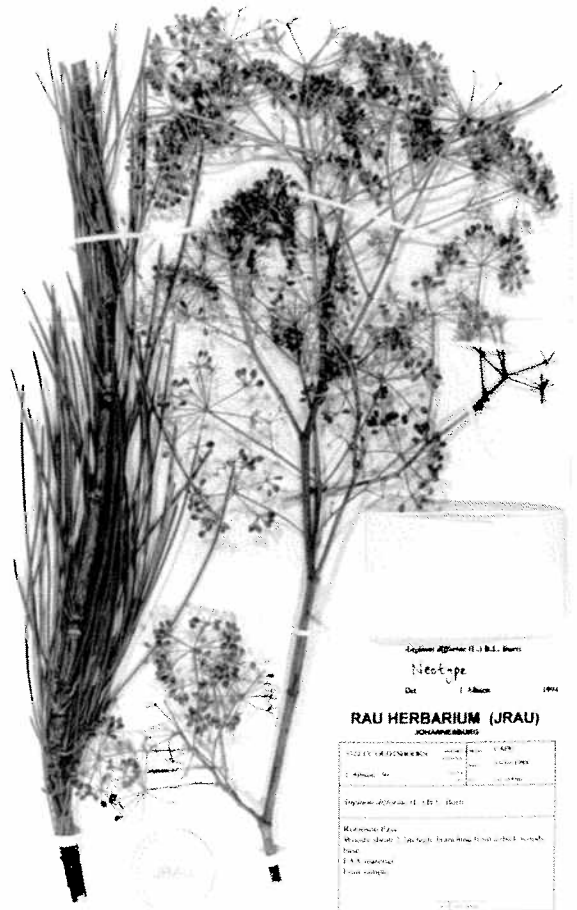


Fig. 5. The neotype of *Anginin difforme*, showing the junciform mature leaves and characteristic fruit.

108626 (NBG), Compton 17936 (NBG), 20366 (BOL, NBG, STE), Leighton 1605 sheet 1 & 2 (BOL), Van Wyk 3013 (JRAU); ca. 50 km from Worcester to De Doorns (-DA), Allison 120 (JRAU); near De Wet (-DA), Esterhuysen 19672 (BOL, NBG, PRE); Burger Pass (-DB), Allison 199 (JRAU); Coo Mountain (-DB), Compton 10270 (NBG), -3320 (Montagu); between Kochmanskloof and Gauritzriver (-CC), Ecklon & Zeyher 2194 (S, SAM); Barrydale (-DC), Allison 72-74 (NBG), Hafström & Acocks 1027 (PRE); ca. 31 km W of Barrydale (-DC), Allison 116-118 (PRE), -3321 (Ladismith); between Anysberg and Ladismith (-AC), Van Wyk 3187 (JRAU); Noukloof Nature Reserve (-CA), Laidler 110 (STE); top of Rooiberg Pass (-DA), Allison 109 (JRAU), Van Wyk 2804 sheet 1-3 (JRAU), -3322 (Oudtshoorn); along Oudtshoorn turn-off from George (-CB), Allison 61, 62 (BOL), 63, 64 (GRA), 65-68, 206

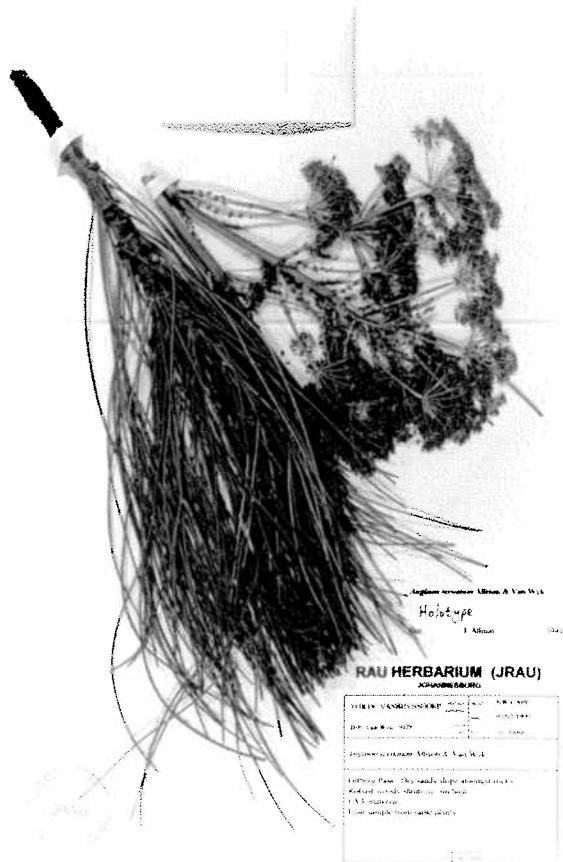


Fig. 6. The holotype of *Anginon ternatum*, showing the equally divided, needle-like, ternate leaves.

