

A taxonomic account of *Agathelpis*, *Globulariopsis* and *Gosela* (Selaginaceae)

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Three minor genera of the Selaginaceae, *Agathelpis* Choisy, *Globulariopsis* Compton and *Gosela* Choisy, are revised. *Globulariopsis* and *Gosela* are both retained as monospecific genera. *Agathelpis* is reduced to two species by combining *A. parviflora* (Berg.) Choisy with *A. dubia* (L.) Hutch. Reference is also made to two of the other minor genera, *Cromidon* Compton and *Tetraselago* Junell.

Drie van die kleiner genusse van die Selaginaceae, *Agathelpis* Choisy, *Globulariopsis* Compton en *Gosela* Choisy, is hersien. *Globulariopsis* en *Gosela* is albei as monospesifieke genusse behou. *Agathelpis* is na twee spesies verminder deur die kombinerings van *A. parviflora* (Berg.) Choisy met *A. dubia* (L.) Hutch. Daar word ook na twee ander kleiner genusse, *Cromidon* Compton en *Tetraselago* Junell verwys.

Keywords: *Agathelpis*, *Globulariopsis*, *Gosela*, Scrophulariaceae, Selaginaceae

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Introduction

The family Selaginaceae (Scrophulariaceae — Selaginaceae of some authors) currently comprises 10 genera that can be artificially divided into two groups: four major and six minor genera. All are African, with the exception of one species of *Walafrida* E. Mey., which is found in Madagascar.

The family began to take its current form with Choisy's revision (1823). He recognized six genera, four of which were then newly described by him (only five of those genera now stand, *Polycenia* Choisy having been reduced to *Hebenstretia* L.). The major genera recognized today are *Hebenstretia* (Linnaeus 1753), *Selago* L. (1753), *Dischisma* Choisy (1823) and *Walafrida* (Meyer 1835). Only *Hebenstretia* and *Dischisma* have been looked at critically in recent years (Roessler 1979); the most up-to-date accounts of *Selago* and *Walafrida* date from Rolfe in *Flora Capensis* (1901).

In this paper, three of the minor genera are discussed, namely *Agathelpis* Choisy (1823), *Gosela* Choisy (1848) and *Globulariopsis* Compton (1931). Compton described *Cromidon* in 1931 to accommodate *Selago corrigioloides* Rolfe, in which he found the bract adnate to the calyx and the corolla 4-lobed. He mistakenly thought that these characters were foreign to *Selago*. There are several more species that are clearly congeneric with *C. corrigioloides* (Rolfe) Compton. It may be that the genus can be retained for these but new diagnostic characters must be found. This is under study by Dr O.M. Hilliard, Royal Botanic Garden, Edinburgh. *Tetraselago* Junell was established in 1961 and introduced a new dimension to Selaginaceae: there are two ovules in each loculus and the fruit is a dehiscent capsule. The four species of *Tetraselago* were all originally described in *Selago* (see Hilliard & Burt 1977, p. 175).

Key (adapted from Dyer 1975)

- 1a Fertile stamens 4; corolla tube about the same length as the bract **2. *Globulariopsis***
- 1b Fertile stamens 2, with or without 2 staminodes; corolla tube two or more times longer than bract **2**
- 2a Calyx densely hairy; 2 staminodes present; ovary 2-locular with 1 ovule in each locule **3. *Gosela***
- 2b Calyx glabrous; staminodes absent; ovary unilocular by abortion with a single ovule **1. *Agathelpis***

1. *Agathelpis* Choisy

Agathelpis Choisy in Mémoire sur la famille de Sélaginées, lu a la Société de Physique et d'Histoire naturelle de Genève: 15 (1823); Harvey: 293 (1868); Rolfe: 178 (1901); Phillips: 553 (1926); Phillips: 678 (1951); Dyer: 561 (1975). Lectotype: *Agathelpis angustifolia* (L.) Choisy [= *A. dubia* (L.) Hutch.].

Small low, heath-like shrublet without axillary brachyblasts (dwarf shoots). Leaves more or less spiralled, linear, ericoid, sessile, dense. *Inflorescence* spicate, short or elongate, lax or compact. *Bract* adnate for about one-quarter the length of the calyx. *Calyx* tubular, 5-lobed, persistent. *Corolla* 5-lobed, tube slender, spreading. *Stamens* 2, usually included; filaments adnate to corolla tube for almost entire length; anthers monotheous. *Nectary* small, obovate, basal, to one side of ovary. *Gynoeceum*: stigma linear; style tapering; ovary superior, unilocular by abortion, 1-seeded. Fruit a nutlet.

Linnaeus' genus, *Eranthemum*, included a great number of dissimilar species that were grouped together on the basis of possessing only two stamens and even Linnaeus (1753) indicated that some species of *Eranthemum* would be better placed in *Selago* L. Vahl (1804) transferred all but one species of *Eranthemum* to either *Justicia* L. or *Selago*. Choisy (1823) removed two species

[*A. angustifolia* (L.) Choisy and *A. parvifolia* (L.) Choisy] from *Selago* and created a new genus *Agathelpis* Choisy to accommodate them.

Choisy (1823) chose the name *Agathelpis* because this name means 'good hope' and refers to what he called the 'fairest Cape', that is, the Cape of Good Hope. The name is appropriate, as both species are endemic to the south-western Cape. Species of *Agathelpis* are usually associated with the lower slopes of mountains, although they are sometimes found at much higher altitudes. The plants are not conspicuous, but are often overlooked as they are small, insignificant, heath-like shrublets, usually found amongst small fynbos species in very exposed, dry and rocky places. Flowering occurs during the summer, and although the flowers are quite small, they are strongly fragrant in the evening. The whole plant bears a strong resemblance to certain members of the Thymelaeaceae and the genus has been referred to that family in the past (Burmam 1738).

Six species of *Agathelpis* have been described, but the genus was reduced to three species by Rolfe (1901): *Agathelpis angustifolia* Choisy [that is, *A. dubia* (L.) Hutch.]; *A. nitida* E. Mey. and *A. parvifolia* (L.) Choisy [that is, *A. parviflora* (Berg.) Hutch.]. In our treatment the genus comprises only two species because *A. parviflora* is reduced to a synonym of *A. dubia*.

Key to the species

- Bracts one-quarter to one-third the length of the corolla tube, 3.5–8.0 × 0.9–3.0 mm, not shiny; flowers yellow, with a yellow tube and maroon lobes or entirely maroon **1.1 *A. dubia***.
- Bracts one-half to three-quarters the length of the corolla tube, 6.0–9.7 × 2.5–3.8 mm, shiny; flowers cream-white **1.2 *A. nitida***

1.1 *Agathelpis dubia* (L.) Hutch., A botanist in southern Africa: 127 (1946); Levyns: 725 (1950); Wijnands: 192 (1983). Iconotype: Burmann: 130, Plate 47, figure 3 (1738) [designated as lectotype by Wijnands (1983)].

Selago dubia L.: 629 (1753).

Eranthemum angustatum L.: 171 (1771) nom. illeg., based on the type of *Selago dubia* L.; Murray: 57 (1784), as *angustifolium*. *Selago angustifolia* (L.) Thunb.: 98 (1794). *Agathelpis angustifolia* (L.) Choisy: 25 (1823); Drège: 74 (1844); Choisy: 23 (1848); Rolfe: 343 (1884); Rolfe: 178 (1901).

Eranthemum parviflorum Berg.: 2 (1767); L.: 171 (1771), as *E. parvifolium*. *Agathelpis parviflora* (Berg.) Choisy: 95 (1823), as *A. parvifolia*, Hutch.: 567 (1946). Type: Cape Province, without precise locality, *Bergius s.n.* (STB, holo., photostat copy seen).

Agathelpis adunca E. Mey.: 252 (1835). Type: Cape Province, Groenkloof, *Drège s.n.* (B, holo., presumed destroyed; G, iso.!).

Agathelpis brevifolia E. Mey.: 253 (1835). Type: Cape Province, Honigvalei, *Drège s.n.* (B, holo., presumed destroyed; G, iso.!).

