

## The genus *Amphiglossa* (Gnaphalieae, Relhaniinae, Asteraceae) in southern Africa

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**Keywords:** *Amphiglossa* DC., Asteraceae, comb. nov., Gnaphalieae, *Pterothrix* DC., Relhaniinae, southern Africa, sp. nov., taxonomy

### ABSTRACT

It is proposed that the generic concept of *Amphiglossa* DC. be broadened to include the genus *Pterothrix* DC. The two genera were previously separated on the presence or absence of ray florets. A thorough study of various characters showed that the type of florets was overemphasised in the past and that the pappus and cypselas provide sufficient evidence to unite the two genera. The genus consists of 11 species of which *Amphiglossa celans* Koekemoer, *A. grisea* Koekemoer, *A. rudolphii* Koekemoer and *A. susanna* Koekemoer are newly described. A key to the species as well as detailed descriptions and distribution maps are provided. Photographs are included for each species and key characters for the genus are also illustrated.

### INTRODUCTION

Formerly the two genera, *Amphiglossa* DC. and *Pterothrix* DC., were poorly known and distinguished by the absence or presence of ray florets. Even De Candolle (1838) was not always sure to which genus certain species belonged, hence his description of *A. perotrichoides* DC. for a species without ray florets. A thorough study of various characters showed that the type of florets was overemphasised in the past and that the pappus and cypselas provide sufficient evidence to unite the two genera. The genus consists of 11 species, four of which are newly described here.

The extensive fieldwork I undertook over a period of six years during different seasons, to cover the different flowering times, was very valuable in revising this group. Not only were four new species discovered but another three, that were mainly known from type material, were re-discovered after earlier collections by Ecklon & Zeyher and Drège.

Nine species in the genus are characterised by very restricted distributions in Namibia and the Northern, Western and Eastern Cape of South Africa. Two other species, *A. tomentosa* (Thunb.) Harv. and *A. triflora* DC. have wider distributions in the other South African provinces and Namibia.

Specimens were studied in BM, BOL, BR, E, G, G-DC, K, LINN, NBG, P, PRE, S, SAM, SBT, TCD, TUB, UPS and WAG (abbreviations as in Holmgren *et al.* 1981). Many of the older collections are of a very poor quality and were of limited value in the revision.

***Amphiglossa* DC.**, Prodrômus 6: 258 (1838); Benth.: 324 (1873); E. Phillips: 799 (1951). Type: *Amphiglossa corrudifolia* DC.

*Pterothrix* DC.: 279 (1838); Benth.: 324 (1873); E. Phillips: 798 (1951). Type: *Pterothrix spinescens* DC.

Perennial, woody, much-branched, wiry shrubs or dwarf shrubs, erect or decumbent, stoloniferous or rhizomatous. Branches glabrous or with a thin layer of arachnoid hairs, tips rarely spinescent. Leaves small, imbricate or widely spaced, often in fascicles, sessile or inconspicuously stalked, ericoid, convex, abaxial surface arachnoid or glabrous, adaxial surface woolly, margins smooth, tips mucronate, acute or rounded. Capitula radiate or discoid, terminal, sessile, solitary, or in small groups of distinct units, homogamous or heterogamous; ray florets 3–12, bilabiate or pseudobilabiate florets female, disc florets bisexual, 5-lobed. Involucral bracts in several series, outermost chaffy or foliaceous, innermost longer, narrower. Receptacle discoid, nude or with small extensions around cypselas bases. Anthers 5, syngenesious, apically acuminate, basally tailed. Style bifid, stigmatic area in two strips along margins of style arms, inflated cells at branch tips short, rounded. Nectary present in all florets, a small disc between style base and cypselas. Cypselas small, asymmetrical, glabrous, papillose. Pappus bristles 18–32, densely plumose from tip to base, in one series, free or rarely fused at the very base. Flowering time: mainly November–March, some species in spring–summer and others in summer–autumn.

*Amphiglossa* is recognised by its small, sessile capitula that are terminally borne, solitary or in small groups, a chaffy involucre, papillose cypselas (Figure 1A, B) and pappus of many fine bristles (Figure 1C, D) that are profusely plumose and interlocking in the central parts. *Amphiglossa* also has a germination strategy unique in the Relhaniinae. Fresh, mature cypselas germinate within 24 hours by means of a basal hygroscopic substance that absorbs water very quickly, causing the seedcoat to burst and thereby facilitating germination. A gelatinous blob (Figure 1E, F), about the size of the swollen cypselas, then surrounds the root tip.