(JRAU), 20668 (JRAU), Van Wyk 2963, 2965 (PRE); Paardepoort (-CD), Allison 105 (JRAU), 106, 107 (PRE). -3323 (Willowmore): ca. 2 km NNW of Uniondale (-CA), Brennan 14068 (NBG); Uniondale (-CA), Esterhuysen 19979 sheet 1-3 (BOL), Van Aarde s.n. sub. BOL 45276 (BOL); 7,5 km NNW of Uniondale (-CA), Van Wyk 3254, 3255 (JRAU).

7. *Anginon paniculatum* (Thunb.) B. L. Burt

In Edinb. J. Bot. 48,2: 173 (1991). – Type: South Africa, Cape Province, “e Cap. b. spei”, Thunberg. s.n. (UPS 7054!), lecto., designated here).

Note. There is only one specimen available for lectotypification in Thunberg’s herbarium and we assume that this is the original specimen.

≡ *Sium paniculatum* Thunb., Prodr.: 50 (1794) & Fl.

Cap.: 209 (1818). – Type as above.

≡ *Rhyticarpus paniculatus* (Thunb.) Koso-Poljansky in J. Russe Bot. 1913: 7 (1913), quoad basion. excl. descr., tab. 4; B. L. Burt in Hilliard & Burt, Notes R. Bot. Gard. Edinburgh 45: 91 (1988). – Type as above.

≡ *Lepisma paniculata* E. Mey. in Drège, Zwei Pflanzengeog. Doc. 71, 110, 198 (1843), nom. nudum, pro parte.

Note. Various specimens have been distributed under this name. Drège s.n. a. from Olifantsriver and Drège s.n. b. from Gifberg are *A. paniculatum*; Drège s.n. c. from Enon and Drège s.n. d. from Kuga are both *A. rugosum* (q.v.).

Robust, sparsely branched, woody shrub, up to 4 m high, mature parts invariably glaucous, with a conspicuous white wax layer. Stems usually branched at the base, mostly leafy from the middle of the plant upwards. Leaves relatively uniform; basal leaves triternate with toothed leaflets; upper leaves invariably divided, 4- to 5-pinnate, never junciform, (120-) 159-236 (-287) mm long; petiole and rachis adaxially grooved; lamina virtually absent. Inflorescences apical on long shoots, exceptionally sparse and lax, with primary, secondary and tertiary racemes; lateral racemes terminate in compound umbels; scale-leaves 3-10 mm long; rays (7-) 11-22 (-32) mm long; involucre bracts (1.6-) 1.8-3.0 (-3.4) mm long; involucel bracts (1.2-) 1.4-1.8 (-2.1) mm long. Flowers with pedicels (1.7-) 2.1-3.0 (-3.5) mm long; calyx teeth 0.3-0.4 (-0.5) mm long; petals widely ovate, (0.8-) 0.9-1.0 (-1.1) × 0.7-0.8 (-0.9) mm, inflexed part (0.3-) 0.4-0.5 mm long; resin ducts unbranched; filaments (0.8-) 0.9-1.2 (-1.3) mm long, the uppermost 0.1-0.2 mm inflexed in bud; anthers (0.6-) 0.7 (-0.9) mm long; ovary (0.6-) 0.7-0.8 (-0.9) mm long; stylopodium (0.9-) 1.0-1.3 (-1.4) mm wide, (0.4-) 0.5-0.6 (-0.7) mm high; style (0.1-) 0.2 (-0.3) mm long. Fruit ovate; mericarps more or less rugose; (4.0-) 4.7-5.7 (-6.3) mm long, (1.0-) 1.3-1.7 (-1.9) mm broad; resin ducts 6.

Notes. This species is similar to *Anginon swellendamense*, but differs in the much larger habit (up to 4 m high), the leafless stem bases and the 4- to 5-pinnate leaves, of which the petiole and rachises are adaxially grooved. *A. paniculatum* is geographically isolated from *A. swellendamense* and occurs in the western Cape, from Citrusdal northwards to Clanwilliam, the Nardouw Mountain and the Matsikamma Mountain at Vanrhynsdorp (Fig. 3).