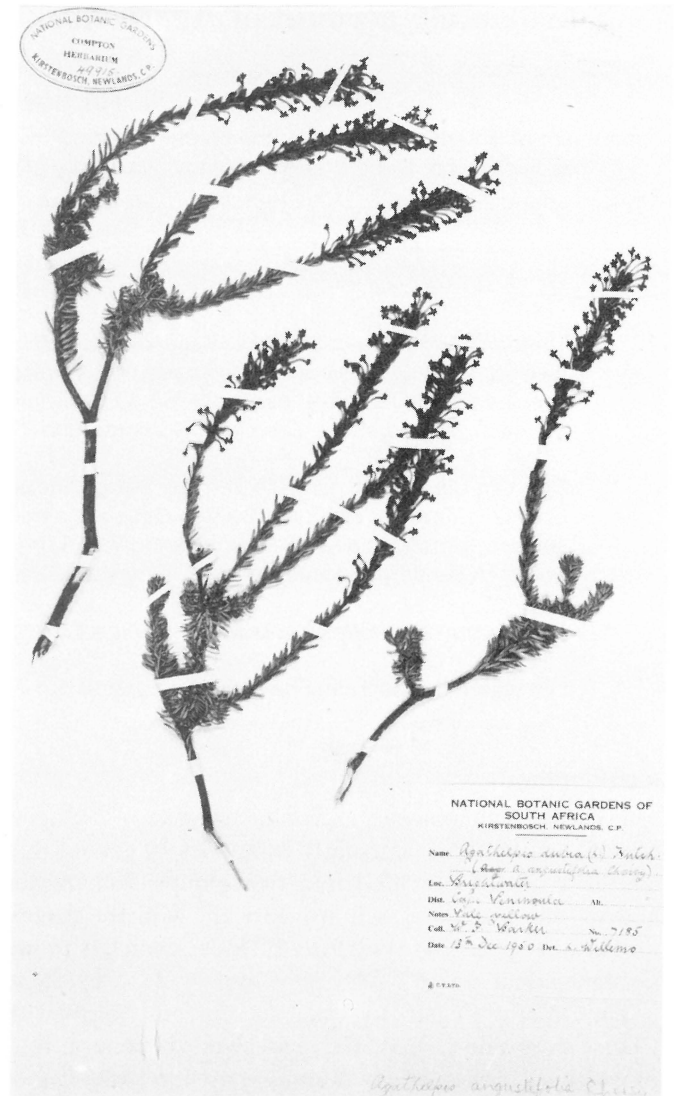


Figure 1 Habit, leaf shape and inflorescence of *Agathelpis dubia* (L.) Hutch., Barker 7185 (NBG) (× 0.3).

Agathelpis mucronata E. Mey.: 252 (1835). Type: Cape Province, Witzenberg, *Ecklon & Zeyher 1383* (B, holo., presumed destroyed; G, iso.!, BOL!, SAM!, STE!).

Small, heath-like shrublet, 0.3–0.7 m tall. *Stem* terete, branching 50–100 mm above the ground, brown and woody below, brown to green above. *Leaves* numerous, linear, 5–15 × 1.0–2.4 mm; lower leaves usually longer than upper. *Spike* ovoid-rotund to elongate or short, compact or lax, many-flowered, terminal, 4–45 mm long. *Bract* persistent, eventually deflexed, ovate-oblong, 3.5–8.0 × 0.9–3.5 mm, slightly keeled, glabrous; apex acute. *Flowers* entirely yellow, or with yellow lobes and maroon tube, or entirely maroon; scented at night. *Calyx* 5-lobed, oblong, 2.5–3.0 mm long, lobes short, obtuse-oblong, usually with trichomes on the lobes adjacent to the bract. *Corolla* 5-lobed, 1.2 × 0.7 mm, 2 posterior lobes partially fused; tube long and slender, 9.5 × 0.7 mm, often curved through 90 degrees. *Stamens* 2, usually included or just emerging from the throat; anthers monothealous, thecae 1.25 × 0.25 mm.

Nectary pale yellow-green, one-quarter of the length of the ovary. *Gynoeceium*: *stigma* linear, 1.1 mm long, 0.2 mm wide at apex tapering to 0.15 mm wide at base; *style* linear, terete, slender, 8.0 mm long, 0.1 mm in diameter; ovary 1.0 × 0.4 mm; ovule solitary, pendulous. *Fruit* a hard, light brown nutlet enclosed within the persistent bract and calyx, which are deflexed when mature. (Figures 1 & 2).

Taxonomic history

Linnaeus (1753) used the binomial, *Selago dubia*, for a plant that he knew 'from the literature only' (Wijnands 1983) and that Burmann (1738) had described as '*Thymelaea foliis angustissimis linearibus, flosculis spicatis*'. Later, he changed the name to *Eranthemum angustatum*, clearly because the epithet '*dubia*' was not

appropriate (Linnaeus 1771), and later Murray transcribed the name as *E. angustifolium* (1784). Vahl transferred the species back to *Selago* in 1804, after which Choisy (1823) transferred it to his new genus *Agathelpis*, as *A. angustifolia*. This name is still in use (Bond & Goldblatt 1984), in spite of Hutchinson having made the correct combination, *A. dubia* (L.) Hutch., in 1946. In 1983, Wijnands validated the name by citing the basionym and gave the authority as Hutch. ex Wijnands. However, citation of the basionym became obligatory only after 1 January 1953, (I.C.B.N., Article 33.2) and therefore Wijnand's validation was unnecessary and Hutchinson's combination is accepted.

Bergius named a species *Eranthemum parviflorum* in 1767, but although Linnaeus based his species on the Bergian specimen he misquoted it as *E. parvifolium*