*Amphiglossa* belongs to the subtribe Relhaniinae with which it shares adaxially tomentose leaves. The Relhaniinae are subdivided further by flower colour: the

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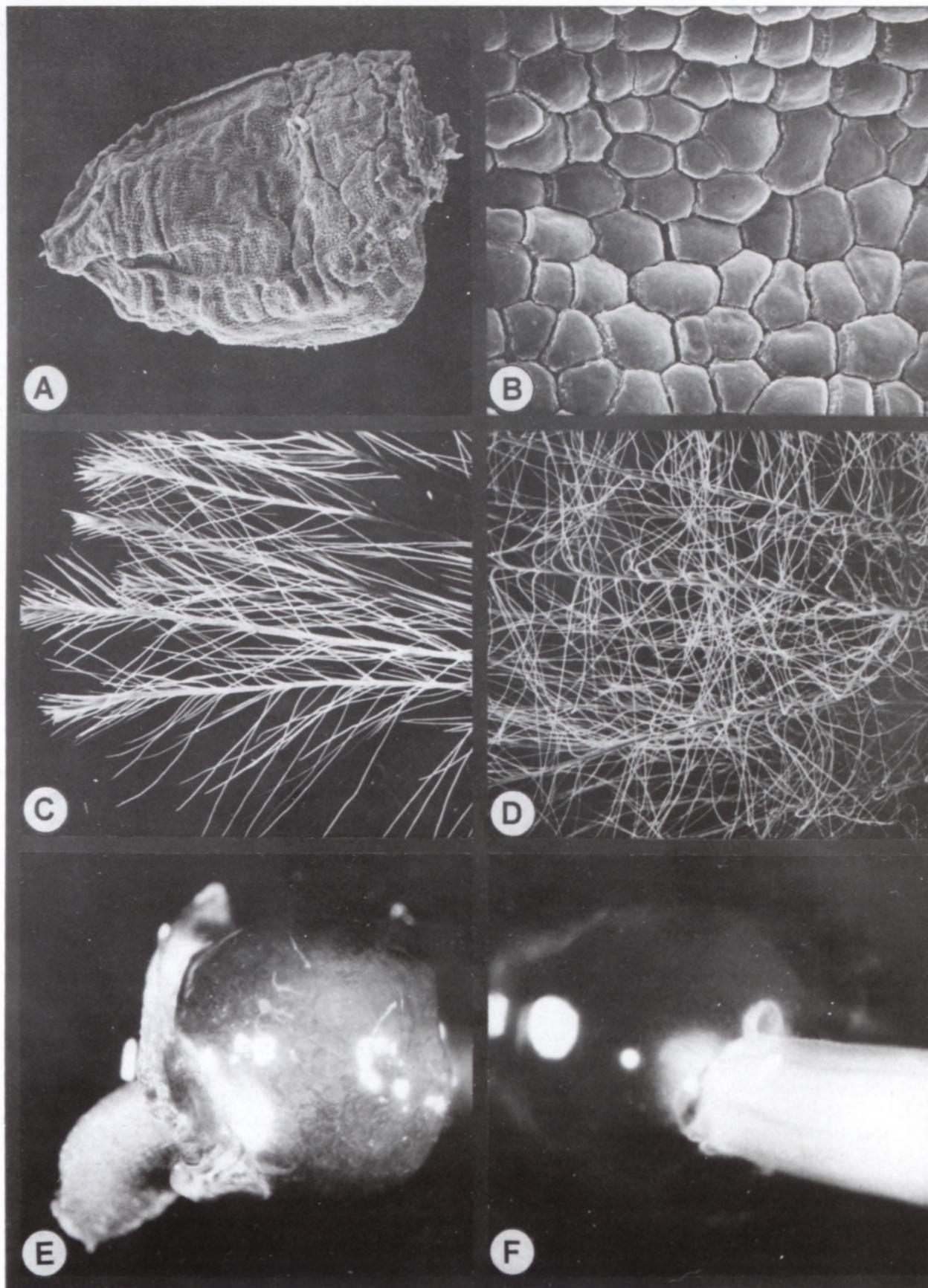