Material examined. 3118 (Vanrhynsdorp): Between Baievlei and Pendorringkraal (-DB), Allison 195 (BOL), 196 (JRAU), 197 (PRE); Gifberg (-DD), Drège s.n. b (S), Marloth 3018, pro parte (PRE); Matsikamma Mountain, 1 km on road to Sewefontein (-DD), Van

Wyk 3337a-c (JRAU); Nardouw Mountain, between Vondeling and Brakvlei (-DD), Van Wyk 3344 (JRAU). -3218 (Clanwilliam): above Clanwilliam Dam (-BB), Taylor 11271 sheets 1-4 (PRE); 38,6 km S of Clanwilliam (-BD), Allison 122 (JRAU) 123 (PRE); National road between Citrusdal and Clanwilliam (-BD), Van Wyk 3025 (JRAU), 3026 (NBG), 3027 (PRE); Olifantsrivier [probably near Citrusdal] (-BD), Drège s.n. a (S). -3219 (Wuppertal): 8 km N of Citrusdal (-CA), Van Wyk 2902 (E). Without precise locality: "e Cap. b. spei", Thunberg s.n. sub UPS 7054 (UPS).

8. *Anginon rugosum* (Thunb.) Raf.

Good Book Amenit. Nat. Philad.: 56 (1840) [reimp. Scad. Gen. Omb. Pl. 56 (Amer. Midl. Nat. Repr. No. 3, 1913), original not seen]; Merrill, Index Rafinesquianus: 178 (1949); B.L. Burtt in Hilliard & Burtt, Notes R. Bot. Gard. Edinburgh 45: 90 (1988); B. L. Burtt in Edinb. J. Bot. 48,2: 176 (1991). – Type: South Africa, Cape Province, "e Cap. b. spei", Thunberg s.n. (UPS 6875!, lecto., designated here; S!, isolecto.).

Note. The only available specimen in the Thunberg herbarium is an obvious choice of lectotype, despite the locality details on the reverse of the sheet (cited above) which do not match the original citation ("Hantam Mountains"). The rugose fruit agrees with the diagnosis and the plant almost certainly came from the eastern Cape. A similar inaccuracy was found in the type locality of *Lotononis decumbens* Thunb., an eastern Cape endemic species said to be from the "Roggeveld" (Van Wyk 1991). This suggests that some of Thunberg's eastern Cape specimens were inadvertently confused or mixed with his north-western Cape collections.

≡ *Conium rugosum* Thunb. Prodr. Pl. Cap.: 50 (1794), Fl. Cap. 2: 203 (1818). – Type as above.

≡ *Rhyticarpus rugosus* (Thunb.) Sond. in Fl. Cap. 2: 540 (1862), pro parte; Wolff in Engl., das Pflanzenreich IV, 228: 177 (1910), pro parte. – Type as above.

= *Anginon uitenhagense* (Eckl. & Zeyh.) B.L. Burtt in Edinb. J. Bot. 48,2: 176 (1991), *synon. nov.* – Type: South Africa, Cape Province, Uitenhage, Zwartkoprivier, Ecklon & Zeyher 2193 (S!, lecto., designated here; SAM!, 3x, isolecto.).

≡ *Trinia uitenhagensis* Eckl. & Zeyh., Enum.: 340 (1837). – Type as above.

= *Rhyticarpus paniculatus* sensu Koso-Poljansky in J. Bot. Russe 1913: 7 (1913), *quoad desc. et tab. 4. excl. basion.*

= [*Lepisma paniculata* E. Mey. in Drège, Zwei Pflanzengeog. Doc.: 131, 133, 198 (1843) *nom. nud.*, pro parte].