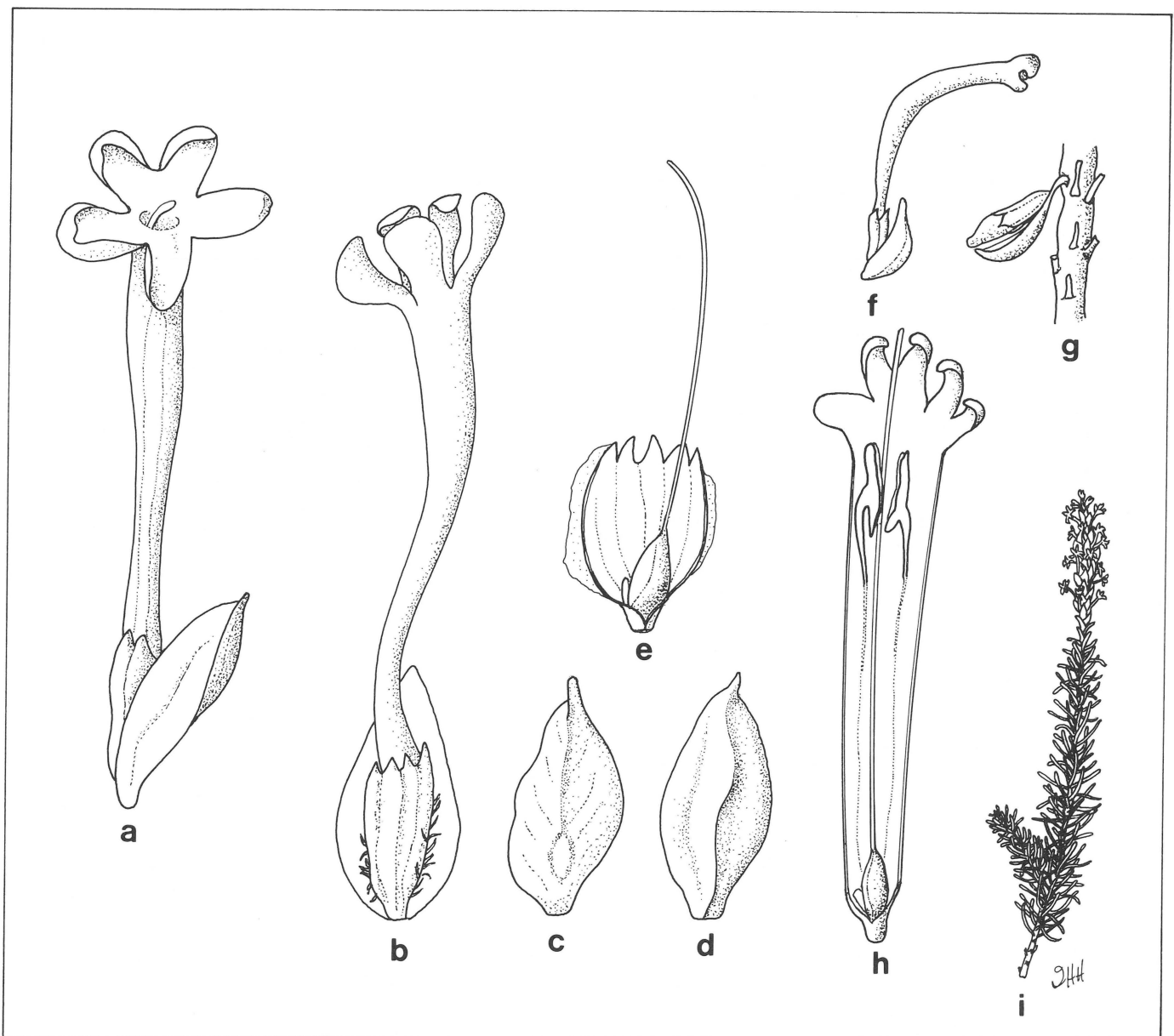


Figure 2 Diagram of *Agathelpis dubia* (L.) Hutch. showing (a) flower and bract ($\times 9$); (b) flower showing trichomes on calyx ($\times 9$); (c) adaxial view of bract ($\times 9$); (d) abaxial view of bract ($\times 9$); (e) dissected calyx and gynoeceium ($\times 9$); (f) young flower, showing 90-degree bend ($\times 4.4$); (g) part of mature inflorescence, showing nutlet included in persistent bract and calyx (deflexed) ($\times 4.4$); (h) dissected flower showing gynoeceium and androecium ($\times 9$) and (i) habit ($\times 0.4$), drawn from Hartley 325 (J).

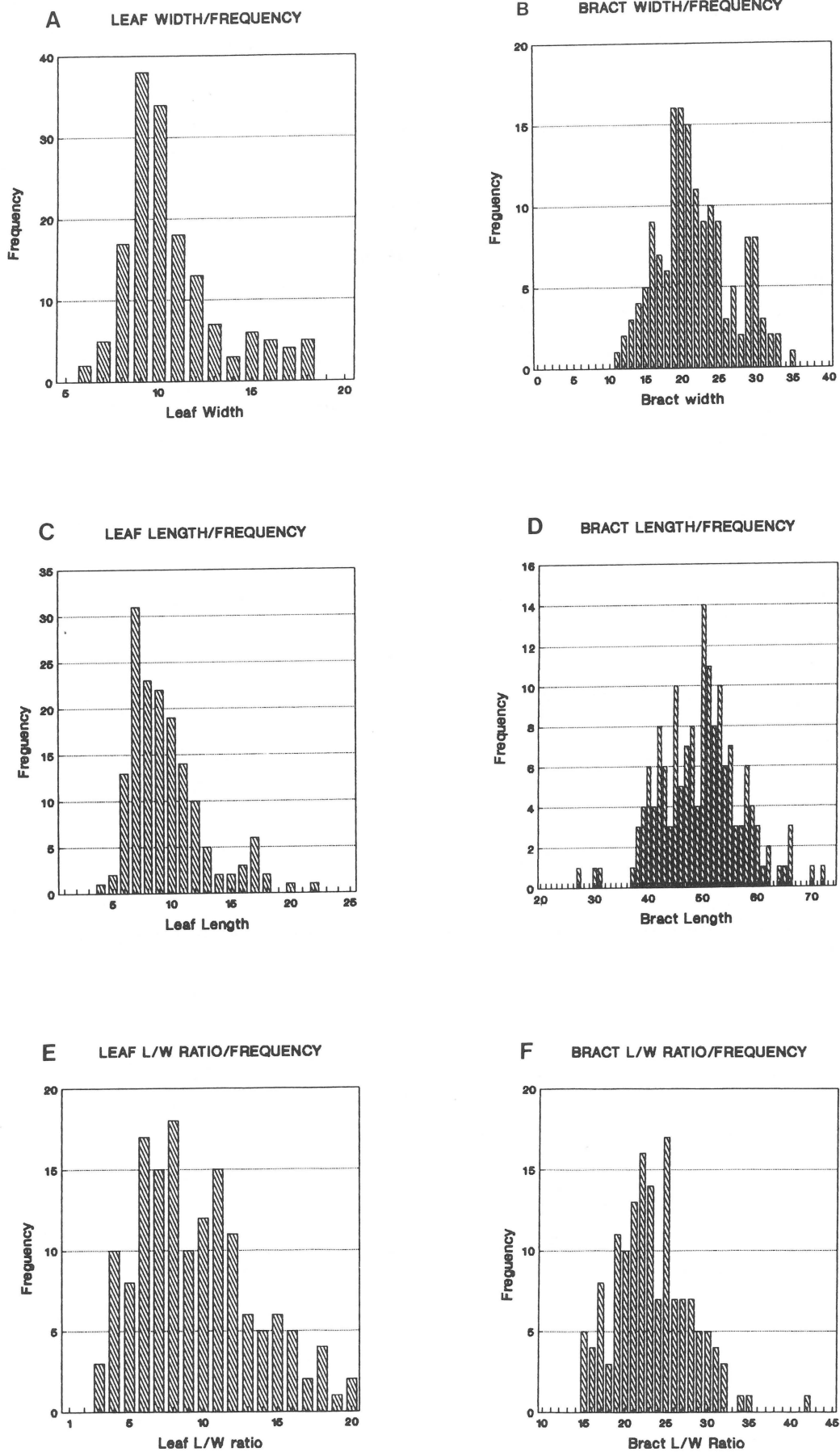


Figure 3 Frequency diagrams constructed from 157 specimens to show the range of variation in features of *Agathelpis dubia* (L.) Hutch. (The X-axis in A, B and D, 10 = 1 mm; C, 10 = 10 mm; E and F, the leaf and bract length/width ratios are represented on the X-axis).

(1771). Choisy (1823) later transferred it to his new genus *Agathelpis*, as *Agathelpis parvifolia*. Hutchinson (1946) recognized it as an orthographic variant and corrected the name to *Agathelpis parviflorum* (Berg.) Hutch. The combination should, however, still be credited to Choisy (I.C.B.N. Article 76.1).

Taxonomic limits

Agathelpis parviflora was regarded as a species separate from *A. dubia* on the basis of its shorter, broader leaves, broader bracts and shorter, more compact inflorescences. This combination of characters rarely occurs and specimens of *A. dubia* show much variation in the length and compactness of the inflorescence as well as in the length and breadth of the leaves and bracts. Specimens with both broad and narrow leaves display long or short inflorescences. One hundred and fifty seven specimens were measured and the results were graphed (Figures 3A, B, C, D, E and F). The graphs show that there is no discontinuity in the variation in features of the bracts and leaves. Therefore *A. parviflora* cannot be upheld as a species separate from *A. dubia*.

Agathelpis mucronata E. Mey., because of its mucronate bracts, was considered to be distinct from *A. dubia*. This character occurs frequently in *A. dubia*, however, and so the distinction cannot be upheld. *A. adunca* E. Mey. was also regarded as being distinct from *A. dubia* because of the apparently distichous inflorescence and very small bracts with hooked apices. These features were also found to occur frequently in *A. dubia*; therefore *A. adunca* and *A. mucronata* were placed in synonymy by Rolfe (1901). *Agathelpis brevifolia* E. Mey. was based on a Drège specimen described by Meyer (1835), but later placed in synonymy with *A. parvifolia* (a synonym of *A. dubia*) by Rolfe (1901).