FIGURE 1.—Diagnostic characters of *Amphiglossa*. A, cypselus of *A. rudolphii*,  $\times 45$ ; B, papillose cypselus surface of *A. corrudifolia*,  $\times 820$ ; C, plumose pappus tips of *A. grisea*,  $\times 40$ ; D, interlocking pappus bristles of *A. rudolphii*,  $\times 25$ ; E, F, gell substance released to aid germination in *A. rudolphii* and *A. tomentosa* respectively,  $\times 20$ .

yellow-flowered genera are referred to the *Relhania* group and the white/pink-flowered genera to the *Metalasia* group. In Anderberg's (1991) cladistic analysis, *Amphiglossa* groups terminally with *Disparago* Gaertn., *Stoebe* L. and *Elytropappus* Cass. The other related genera in the *Metalasia* group are: *Hydroidea* Karis, *Lachnospermum* Willd., *Phaenocoma* D. Don, *Planea* Karis, *Atrichantha* Hilliard & Burtt, *Bryomorpha* Harv., *Calotesta* Karis, *Dolicothrix* Hilliard & Burtt and *Metalasia* R.Br. (Anderberg 1991).

**Diagnostic characters:** pappus of 18–32 very fine bristles, densely plumose from close to base to tip, interlocking and released *en masse* with seeds; cypselas papillose.

**Distribution and habitat:** Namibia, Western, Eastern and Northern Cape, Free State, Lesotho, North-West, Gauteng and Mpumalanga. Dry, rocky and sandy areas, often in deep sand or on granite outcrops.

**Conservation status:** most species not threatened.

#### Key to the species of *Amphiglossa*

- 1a Ray florets present:
- 2a Brachyblasts numerous, very obvious, to 15 mm long; leaves imbricate:
- 3a Ray florets with 1 or 2 small lobes in sinus . . . . . *A. callunoides*
- 3b Ray florets without lobe in sinus . . . . . *A. corrudifolia*
- 2b Brachyblasts, if present, short; leaves in fascicles, not imbricate:
- 4a Ray floret lamina curled like a watch-spring, strap-shaped; capitula 6.5–7.5 × 2.0–3.0 mm . . . . . *A. grisea*
- 4b Ray flower lamina open and spreading, ovate; capitula 8.5–10.0 × 2.5–3.5 mm . . . . . *A. tomentosa*
- 1b Ray florets absent:
- 5a Capitula with more than 10 florets; restricted to white sand dunes in the Witsand complex near Postmasburg . . . . . *A. tecta*
- 5b Capitula with 4 or 5 florets; distribution not as above:
- 6a Some terminal branches modified into spines; distributed outside the Western Cape . . . . . *A. triflora*
- 6b Spines absent; distributed in Namibia and in the Western Cape:
- 7a Leaves minute, adpressed; plants known from the Kosis Mountain near Lüderitz (Namibia) and possibly also granite mountains further south . . . . . *A. thuja*
- 7b Leaves longer than 5 mm, usually spreading; plants distributed in Western Cape (*A. celans* in the Garies area):
- 8a Plants wiry, sparsely branched and sparsely leaved, often scrambling; known from a small area west of Garies . . . . . *A. celans*
- 8b Plants cushion-like shrubs or dwarf shrubs; distributed in the Western Cape:
- 9a Leaf tips rounded, involucre with glossy, yellow sheen and small tomentose patches on abaxial surface; restricted to the Ceres Karoo (Kagga Kamma and Katbakkies areas north of Ceres) . . . . . *A. susannae*
- 9b Leaf tips acuminate; involucre chaffy or greenish with tomentose abaxial surface; distributed to the north, west and south of the Ceres Karoo:
- 10a Shrubs taller than 0.3 m; leaves widely spaced, fascicles rare; involucre tips acute . . . . . *A. rudolphii*
- 10b Shrublets smaller than 0.3 m; leaves not so widely spaced, in fascicles; involucre tips aristate . . . . . *A. perotrichoides*

***Amphiglossa callunoides* DC.**, Prodrômus 6: 259 (1838). Type: Eastern Cape, 3325 (Port Elizabeth):

District Uitenhage, in the stony channel of the Zwartkops River, fl. Jan. 1835, *Ecklon 51* (G-DC, lecto.!, here designated). Figure 2B.