Slender, sparsely branched, woody shrub, up to 1.5 m

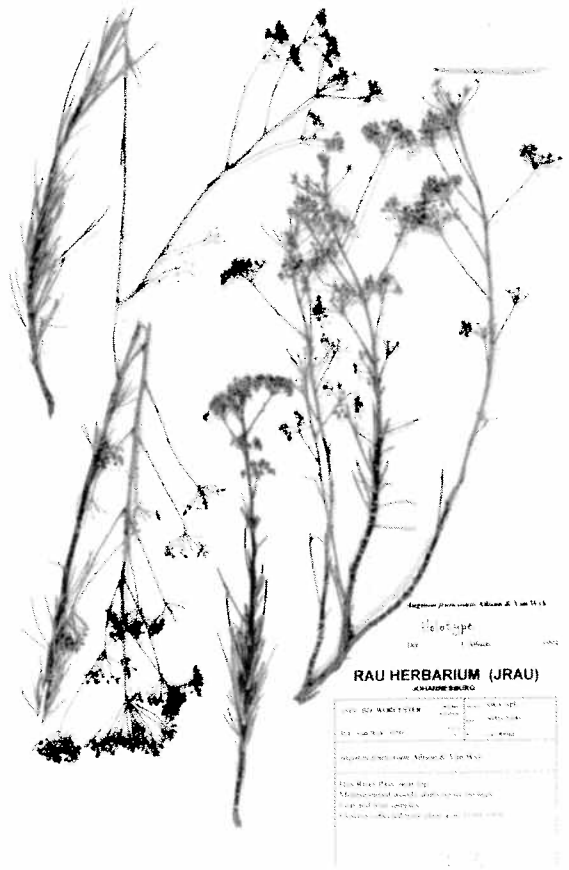


Fig. 7. The holotype of *Anginon fruticosum*, showing the unequally divided mature leaves and small, congested inflorescence.

high, mature parts invariably glaucous, with a conspicuous white wax layer. Stems branched at the base, mostly leafy from the middle of the plant upwards. Leaves relatively uniform but very variable on each leaf cluster; basal leaves triternate with flat toothed leaflets; upper leaves much reduced, invariably divided, 3-pinnate, the segments slender but never junciform, (42-) 77-162 (-202) mm long; petiole and rachis adaxially grooved; lamina virtually absent. Inflorescences apical on long shoots, sparse, with primary and secondary racemes; lateral racemes terminate in compound umbels; scale-leaves 4-8 mm long; rays (12-) 19-33 (-44) mm long; involucre bracts (1.4-) 1.9-3.2 (-3.9) mm long; involucel bracts (1.2-) 1.4-2.1 (-2.4) mm long. Flowers with pedicels (2.2-) 3.0-5.2 (-7.3) mm long; calyx teeth (0.3-) 0.4-0.5 (-0.6) mm long; petals very widely ovate, (0.8-) 0.9-1.0 (-1.1) × (0.9-) 1.0-1.1 mm, inflexed part 0.4-0.6

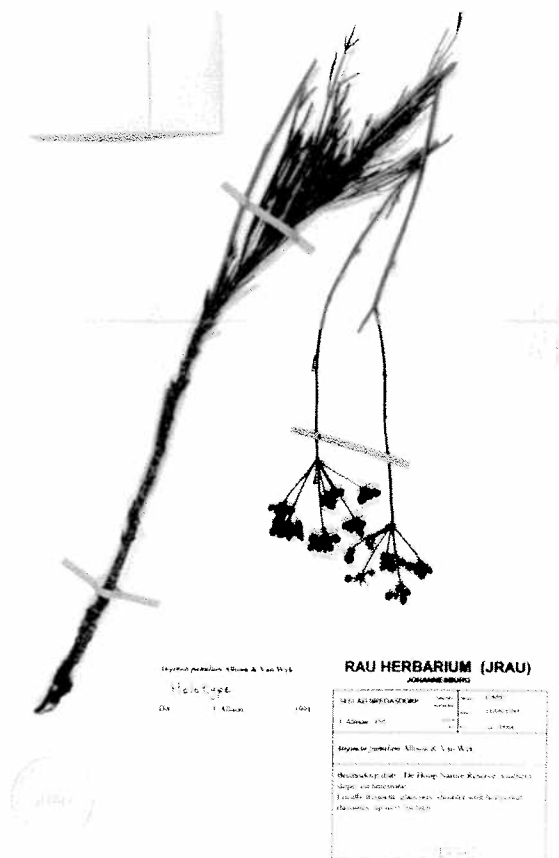


Fig. 8. The holotype of *Anginin pumilum*, showing the dwarf habit and slender, divided mature leaves and sparse inflorescence.

mm long; resin ducts unbranched; filaments (1.0-) 1.2-1.7 (-2.2) mm long, the uppermost 0.1-0.2 mm inflexed in bud; anthers 0.7-0.8 (-0.9) mm long; ovary (0.9-) 1.0-1.1 (-1.2) mm long; stylopodium 1.0-1.6 (-1.5) mm wide, (0.6-) 0.7-0.8 (-0.9) mm high; style 0.2-0.3 mm long. Fruit very widely ovate; mericarps rugose, (2.2-) 2.4-3.0 (-3.2) mm long, 1.3-1.5 (-1.6) mm broad, resin ducts 6.