Distribution and flowering time

Although *A. dubia* has been found as far north as the Rietkloof Mountains in the Kamiesberg, the greatest number of specimens has been collected between Vanrhynsdorp and the Cape Peninsula. A small number of specimens has been collected as far south-east as Montagu and Ladismith (Figure 4). Plants flower mainly during the drier summer months, between September and January, but flowers have been found as early as August and as late as July, possibly due to unseasonal conditions.

Specimens examined

—**3018** (Kamiesberg): Beaem Hill, 3.2 km south-east of Leliefontein (–AC), 17/01/1911, *Pearson 6356* (BOL); Kamiesberg (–AC), 03/11/1963, *Taylor 5532* (STE); Near summit of north slope of Rietkloof Mountains (–DC), 09/12/1910, *Pearson 5710* (SAM).

—**3118** (Van Rhynsdorp): Klaver (–DC), 29/10/1944, *Leipoldt 4123* (BOL); Top of Nardouws Pass (–DD), 29/09/1946, *Leipoldt 4342* (BOL).

—**3218** (Clanwilliam): Cedarberg, Wolfberg (–AB), 15/12/1950, *Esterhuysen 18097* (BOL); Pakhuis Pass (–BB), 30/09/1940, *Compton 9624* (NBG); Elands Kloof (–BD), 26/09/

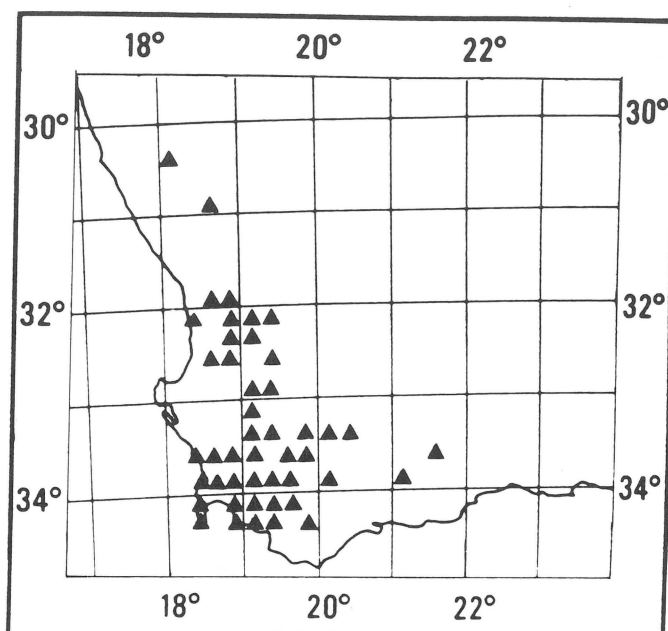


Figure 4 Map showing known distribution of *Agathelpis dubia* (L.) Hutch.

1936, *Lewis s.n.* (BOL); Piquetberg, hills north-west of Moutons Vley (–DA), 06/11/1934, *Pillans 7328* (BOL); Piquetberg (–DB), 02/11/1951, *Compton 22969* (NBG).

—**3219** (Wuppertal): Middelberg Plateau (–AA), 14/12/1941, *Bond 1339* (NBG); Kouebokkeveld, Klyn Vley (–AB), 29/01/1897, *Schlechter 10196* (G); Cedarberg, Middelberg (–AC), 14/12/1941, *Esterhuysen 7207* (BOL); Kouebokkeveld, Baliesgatberg (–CB), 25/09/1969, *Hanekom 1255* (STE); Olifants River valley (–CC), 29/09/1972, *Thompson 1500* (STE); Cedarberg, Tafelberg (–CD), 03/05/1953, *Esterhuysen 21366* (BOL).

—**3318** (Cape Town): Groenkloof (–CB), October, *Drège s.n.* (SAM); Table Mountain (–CD), August, *Bolus 1882* (BOL); Grassy slope on Devils Peak (–CD), February 1876, *Bolus s.n.* (SAM); Burgers Post Farm, near Pella (–DA), 14/11/1979, *Boucher & Shepherd 4886* (STE); Paarl, Taal Monument (–DB), 06/10/1976, *Moffett 1302* (STE); Eersterivier, hilltop east of Penhill (–DC), 15/11/1980, *Raitt 483* (STE); Stellenbosch, Mountains around Coetzenberg (–DD), February 1971, *Coppejans 413* (STE).

—**3319** (Worcester): Hex River Mountains, below Milner Peak (–AA), 16/12/1948, *Esterhuysen 14913* (BOL); Witzenberg, Kardouw (–AC), December, *Zeyher 1383* (G, holo.; BOL, SAM, STE, iso.); Mosterts Hoek Twins (–AD), 08/01/1944, *Esterhuysen 9851* (BOL); Bonteberg (–BD), 03/11/1940, *Compton 9981* (NBG); Du Toitskloof (–CA), *Drège s.n.* (G, holo.); Mountains south of Wemmershoek (–CC), January 1921, *Andreae 698* (NBG); Between Villiersdorp and Caledon, Eseljag Pass (–CD), 26/09/1936, *Goldblatt 2519* (NBG); Hills south-east of Keerom (–DA), 25/11/1938, *Pillans 8689* (BOL); Lower slopes of Naudesberg (–DB), 24/11/1959, *Rycroft 2204* (NBG, STE); Jonaskop (–DC), 10/10/1974, *Boucher 2527* (STE).

—**3320** (Montagu): Cabidu (–AC), *Compton 22230* (BOL, NBG); Laingsberg, Witteberg (–AD), 10/11/1935, *Compton 5878* (BOL, NBG); Langeberg, near Montagu (–CC), 28/10/



Figure 5 Holotype of *Agathelpis nitida* E. Mey. showing leaf arrangement, leaf shape and inflorescence morphology, Drège *s.n.* (G) ($\times 0.3$).

1954, Esterhuysen 23902 (BOL).

—**3321** (Ladismith): Near Garcias Pass, Muiskraal ridge (–CC), 03/10/1897, Galpin 4417 (PRE); Near Assegaibos (–DA), 31/08/1946, Jordaan 628 (STE).

—**3418** (Simonstown): Youngsfield (–AB), 05/11/1935, Compton 5942 (NBG); Muizenberg Mountain (–AD), December, Bolus 2914 (BOL); Steenbrasmond (–BB), 22/10/1939, Compton 8037 (NBG); Beyond Gordons Bay on coastal road, south-west slope (–BB), November 1983, Hartley 325 (J); Hangklip (–BD), 23/11/1958, Taylor 5835 (NBG, STE).

—**3419** (Caledon): Flats east of Viljoens Pass (–AA), September 1949, Davis *s.n.* (SAM); Caledon (–AB), 18/03/1916, Purcell *s.n.* (SAM); Kleinmond vlakte, north of vlei (–AC), 03/10/1946, de Vos 189 (STE); Vogelgat, Fernkloof Nature Reserve, Buys-se-huis (–AD), 03/10/1978, Williams 2593 (NBG); Riviersonderend, Schilpadkop (–BA), 02/01/1952, Esterhuysen 21032 (BOL); Little Hangklip (–BD), 09/10/1958, Levyns 10869 (BOL).

1.2 *Agathelpis nitida* E. Mey., Commentariorum de Plantis Africae australioris: 252 (1835). Drège: 89, 162 (1843); Walpers: 169 (1844); Choisy : 23 (1848). Type: Cape Province, Duivelsberg, Drège *s.n.* (G, holo.!).