Stoloniferous, woody, multistemmed, blue-grey shrubs, to 0.5 m tall. Branches slender and very flexible, erect at first, bending over and becoming stoloniferous, rooting where they touch the ground; older plants forming well-anchored bushes, covering an area of up to 6 m<sup>2</sup>; young active shoots up to 3 mm diam., older, main branches 1.5–2.0 mm diam. Primary brachyblasts developing in every leaf axil on main stems, numerous secondary brachyblasts developing in leaf axils of primary brachyblasts; stems of brachyblasts and young branches often white-tomentose; brachyblasts mostly negatively geotropic, whereas main branches positively geotropic, thus creating the impression that secondary branching is restricted to one side of the main branch. Leaves persistent, sessile, adpressed, narrowly triangular, margins entire, slightly inrolled, midrib prominent, adaxial surface woolly, abaxial surface smooth, tips shortly mucronate, young leaves yellowish green, older leaves fading to grey, giving a characteristic blue-grey sheen to plants; subtending leaves on main stems alternate, up to 10 mm long and 2 mm wide at base, about a leaf length apart, leaving branch exposed; brachyblast leaves minute, up to 2 mm long, imbricate, subtending leaves on brachyblasts not much longer than ordinary leaves. Capitula radiate, heterogamous, 7–8 × 2–3 mm, 8–10-flowered with the same number of ray and disc florets; single head terminally borne on brachyblast, linear when young, involucre spreading at maturity to release pappus and seeds. Outer involucre bracts 10–15, foliaceous in upper part and along midvein, remaining green around midrib, in 3–6 series, ovate, 2.5–4.5 mm long, increasing in length from outer to inner series, the outer about half the length of innermost bracts. Inner involucre bracts scarious along margins, with multicellular glands, 10–15, in 4 or 5 series, 6.0–7.5 mm long, linear to narrowly oblong, hyaline towards apex, those in innermost series hyaline in upper half, mucronate, as long as pappus. Receptacle flattened, less than 2 mm diam., honeycombed, ridges shorter than 1 mm. Bilabiate or pseudobilabiate florets white, female, 4 or 5; lamina ± 1.5 × 0.5 mm, 3-lobed; tube 4.5–5.0 mm long. Disc florets white, bisexual, 5-lobed, 5.0–5.5 mm long. Cypselas subterete, ± 1 mm long, chestnut-coloured, inconspicuously ribbed, papillose, developing in 3–5 florets, more often in bilabiate or pseudobilabiate florets; released in a cluster together with pappus at maturity. Pappus bristles 18–23, ± 5 mm long, barbed in lower fifth, plumose in upper part, seta up to 1.5 mm long. Flowering time: January–April.

**Diagnostic characters:** stoloniferous growth form, numerous brachyblasts; leaves very small; capitula small, terminal on brachyblasts; small white florets just visible at tip of involucre.

**Distribution and habitat:** known from two localities only: a short section of the Kwa-Zunga River (inland part of Swartkops River), NW of Uitenhage between Springfontein and Rooikrantz Farms, and the Farm Hoeree in the Kouga Mountains, NW of Joubertina (Figure 3). Observed growing in abundance amongst boulders in the bed of the Kwa-Zunga River.