Notes. This species is similar to *Anginin paniculatum*, but differs in the smaller habit and particularly in the marked difference between the lower and upper leaves of each leaf cluster. The lower leaves are laminate, while the upper are 3-pinnate, with reduced, slender segments. The lower and upper mature leaves of *A. paniculatum* are all 4- to 5-pinnate. *A. rugosum* is geographically isolated from its close relatives and has been recorded only from the eastern Cape (Fig. 3), where it is usually associated with limestone areas.

Material examined. 3324 (Steytlerville): Kouga Mountains, on plateau just north-west of Geelhoutboskloof (-CA), Vlok 2630 (JRAU); Kuga (-DB), Drège s.n. d (S). -3325 (Port Elizabeth): Addo Park, on Zuurkop (-BD), Liebenberg 7725 sheet 1 & 2 (PRE); Zwartkopsrivier, (-CD), Ecklon & Zeyher 2193 sheets 1-3 (S, SAM), Zeyher 335 (SAM); Redhouse (-DC), Paterson 456 sheet 1 (BOL), sheets 2 & 3 (GRA). -3326 (Grahamstown): 2.4 km from Reed Valley to Paterson (-AC), Allison 208 (BOL), 209 (GRA), 210 (JRAU), 211 (NBG), 212 (PRE), 213 (E), Archibald 3955 (PRE); Grahamstown (-BC), MacOwan 1614 (BOL, GRA). Without precise locality: Thunberg s.n. (S), s.n. sub UPS 6875 (UPS).

9. *Anginin streyi* (Merxmüller) Allison & Van Wyk, comb. nov.

Type: Namibia, Buellspoor, Bez. Rehoboth, Grenzkopf, Strey 2154 (M!, lecto., designated here; K!, PRE! 3x, isolecto.).

≡ *Sonderina streyi* Merxmüller in Mitt. Bot. Staats. München 1: 19-20 (1950). – Type as above.

Note: We lectotypify this species merely because the specimen in M was not explicitly designated as the holotype.

Sparingly branched shrub, woody at least at the base, up to 1.2 m high, mature parts green, not glaucous. Stems branched at the base, sparsely leafy. Leaves relatively uniform; basal leaves biternate with toothed leaflets; upper leaves invariably laminate, much divided, never needle-like or junciform, (65-) 87-124 (-135) mm long; petiole and rachis adaxially grooved; lamina invariably present, finely divided into small segments. Inflorescences apical on long shoots, sparse, with primary and secondary racemes; lateral racemes terminate in compound umbels, very rarely with some simple umbels; scale-leaves 2-3 mm long; rays (16-) 18-40 (-45) mm long; involucre bracts 0.8-1.5 mm long; involucre bracts 0.7-1.0 mm long. Flowers with pedicels 4.0-5.0 (-6.0) mm long; calyx teeth 0.4-0.6 mm long; petals widely ovate, 0.6-0.8 × 0.5-0.7 mm, inflexed part 0.3-0.4 mm long; resin ducts unbranched; filaments ± 0.8 mm long, the uppermost 0.1-0.2 mm inflexed in bud; anthers (0.4-) 0.5-0.6 (-0.7) mm long; ovary (0.3-) 0.4-0.6 mm long; stylopodium 0.7-0.8 (-1.0) mm wide, 0.3-0.4 (-0.6) mm high; style (0.1-) 0.2-0.4 mm long. Fruit widely depressed ovate; mericarps more or less smooth, ± 2 mm long, ± 1.5 mm broad; resin ducts 6.

Notes. *Anginin streyi* is closely related to *A. verticillatum*, but can be distinguished by the lateral racemes which predominantly terminate in compound umbels and only rarely in simple umbels as in the latter. The