Shrub 0.5–0.8 m high. *Stems* pubescent. *Leaves* often closely packed on stem, sessile, linear, sub-obtuse or acute, glabrous, $0.9\text{--}25.0 \times 0.7\text{--}1.7$ mm; upper leaves

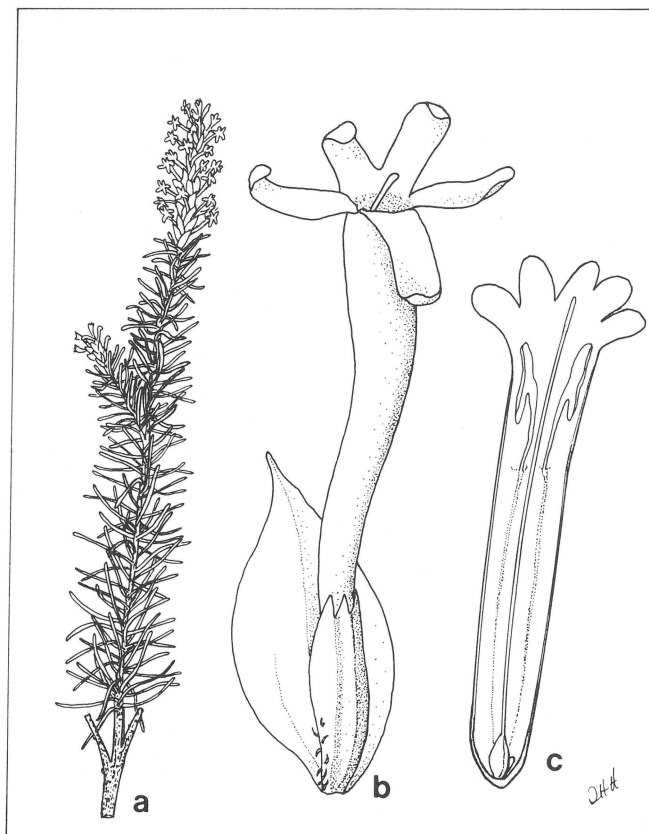


Figure 6 Diagram of *Agathelpis nitida* E. Mey. showing: (a) habit ($\times 0.25$); (b) flower and bract ($\times 6$) and (c) dissected flower showing gynoecium and androecium ($\times 4.5$) drawn from Esterhuysen 17431 (BOL).

often longer and wider than lower. *Spike* terminal, many-flowered, compact, short, 40–120 mm long. *Bracts* conspicuous, shiny, ovate, acute, keeled, $6.0\text{--}9.7 \times 2.5\text{--}3.8$ mm, adnate to the calyx for about one-half the length. *Flowers* creamy white. *Calyx* 5-dentate, 5-ribbed, one-fifth to one-third length of corolla tube, shorter than the bracts; lobes oblong, obtuse. *Corolla* 5-lobed; tube slender, usually curved, 9–23 mm long; lobes oblong, obtuse, spreading, adaxial lobes 2, incompletely divided. *Stamens* 2; anther about one-fifth the length of the corolla tube; filaments adnate to tube for about four-fifths of the length. *Nectary* ovoid, 1 mm long $\times 0.2$ mm wide, green, about one-third the length of the ovary. *Gynoecium*: ovary about one-seventh of the length of the corolla tube, 2.7×1.1 mm; style linear, stigma sometimes exerted in mature flowers. (Figures 5 & 6).

Diagnostic features

Agathelpis nitida, with its closely packed, relatively long, narrow leaves and large shiny bracts is easily distinguished from *A. dubia*.

Distribution

This species apparently has a very localized distribution; collections are confined to Skeleton Gorge on Table Mountain and Devils Peak (Figure 7).

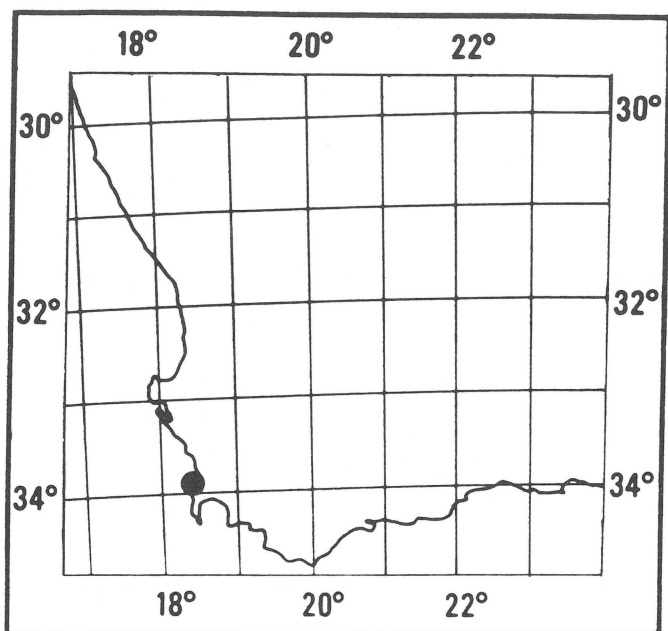


Figure 7 Map showing the known distribution of *Agathelpis nitida* E. Mey.

Flowering time and discrepancy in flower colour

Flowering occurs during August and September. There is an apparent discrepancy with regard to the colour of the flowers. Levyns (1950) states that the corolla is red, while Rolfe (1901) indicates that the corolla is white. There are very few herbarium specimens of this species and flower colour is mentioned by only two collectors (*Esterhuysen 17431* and *Dümmer 1752*); both state that the corolla is white.

Specimens examined

—**3318** (Cape Town): Devils Peak, near waterfall (–CD), 20/08/1895, *Wolley Dod 625* (BOL); Devils Peak (–CD), 04/12/1897, *Froembling 411* (NBG); Devils Peak (–CD), August 1908, *Dümmer 1752* (NBG); Devils Peak (–CD), 1829, *Ecklon & Zeyher s.n.* (SAM); Devils Mountain (–CD), August, *Drège s.n.* (SAM, PRE); Table Mountain, above forest in Skeleton Gorge, old scree slope at foot of cliffs (–CD), 10/09/1950, *Esterhuysen 17431* (BOL, NBG, PRE).

2. *Globulariopsis* Compton

Globulariopsis Compton in Transactions of the Royal Society of South Africa 19: 308 (1931); Phillips: 677 (1951); Dyer: 560 (1975). Type: *Globulariopsis wittebergensis* Compton.

Small heath-like shrublet. *Leaves* opposite or sometimes alternate on younger stems. *Inflorescence* a dense, globose, bracteate spike; bract free from calyx. *Calyx* 5-lobed, campanulate; tube cylindrical. *Corolla* 5-lobed; tube cylindrical below, campanulate above; lobes shorter than tube, elliptic-oblong, with one lobe slightly larger than the others, imbricate in bud. *Stamens* 4, didynamous, inserted about half-way up the corolla tube, included; filaments linear; anthers monothealous. *Nectary* small and basal. *Gynoecium*: stigma simple,

exserted; style semiterete, the same length as the corolla tube; ovary elliptic, unilocular, with a single pendulous ovule.

Globulariopsis is a monotypic genus that is restricted to the western Cape and is commonly known as 'dassiesbos'. The sterile plants are insignificant, but when in flower these small globose shrublets are covered with masses of small white flowers and are spectacular. *Globulariopsis* differs from *Agathelpis* and *Gosela* by the presence of 4 stamens, from *Selago* by a unilocular ovary, from *Microdon* by the zygomorphic corolla and from *Cromidon*, *Hebenstretia*, *Dischisma* and *Walafrida* by the 5-partite calyx.

2.1 *Globulariopsis wittebergensis* Compton in Transactions of the Royal Society of South Africa 19: 309 (1931); Compton 9: 135 (1943). Type: Cape Province, Laingsburg, summit of Witteberg, *Compton 2687* (BOL, holo.!).

Small, spreading, heath-like shrublet, 100–150 mm tall; branches slender, sparsely puberulous, with many internodes. *Leaves* spreading, linear-elliptic, obtuse, 3–5 × 1–2 mm glabrous, coriaceous, entire or 3–5 dentate. *Spike* compact, terminal, 6–10 mm long, more or less globose, bracteate. *Flowers* small, white. *Bract* free from the calyx, oblong-lanceolate, upper part convex, curved, 3–4 × 1 mm, white hairs on abaxial surface; apex often glabrous. *Calyx* tube 1.5 mm long; lobes 1.25 mm long, narrowly triangular, densely hairy. *Corolla* 2.0–2.5 mm long; lobes elliptic-oblong, 2 posterior lobes partially divided, 1.0–1.5 mm long. *Stamens*: 2 posterior stamens shorter, adnate between lateral and posterior petals, for two-thirds of the length of the corolla tube; 2 anterior stamens longer, adnate between lateral and anterior corolla lobes for one-third of the length of the corolla tube; filaments broadly linear; anthers all fertile. *Gynoecium*: stigma filiform; style slender, 2.5 mm long, minutely pubescent at base; ovary brown, 0.5 mm long. (Figure 8).