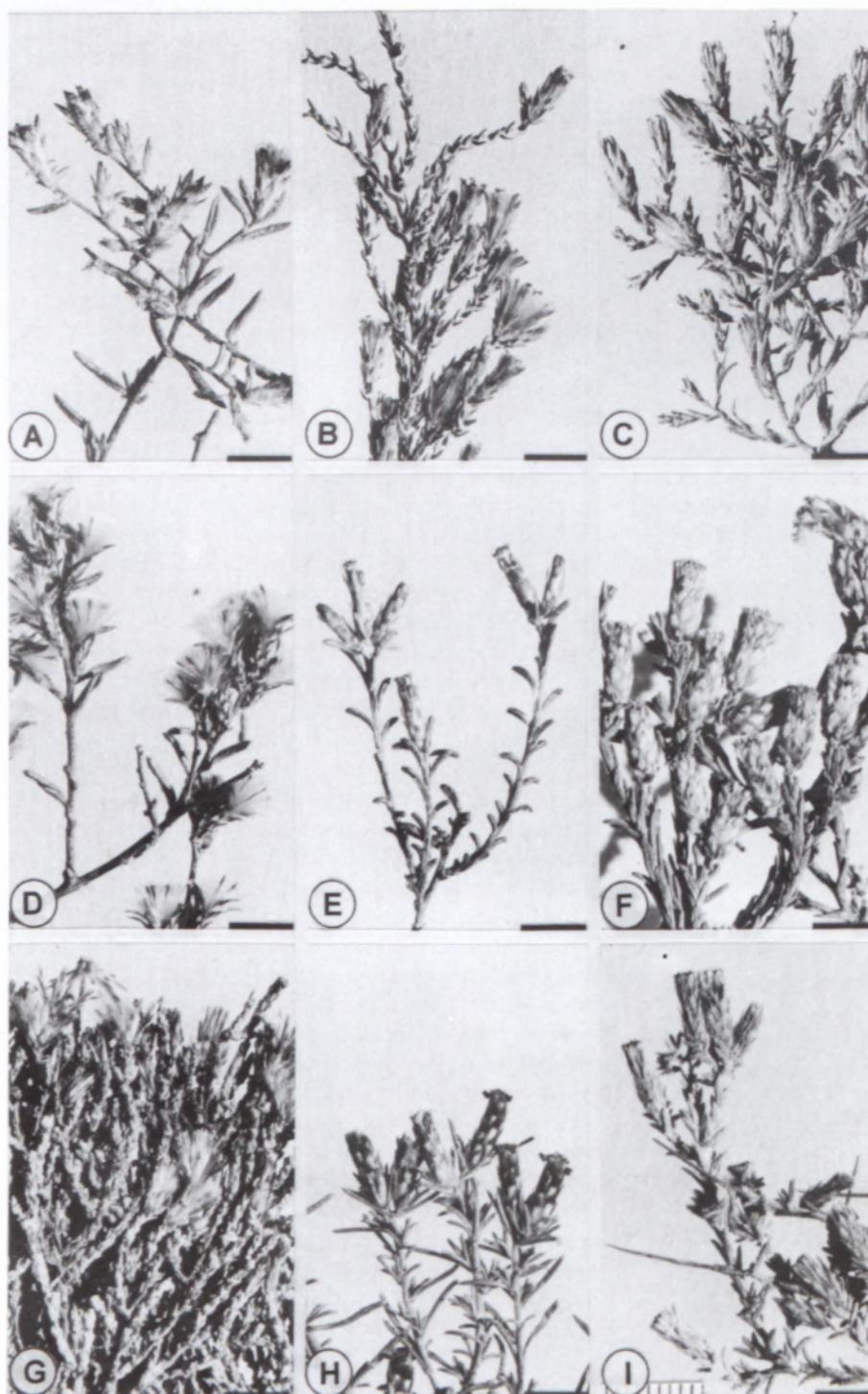


FIGURE 2.—Branches, leaves and capitula of selected species. A, *Amphiglossa celans*; B, *A. callunoides*; C, *A. grisea*; D, *A. rudolphii*; E, *A. susannae*; F, *A. tecta*; G, *A. thuja*; H, *A. tomentosa*; I, *A. triflora*. Scale bars: 10 mm.

*Conservation status*: rare, but locally abundant from two localities only; threatened by sandmining activities in the riverbed near Uitenhage and also by natural flooding.

*Number of collections known*: 25.

*Vouchers*: Ecklon 45; Ecklon & Zeyher 2916; Koekemoer 1148; Oelofsen 171.

***Amphiglossa celans* Koekemoer, sp. nov.**, suffrutex scandens multicaulis leniter lignosus, vel volubilis, ad 0.3 m altus. *Capitula* homogama, solitaria, terminalia, quinqueflora. *Bractea involucre* 12–17, stereoma in parte centrali supere perspicue manifestum. *Flosculi tubulosi* albi vel rosei, hermaphroditi. *Cypselae* subteretes, in floribus omnibus perfecte evolutae. *Pappi*

*setae* 18–26, in fundo connatae, basin versus hamatae, hamulis implicatibus. *Florescentia* Februarii–Aprilis. Adhuc ex area parva inter pagos Garies et Kotzesrus, in provincia Capensi Boreali nota.