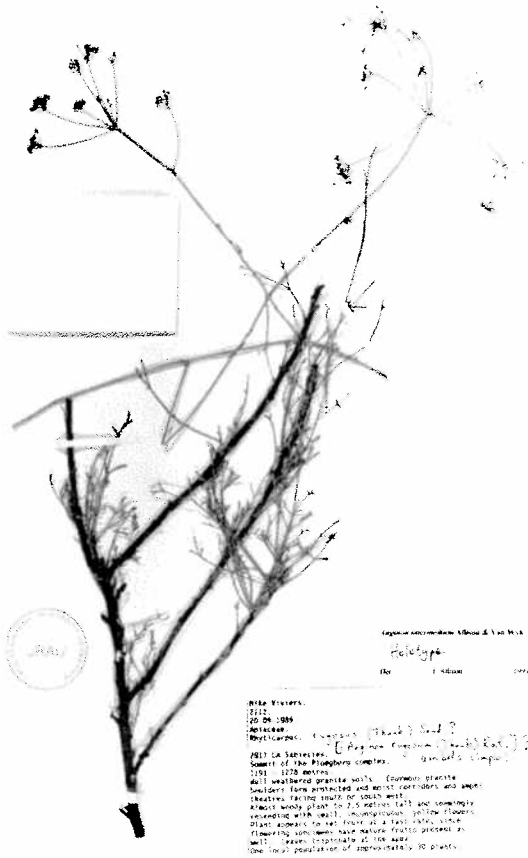


Fig. 10. The holotype of *Anginon intermedium*, showing the slender, partially laminate leaves and the simple umbels.

meesberg (-BD), Allison 170 (E), 171 (JRAU), 172 (K), 173 (NBG), 174, 175 (PRE), 176 (SAM). -2817 (Vioolsdrif): Hillsides near Verleptpram (-AA), Dr'ège s.n. a (K, S); top and upper eastern slopes of Ploegberg (-CA), Allison 177 (E), 178 (JRAU), 179 (K), 180, 181 (NBG), 182 (PRE); base of Cone Peak, ca. 10 km south of the Orange River (-CC), Williamson s.n. (JRAU). -2917 (Springbok): Sandhoogte, S of Nababiep (-DB), Hugo 3039 sheet 1 & 2 (PRE); top of Nababiepsberg (-DB), Allison 189 (JRAU). -3018 (Kamiesberg): Kamiesberg Pass (-AC), Allison 191 (JRAU), 192 (NBG), 193 (PRE); near Kammapas (-AC), Zeyher s.n. (S). -3019 (Calvinia): Kubiskouw Mountain (-CD), Marloth 12861 (PRE) [not typical]. -3220 (Sutherland): NW of Klipbank River (-CB), Acocks 16965 (PRE) [not typical].

11. *Anginon intermedium* Allison & Van Wyk, sp. nov.

Anginon fruticoso similis, sed inflorescentiae structura, ramis lateralibus in umbellis singularibus terminantibus (in *A. fruticoso* in umbellis compositis terminantibus) et petalis canalibus resiniferis non ramosis (in *A. fruticoso* ramosis) differt. Species etiam *A. verticillato* similis, sed foliis maturis acicularibus (in *A. verticillato* plerumque laminatus) differt. – Typus: South Africa, Cape Province, Vioolsdrif distr., summit of the Ploegberg complex, Viviers 2112 (PRE, holo.; NBG, iso.).

Much-branched, woody shrub, 1.0-2.5 m high; mature parts green, not glaucous. Stems branched at the base, mostly leafy from the base upwards. Leaves variable; basal leaves biternate with toothed leaflets; upper leaves laminate or needle-like, often finely and unequally divided, sometimes junciform, (37-) 49-96 (-144) mm long; petiole and rachis adaxially grooved; lamina present on some leaves, absent on others. Inflorescences apical on long shoots, somewhat sparse, with primary and secondary racemes; lateral racemes terminate in simple umbels; scale-leaves not seen; rays (25-) 32-59 (-70) long; involucre bracts (1.8-) 1.9-2.3 (-2.6) mm long; involucre bracts (1.1-) 1.2-1.7 (-1.8) mm long. Flowers with pedicels (3.3-) 3.8-6.1 (-7.4) mm long; calyx teeth 0.3 (-0.4) mm long; petals widely ovate, 0.9-1.1 (-1.3) × (0.8-) 0.9-1.0 mm, inflexed part 0.6-0.8 (-0.9) mm long; resin ducts unbranched; filaments (1.0-) 1.1-1.2 (-1.3) mm long, the uppermost 0.1 (-0.2) mm inflexed in bud; anthers 0.7 (-0.8) mm long; ovary (1.1-) 1.2-1.5 (-1.6) mm long; stylopodium (1.0-) 1.1-1.4 mm wide, 0.4-0.6 (-0.7) mm high; style 0.2-0.4 mm long. Fruit unknown.