Distribution and flowering time

Globulariopsis has a very limited distribution, having been found at only two localities, namely the top of the Witteberg range above Matjiesfontein and, less than 100 km west, on top of the Bonteberg Mountains, near Touwsrivier (Figure 9). The flowering season is of rather short duration, beginning in late September and finishing by mid-summer.

Specimens examined

—**3319** (Worcester): Bonteberg (–BD), 03/11/1940, *Compton 9983* (NBG).

—**3320** (Montagu): South of Bantams, south slopes of Witteberg (–BC), 04/11/1963, *Esterhuysen 30509* (NBG).

3. *Gosela* Choisy

Gosela Choisy in DC., Prodrromus systematis naturalis regni vegetabilis 12: 22 (1848); Harvey: 293 (1868); Rolfe: 177 (1901); Phillips: 553 (1926); Phillips: 667

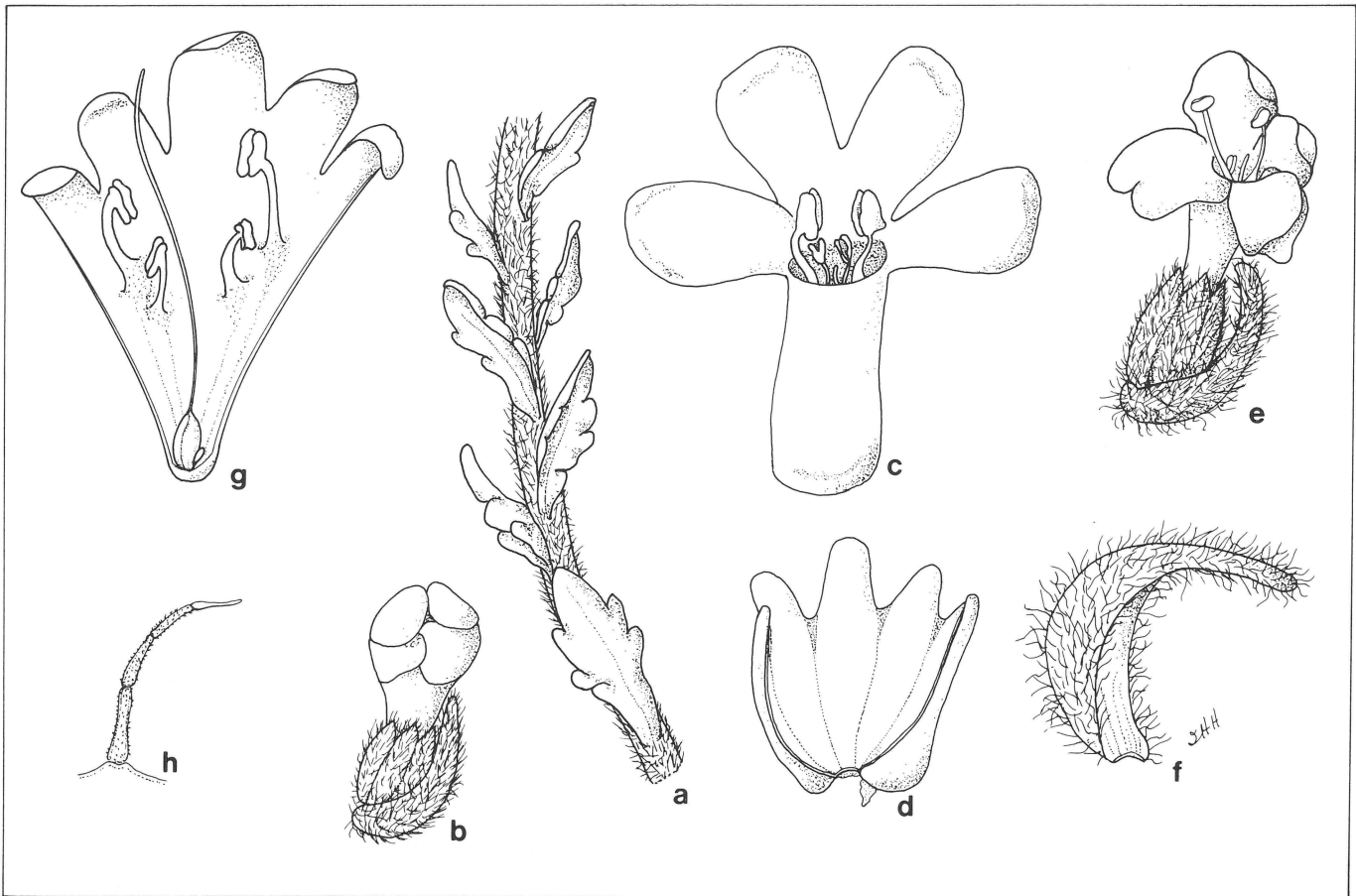


Figure 8 Diagram of *Globulariopsis wittebergensis* Compton showing: (a) part of leafy stem ($\times 7$); (b) aestivation of corolla ($\times 7$); (c) corolla and stamens ($\times 14$); (d) dissected calyx ($\times 10.6$); (e) single flower and bract ($\times 7$); (f) bract ($\times 10.6$); (g) dissected flower showing androecium and gynoecium; (h) single trichome, all drawn from *Moffett 3612* (J).

(1951); Dyer: 561 (1975). Type: *Gosela eckloniana* Choisy.

Heath-like shrub. *Leaves* linear, many borne on axillary brachyblasts. *Inflorescence* a compact, bracteate, spike, lower flowers longer than upper flowers making spike appear corymb-like. *Calyx* 5-lobed, gamosepalous, villous. *Corolla* 5-lobed; tube narrowly cylindrical below, broadening above, 4–6 times longer than calyx. *Stamens* 2, anterior large and fertile; 2 posterior reduced to staminodes with small exserted anthers; filaments adnate to corolla tube for most of their length. *Nectary* anterior, basal. *Gynoecium*: stigma linear, exserted; style slender; ovary ellipsoid, bilocular, with a single ovule in each locule, one ovule sometimes aborted. *Fruit* enclosed in persistent calyx.

Gosela is a monotypic genus. The plants are low, branching shrublets and at each node a long narrow leaf subtends a short brachyblast, thus the leaves appear fasciated. *Gosela* differs from all other species of the Selaginaceae by the presence of 2 stamens and 2 staminodes. The spike of *Gosela* is corymb-like because the corolla tubes of the lower flowers are longer than those of the upper; this gradation does not occur in the other minor genera.

3.1 *Gosela eckloniana* Choisy in DC., Prodrum systematis naturalis regni vegetabilis 12: 22 (1848).
Type: Cape Province, Clanwilliam district, Olifants

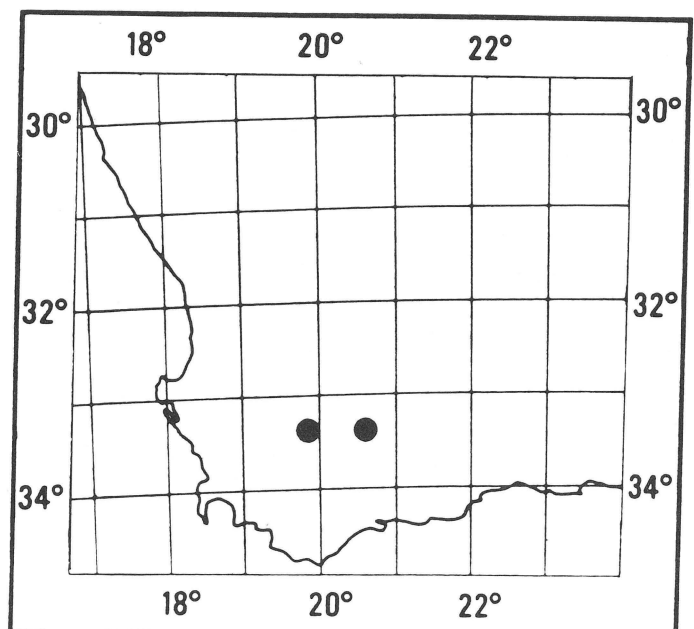


Figure 9 Map showing known distribution of *Globulariopsis wittebergensis* Compton.