*TYPE*.—Northern Cape, 3017 (Hondekliipbaai): 35 km from Garies to Kotzesrus, (–DD), 1995-11-20, Koekemoer 1099 (PRE, holo.; MO, NBG, S, iso.). Figure 2A.

The specific epithet '*celans*' (= hiding) refers to the unobtrusive manner in which this plant grows amongst other plants.

Scrambling, multistemmed, weakly woody subshrub or scrambler, up to 0.3 m tall. *Stems* up to 2 mm diam., branches bare or very sparsely leaved in lower part, grey-

ish or brick-red with a shiny appearance, often with zigzag branching pattern. *Leaves* sessile, ascending, elliptic to linear, margins entire, inrolled, twisted, adaxial surface woolly, tips shortly mucronate, up to  $8.0 \times 1.5$  mm, seemingly caducous after growing season, greyish green, very sparse on most branches,  $\pm$  half a leaf length apart on terminal branches; young, active shoots up to 3 mm diam., large-leaved, leaves flat, up to  $16 \times 6$  mm. *Capitula* discoid, homogamous, solitary in last 3 or 4 terminal leaf axils,  $7-8 \times 2-3$  mm, 5-flowered. *Involucral bracts* 12–17, up to  $8.0 \times 1.3$  mm, stereome clearly visible in central upper part, outermost bracts foliaceous, joined together by hairs on outside, innermost bracts scarious along margins, tinged dark wine-red towards slightly recurved, mucronate apex. *Receptacle* conical, less than 1 mm diam., honeycombed, ridges shorter than 1 mm. *Florets* white or pink, bisexual, 5-lobed, 4.5–5.0 mm long. *Cypselas* subterete,  $\pm 1$  mm long, inconspicuously ribbed, papillose, annulus not distinct. *Pappus bristles* 18–26, connate at very base,  $\pm 4$  mm long, barbed in lowermost part with barbs interlocking, shortly plumose along shaft ending in tufted tip, seta up to 0.2 mm long. *Flowering time*: February–April.

*Diagnostic characters*: wiry branches; small solitary capitula; dark-tipped involucre.

*Distribution and habitat*: poorly known, currently only from a small area between Garies and Kotzesrus (Figure 3). 'Strandveld', deep sand, with sparse vegetation, of predominantly mesembryanthemous and asteraeous elements that seldom grow taller than 500 mm.

*Conservation status*: rare.

*Number of collections known*: 2.

Vouchers: Koekemoer 1099, 1100.

***Amphiglossa corrudifolia* DC.**, Prodrumus 6: 258. (1838). Type: in Africa australi ad Zwarte Camisberge et Onder Bokkeweld, alt. 2–300 ped, Drège 2723 (G-DC, lecto.!, here designated, BM!; P!; PRE, photo.!).

Erect, rhizomatous, chaffy-green shrubs, up to 0.4 m tall. *Branches* rigid, up to 4 mm diam., secondary branches ascending, to 2 mm diam., developing in each leaf axil on main stem; older plants forming well-anchored bushes; stems becoming rhizomatous and producing copious shoots when covered by sand deposits during floods. *Brachyblasts* developing in each leaf axil of secondary branches, generally short, up to 5 mm long, bearing capitula close to stems; secondary brachyblasts rare. *Young branches* and stems of brachyblasts often white-tomentose. *Leaves* bright green, sessile, adpressed, triangular, margins entire, slightly inrolled, midrib prominent, adaxial surface woolly; subtending leaves to secondary branches on main stems alternate, up to 11 mm long, 4 mm wide at base,  $\pm$  a leaf length apart, leaving branch exposed, browning with age and then often reflexed; subtending leaves on secondary stems much shorter, up to 5 mm long, 1.5 mm wide at base, becoming brown in older parts, ascending to inclined; leaves on brachyblasts minute, up to 2 mm