Notes. This species is similar to *Anginon fruticosum* but differs in the lateral racemes which terminate in simple umbels (compound in *A. fruticosum*) and also in the unbranched resin ducts of the petals (branched in *A. fruticosum*). The leaves (Fig. 10) are longer than in *A. fruticosum* and vary from totally laminate (lower parts of the stem), to laminate only at the apex (middle of the stem), to junciform and without any lamina (upper part of the stem, directly below the inflorescence). This species is also similar to *A. verticillatum*, but differs in the junciform or nearly junciform mature leaves (invariably laminate in the latter). *A. intermedium* co-occurs with *A. verticillatum* and *A. difforme* at several localities in Namaqualand (Fig. 2) but we have not found any evidence of hybridization or introgression.

Material examined. 2817 (Vioolsdrif): Summit of the Ploegberg complex (-CA), Viviers 2112 (NBG, PRE). -2917 (Springbok): Top of Nababiepsberg (-DB), Alli-

son 188 (JRAU). -3018 (Kamiesberg): Kamiesberg Pass (-AC), Allison 190 (JRAU), 194 (PRE). -3119 (Calvinia): Hantam Mountain, kloof north of Calvinia (-BD), Marloth 10278 (STE).

12. *Anginon jaarsveldii* B. L. Burt

In Edinb. J. Bot. 48,2: 256 (1991) [see also pp. 173-175]. – Type: NW Cape, 2919AA, Groot Pellaberg, south slope just below krantz, dry rocky area with xerophytic plants, 1,2 m high, 10 viii 1982, Van Jaarsveld & Paterson 6723 (E, holo, NBG, iso.).

Note. We have not seen the type specimens, but studied the only known population in situ (Ernst van Jaarsveld kindly accompanied us on a field trip in 1991).

Much-branched, rounded, woody shrub, 1-2 m high; mature parts yellowish green, not glaucous. Stems repeatedly branched from the base upwards, more or less leafy from the base upwards. Leaves relatively uniform; basal leaves biternate with entire leaflets; upper leaves 3-pinnate, invariably divided, never needle-like or juncoform, (23-) 28-50 (-72) mm long; petiole and rachis adaxially grooved; lamina invariably present, slender, narrowly oblong. Inflorescences mostly apical on long shoots, rarely on short shoots, relatively short and somewhat congested, invariably with only primary divisions; lateral racemes terminate in simple umbels; scale-leaves 2-4 mm long; rays (11-) 19-34 (-48) mm long; involucre bracts (1.9-) 2.1-2.9 (-3.1) mm long; involucre bracts (1.0-) 1.1-1.3 (-1.4) mm long. Flowers with pedicels (2.4-) 3.1-5.1 (-7.3) mm long; calyx teeth 0.4 (-0.5) mm long; petals widely ovate, 0.9-1.1 (-1.2) × (0.6-) 0.7-0.8 (-0.9) mm, inflexed part (0.4-) 0.5-0.6 (-0.7) mm long; resin ducts unbranched; filaments (0.8-) 1.0-1.3 (-1.5) mm long, the uppermost 0.1-0.2 mm inflexed in bud; anthers (0.7-) 0.8 (-0.9) mm long; ovary (0.7-) 0.8-1.0 mm long; stylopodium 0.8-1.1 (-1.2) mm wide, (0.4-) 0.5-0.6 (-0.7) mm high; style 0.2-0.4 mm long. Fruit depressed ovate; mericarps usually not wrinkled, with small translucent dots (substomatal cavities) on a smooth surface, (1.6-) 1.8-2.3 (-3.0) mm long, (1.2-) 1.3-1.6 (-2) mm broad, resin ducts 6, rarely 8.

Notes. *Anginon jaarsveldii* is a distinctive species, easi-

ly recognised by the densely branched and rounded habit and the slender, pinnate leaves. It is known only from Pella Mountain in the northern Cape Province (Fig. 4).

Material examined. 2919 (Pofadder): Upper south-western slopes of Pella Mountain (-AA), Allison 162 (BOL), 163, 164 (E), 165, 166 (JRAU), 167 (K), 168 (NBG), 169 (PRE).

Acknowledgements - We thank the directors and staff of the cited herbaria for sending loans of specimens and for allowing us to study their material. Our sincere thanks to Mr B. L. Burt, for sending us some specimens of *Anginon* and also for his valuable advice and the interest he has shown in this project. We also wish to thank Dr D. J. B. Killick for translating the diagnoses. Financial support from the Rand Afrikaans University and the Foundation for Research Development is gratefully acknowledged.