River, *Ecklon & Zeyher* 36 (B, holo., presumed destroyed; PRE, iso!).

Shrub 0.4–0.8 m high; branches slender, puberulous, distant. *Leaves* broadly linear, margins revolute, trichomes sometimes present on margins and midrib or lower part of abaxial surface, 3–14 in each brachyblast, longer leaves in brachyblast 4–13 × 0.5–1.25 mm, shorter leaves 1–5 × 0.4–0.8 mm, upper leaves grade into bracts. *Spikes* short to slightly elongate, compact, 8–155 mm long, fruiting spike elongate. *Bracts* as little as one-sixth the length of the corolla tube, ovate-lanceolate, densely villous, 5.0–9.5 × 1.3–3.5 mm; apex acute. *Flowers* cinnamon-coloured. *Calyx* bilabiate; lobes longer than tube; 2 posterior lobes incompletely divided, slender, 2–5 mm long, densely villous. *Corolla* with long slender tube broadening slightly towards apex, 14–43 mm long; lobes 5, subequal, about 3 mm long, 2 anterior lobes incompletely divided, spreading, obovate-oblong. *Stamens* 2, filaments adnate to corolla tube for

most of their length; anthers monothealous; staminodes 2, with sterile anthers. *Gynoecium*: stigma flat, 1.8 mm long, linear; style slender; ovary ellipsoid to elongate; anterior ovule sometimes absent. (Figures 10, 11 & 12).

Distribution and flowering time

Gosela eckloniana grows on mountain slopes in the Wuppertal and Worcester districts as well as on the mountains in the southern-most areas of the Clanwilliam district (Figure 13). The flowering season is between September and December and occasionally in early January.

Specimens examined

—3218 (Clanwilliam): Olifants River (–BB), *Ecklon & Zeyher* 36 (PRE); Elandsbloof Mountains (–BD), 25/09/1936, *Compton* 6531 (NBG); Piekenierskloof (–DB), October, *Ecklon & Zeyher* 13 (SAM).

—3219 (Wuppertal): Pakhuis Pass (–AA), 30/09/1941, *Barker* 1042 (NBG); Between Olifants and Kromme Rivers, top of

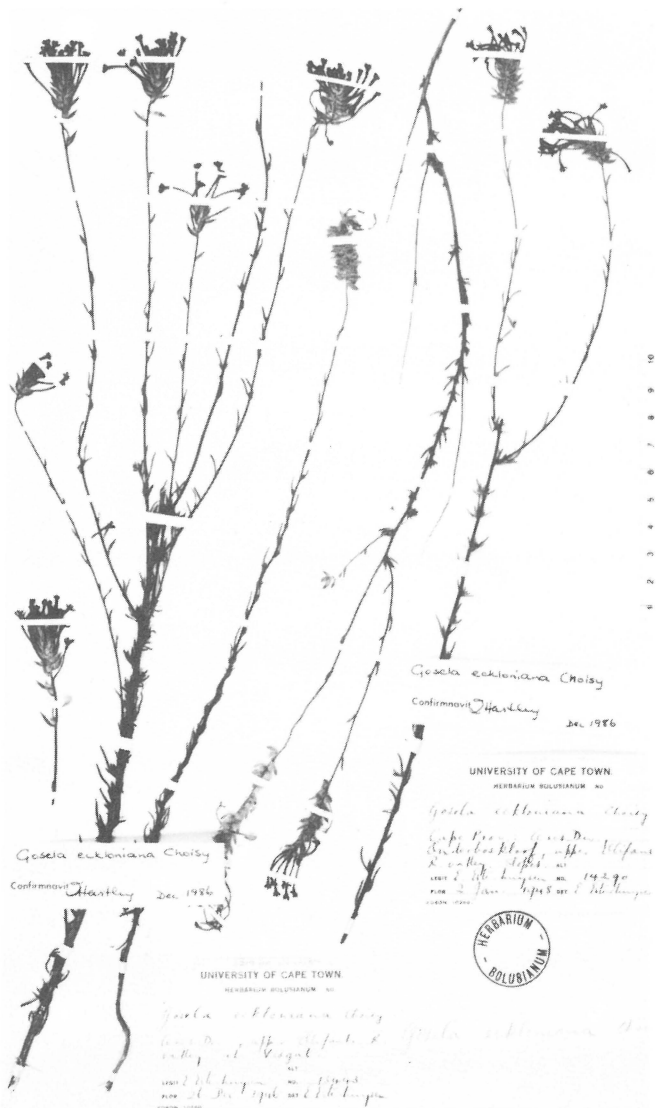


Figure 10 Photograph of specimen of *Gosela eckloniana* Choisy showing habit, leaf arrangement and inflorescence, scale included in photograph, *Esterhuysen* 14290 (BOL).

Figure 11 Inflorescence of *Gosela eckloniana* Choisy showing long corolla tubes and the hairy calyx and bracts (× 8).