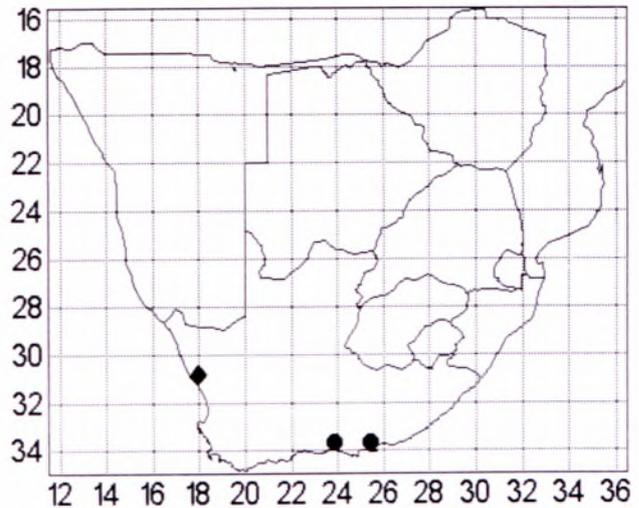


FIGURE 3.—Geographical distribution of *A. callunoides*, ●, and *A. celans*, ◆.

long, imbricate. *Capitula* radiate, heterogamous,  $7-8 \times 2-3$  mm, 8–10-flowered, with same number of ray and disc florets; single heads terminally borne on short brachyblasts, linear when young, involucre spreading at maturity to release pappus and seeds. *Outer involucral bracts* 10–15, 2.5–4.5 mm long, foliaceous in upper part and along midvein, in 3–6 series, ovate, increasing in length from outer to inner series, the outer about half the length of innermost bracts. *Inner involucral bracts* scarious along margins, 10–15, 6.0–7.5 mm long, in 4 or 5 series, linear to narrowly oblong, those in outer series remaining green around midrib, hyaline towards apex, those in innermost series hyaline in upper half, mucronate, as long as pappus. *Receptacle* flattened, less than 2 mm diam., honeycombed, ridges shorter than 1 mm. *Ray florets* white, female, 4 or 5, lamina shorter than 1 mm, narrower than 0.5 mm, tapering towards tip, 1–3-lobed; lobes equal or very uneven; tube 4.5–5.0 mm long. *Disc florets* white; tube often tinged with pink below lobes, bisexual, 5.0–5.5 mm long, 5-lobed; lobes often asymmetrical. *Cypselas* subterete,  $\pm 1$  mm long, greyish, inconspicuously ribbed, papillose, developing in 3–5 florets, more often in ray florets, released in a cluster at maturity, with pappus interlocking. *Pappus bristles* 18–23,  $\pm 5$  mm long, barbed in lower fifth, plumose in upper part, seta up to 1.5 mm long. *Flowering time*: January–April.

*Diagnostic characters*: rhizomatous; growing in sandy riverbeds; leaves small, triangular; brachyblasts numerous; capitula small, solitary; pappus fluffy.

*Distribution and habitat*: known from the Farm Klein Sleutelfontein in a dry riverbed in the Houtrivier, a tributary of the Sand River, near Prince Albert and from an unknown locality of Drège in the 'Bockland' (Figure 4). In deep shale-derived soils, in river or sand beds amongst grassy tufts. This species was recollected in September 1998 in the same area where Drège originally found it. Although it appears to be quite rare, an extensive search in the area is needed to establish the extent of the distribution.

*Conservation status*: rare, but well-conserved on protected farmland; could be endangered by flooding.

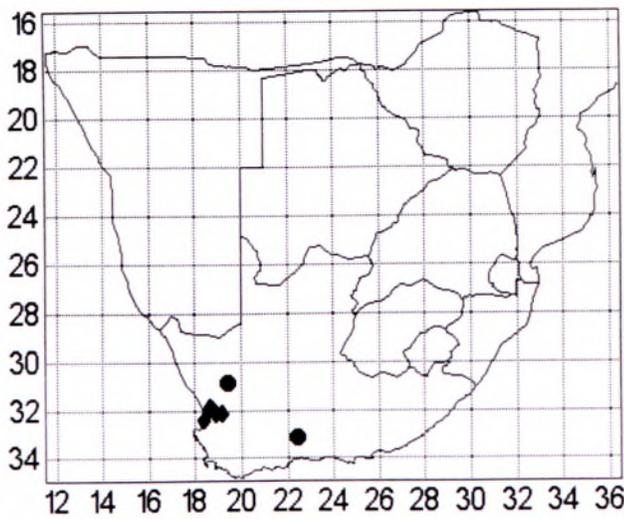


FIGURE 4.—Geographical distribution of *A. corrudifolia*, ●, and *A. grisea*, ◆.

Number of collections known: 11.