References

- Briquet, J. 1897a. Examen critique de la théorie phylloclique de feuilles entières chez les Umbellifères terrestres. – Bulletin de l'Herbier Boissier 5(6): 424-443.
– 1897b. Sur la carpologie et la systématique du genre *Rhyticarpus*. – Bulletin de l'Herbier Boissier 5(6): 444-452.
Burt, B. L. 1988. Umbelliferae. – In: Hilliard O. M. & Burt B. L. Notes on some plants of southern Africa. XIV. Umbelliferae. Notes R. Bot. Gard. Edin. 45: 90-94.
– 1991. Umbelliferae of southern Africa: an introduction and annotated checklist. – Edinburgh J. Bot. 48(2): 133-282.
Drude, O. 1898. Umbelliferae. – In: Engler, A. & Prantl, K. (eds), Die natürlichen Pflanzenfamilien 3(8): 182. Engelmann, Leipzig.
Sonder, O. W. 1862. *Rhyticarpus*; *Bupleurum*. – In Harvey, W. H. & Sonder, O. W. (eds), Flora Capensis 2, pp. 540-541. Hodges Smith, Dublin.
Van Wyk, B-E. 1991. A synopsis of the genus *Lotononis* (Fabaceae: Crotalariaeae). – Contr. Bol. Herb. 14: 1-292. University of Cape Town.
– , Allison, I. & Tilney, P. M. 1997. Morphological variation and phylogenetic relationships in the genus *Anginon* (Apiaceae). Nord. J. Bot. 17: 465-480.
Wolff, H. 1910. Umbelliferae - Apioideae - Ammineae Heteroclitae. – In: Engler, A. (ed.), Das Pflanzenreich IV. 228: 1-17, 175-178.

Review

Barneby, R. C. & Grimes, J. W. 1996. Silk Tree, Guanacaste, Monkey's Earring. A Generic System for the Synandrous Mimosaceae of the Americas, Part. 1. Abarema, Albizia, and Allies. – Memoirs of The New York Botanical Garden vol. 74, Part I. The New York Botanical Garden, Bronx, New York. ISBN 0-89327-395-3. 292 pages. 45 USD.

This is the long awaited, first part of the revision of all American bipinnate Ingeae (Leguminosae-Mimosoideae) dealing with the genera *Hydrochorea*, *Balizia*, *Abarema*, *Hesperalbizia*, *Pseudosamanea*, *Samanea*, *Blanchetiodendron*, *Leucocloron*, *Chloroleucon*, *Sphinga*, *Havardia*, *Ebenopsis*, *Painteria*, *Macrosamanea*, *Albizia*, *Enterolobium*, *Cedrelinga*, *Falcataria*, *Paraserianthes*, *Lysiloma*. In the second, forthcoming part the genera *Calliandra*, *Cojoba*, *Pithecellobium*, and *Zygia* will appear.

Since the revision of the Ingeae by G. Bentham (1875) nobody has dared to dig into this extremely speciose group of American Mimosoideae until recently when Barneby & Grimes dealing with the bipinnate Ingeae and T. D. Pennington (The genus *Inga*, Botany, The Royal Botanic Gardens, Kew 1997. ISBN 1 900347 12 1. 844 pages) with the about 250 spp. of the genus *Inga* made two major contri-

butions to our knowledge of New World Ingeae.

The present volume contains chapters on the: "Anatomy and morphology of the *Pithecellobium* complex", "Characters, Phylogenetic Analysis, and Classification of Ingeae", "Key to the genera of Ingeae native, naturalised, and planted in the Americas", and lists the above mentioned genera in four groups: The *Abarema*, the *Samanea*, the *Chloroleucon*, and the *Pithecellobium*-alliances. Chapters on the Literature Cited, Numerical List of Taxa, List of Numbered Exsiccatae, and Index to Scientific Names concludes the volume.

The keys to both genera and species are pragmatic and clear. The descriptions are long and meticulous. Under each species notes are given on the autecology, the distribution, salient characters, and taxonomic history. The illustrations are few, but excellent. The distribution maps are clear, but suffer from the uneven quality of the base maps.

As pointed out by the authors future work on e.g. the molecular taxonomy, the cytology, the seedlings, and the wood anatomy shall reveal if this new classification can stand the test of time. The African-Madagascan species of the group also need to be taken into consideration.

The authors and the publisher are to be congratulated on this book, which deserve a place on the book shelves of botanical libraries, in herbaria, and which moreover can be used in advanced teaching in taxonomy and phylogeny.

Ivan Nielsen