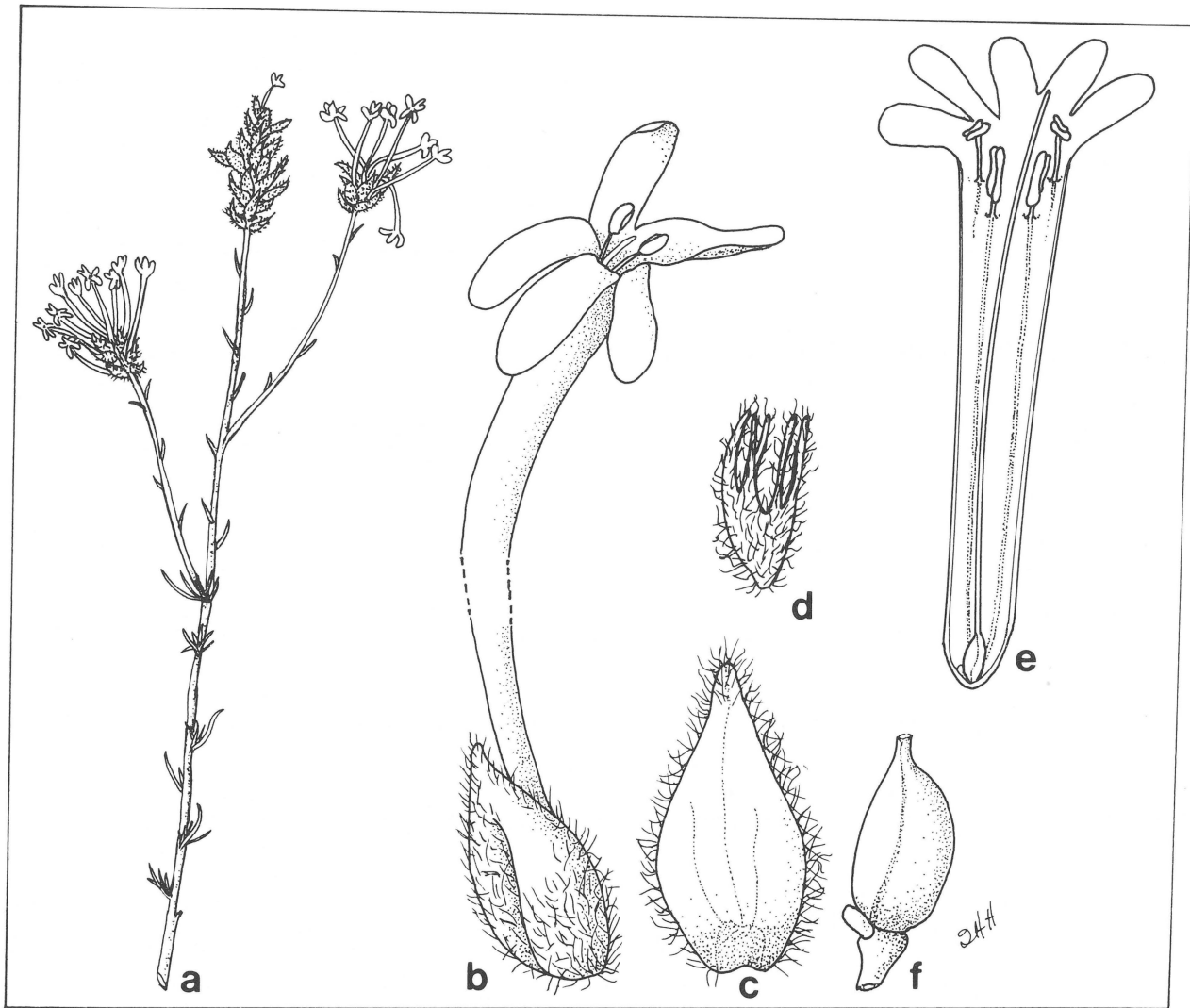


Figure 12 Diagram of *Gosela eckloniana* Choisy, showing: (a) habit ($\times 0.5$); (b) flower and bract ($\times 5$); (c) adaxial view of bract ($\times 7$); (d) hairy calyx ($\times 6$); (e) dissected flower showing gynoecium and androecium ($\times 5$) and (f) ovary and nectary ($\times 10$), all drawn from *Barker 1042* (NBG).

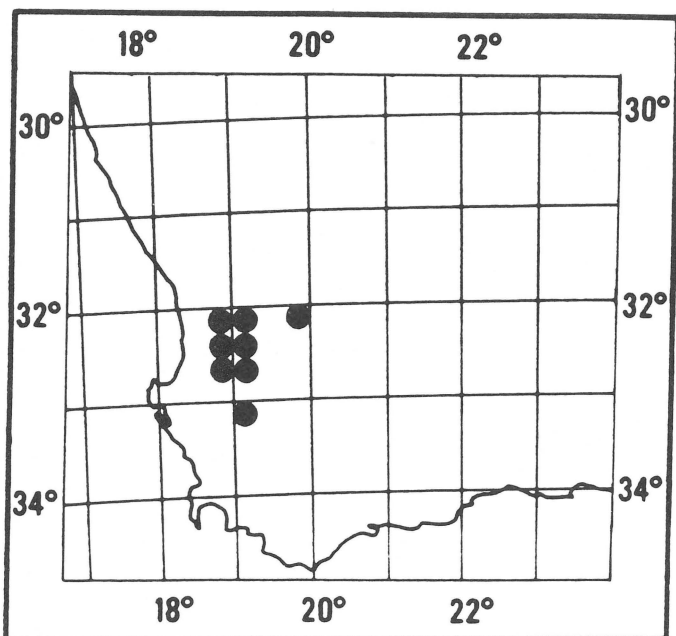


Figure 13 Map showing known distribution of *Gosela eckloniana* Choisy.

the mountain (-AC), December 1919, *Andreae 206* (STE); Elandskloof (-BB), 26/09/1936, *Lewis s.n.* (BOL); Zuurvleisberg (-CA), 11/10/1923, *Pocock 25* (STE).

—3319 (Worcester): Visgat, upper Olifants River valley (-AA), 26/12/1946, *Esterhuysen 13443* (BOL, NBG).

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Appendix 1 Other specimens examined

1.1 *Agathelpis dubia*

Andrag 168 (STE), 832 (PRE); Anonymous 484 (STE); *Barker* 1748 (NBG), 4490 (NBG), 7185 (NBG); *Boucher* 732 (PRE, STE), 2306 (STE); *Bolus* 13633 (PRE), *s.n.* (SAM); *Burmann s.n.* (G); *Compton* 3488 (BOL), 6493 (NBG), 9624 (NBG), 10059 (NBG), 14016 (NBG), 20957 (NBG); *Davies* 51 (STE); *de Kock* 25 (PRE); *de Vos* 1053 (STE); *Drège* 77 (SAM), *s.n.* (G, holo.), *s.n.* (G, holo.), *s.n.* (G); *Drewes s.n.* (NBG); *Duthie* 719 (BOL); *Elliot* 96 (PRE); *Ecklon & Zeyher* 21 (G), 22 (G), *s.n.* (SAM); *Esterhuysen* 3359 (BOL), 3626 (BOL), 3777 (BOL, NBG), 7136 (PRE), 11077 (BOL), 11360 (BOL), 12342 (BOL), 22597 (BOL), 23903 (BOL), 23951 (BOL), 27480 (BOL), 32245 (BOL), 34028 (BOL), 34434 (BOL, STE), 34684 (BOL); *Gillett* 552 (STE), 859 (STE), 1058 (STE), 1750 (STE), 1832 (STE), 3339 (STE), 3460 (STE, PRE); *Goldblatt* 1513 (NBG); *Guthrie* 2195 (NBG), 2513 (NBG), 2674 (NBG); *Hugo* 683 (STE), 776 (STE), 1865 (STE), 2292 (STE); *Hutchinson* 27 (BOL), 320 (BOL), 668 (BOL); *Johnson* 265 (NBG); *Jordaan* 7571 (STE); *Kerfoot* 5529 (STE), 6185 (NBG); *Lambert s.n.*, 1816 (G); *Leighton* 2271 (BOL); *Leipoldt* 3995 (PRE), 4180 (BOL), *s.n.* (BOL), *s.n.* (NBG); *Levyms* 2260 (BOL), 5364 (BOL), 9354 (BOL); *Lewis s.n.* (BOL); *Maguire* 1251 (NBG); *Martin* 715 (NBG); *McKinnon* 114 (STE); *Morris* 131 (NBG); *Mostert s.n.* (STE); *Orchard* 257 (STE); *Parker* 3617 (BOL, NBG), 3754 (NBG), 4000 (NBG); *Pearson* 5181 (BOL), 7315 (SAM); *Penfold* 38 (NBG); *Phillips* 371 (NBG), 1252 (SAM), 1253 (SAM), *s.n.* (G); *Pocock* 643 (STE); *Pillans* 8403 (BOL), 9791 (BOL), 10339 (STE), *s.n.* (PRE); *Potts s.n.* (SAM); *Purcell s.n.* (SAM); *Rogers* 16076 (G); *Rodin* 3121 (BOL); *Rycroft* 1369 (NBG), 3340 (NBG); *Schlechter* 287 (G), 1178 (G), 9062 (G), 9250 (BOL, G, PRE), 10196 (BOL); *Smuts s.n.* (STE); *Stauffer* 5028 (G, STE); *Stirton* 10175 (STE); *Stokoe s.n.* (SAM); *Taylor* 563 (STE); *Thode* 6216 (STE), 8207 (STE); *Thomas s.n.* (NBG, STE); *Thorne s.n.* (SAM); *Topper* 177 (NBG); *Tyson* 2519 (NBG), 2883 (NBG); *van der Merwe* 2072 (STE); *Wasserfall* 670 (NBG), 754 (NBG); *Wilman* 477 (BOL); *Wilms* 3524 (G); *Wolley Dod* 631 (BOL); *Zeyher* 4892 (BOL, STE), 3556 (SAM), 3557 (SAM), *s.n.* (SAM).

1.2 *Agathelpis nitida*

Drège s.n. (G, holo.); *Pappe* 52 (SAM); *Verreaux* 1831 (G).

2.1 *Globulariopsis wittebergensis*

Compton 2687 (BOL), 12214 (NBG, PRE), 13999 (NBG); *Esterhuysen* 3767 (NBG); *Moffett* 3612 (J).

3.1 *Gosela eckloniana*

Compton 16189 (NBG); *Ecklon & Zeyher* 3554 (SAM); *Esterhuysen* 3360 (BOL), 7429 (BOL, NBG, SAM), 14290 (BOL); *le Maitre* 257 (STE); *Levyms* 2999 (BOL); *Lewis s.n.* (BOL); *Pillans* 9142 (BOL), 9614 (BOL); *Pocock* 582 (STE); *Taylor* 2932 (NBG), 4548 (STE), 6204 (STE); *Stokoe s.n.* (SAM).