Vouchers: Drège 2723; Koekemoer 1291, 1380.

**Amphiglossa grisea** Koekemoer, sp. nov., frutex compactus multicaulis lignosus caesiellus, ad 0.3 m altus. Folia juvenia glauca, seniores brunnescentia. Capitula heterogama, 9-flora, cum flosculis 3 ligulatis et 6 tubulosis. Bractea involucriales exteriores 8–14, in parte superiori et secus nervum medium foliaceae. Flosculi radii albi, feminei, lamina  $\pm 1.5$  mm longa, plerumque in cochleam voluta. Flosculi tubulosi albi, hermaphroditi. Cypselae subteretes, ectocarpio libero. Pappi setae 15–20, in quinta parte basali hamatae, supra plumosae. Florescentia Januarii–Martii. Inter pagos Nieuwoudtville et Clanwilliam, in provincia Capensi Occidentali nota.

TYPE.—Western Cape, 3118 (Vanrhynsdorp): Nardouwsberg, 'Brand se Berg', turn-off from R363 road, top of pass, about 4 km after crossing the Doringrivier, (–DC), 1995-11-21, Koekemoer 1106 (PRE, holo.; MO, NBG, S, iso.). Figure 2C.

The specific epithet 'grisea' refers to the blue-grey colour of these shrubs.

Compact, multistemmed, woody blue-grey shrub, up to 0.3 m tall. Branches slender, up to 2 mm diam., entangled, bare in lower parts, new growth branching copiously at short intervals; secondary branches often white-tomentose, leafy, often with zigzag branching pattern; tertiary branches frequently at right angles but soon bending upwards, giving a candelabrum appearance. Brachyblasts absent or reduced to leafy clusters. Leaves up to  $6 \times 1$  mm, sessile, adpressed, linear, margins entire, slightly inrolled, midrib prominent, adaxial surface woolly, young leaves greyish green, older leaves brownish. Capitula radiate, heterogamous,  $6.5\text{--}7.5 \times 2\text{--}3$  mm, 9-flowered, with 3 ray and 6 disc florets; single heads terminally borne on tertiary branches, linear when young, involucre spreading at maturity to release pappus and seeds. Outer involucrial bracts 8–14, 2.5–4.5 mm

long, foliaceous in upper part and along midvein, ovate, increasing in length from outer to inner series, outer about half the length of innermost bracts. Inner involucrial bracts scarious, 15–20, 5.0–6.0 mm long, linear to narrowly oblong. Receptacle flattened, less than 2 mm diam., honeycombed, ridges shorter than 1 mm. Ray florets white, female, lamina  $\pm 1.5$  mm long, characteristically rolled like a watch-spring, 3-lobed. Disc florets white, bisexual, 5-lobed, up to 4 mm long with few glands on outer surface of lobes. Anthers apically truncate. Cypselas subterete,  $\pm 1$  mm long, greyish, inconspicuously ribbed, papillose, with loose ectocarp, but ecto- and endocarp seemingly attached at cypselas base. Pappus bristles 15–20,  $\pm 3.5$  mm long, barbed in lower fifth, plumose in upper part, seta up to 1 mm long, bristles free, truncate and tufted at apex. Flowering time: January–March.

**Diagnostic characters:** compact grey bush; small, unobtrusive capitula; lamina of ray florets rolled like a watch-spring.

**Distribution and habitat:** Western Cape between Nieuwoudtville and Clanwilliam (Figure 4). Sandy flats and mountain foothills.

**Conservation status:** not threatened; thrives on disturbances.

Number of collections known: 6.

Vouchers: Hugo 1027; Koekemoer 588, 1106, 1111, 1215.

**Amphiglossa perotrichoides** DC., Prodrômus 6: 258. (1838). Type: Western Cape, Swellendam Div., Burchell 7499 (K, lecto!, here designated; PRE!).

*Pterothrix perotrichoides* (DC.) Harv.: 275 (1894), syn. nov.

Woody, multistemmed grey shrub, up to 0.3 m tall. Main branches up to 1.5 mm diam., long, slender and very flexible, erect at first, bending towards ground, possibly becoming stoloniferous where they touch soil; secondary branches developing from base upwards, creating impression that branching is restricted to only one side of main branch. Brachyblasts reduced to short leafy clusters. Leaves sessile, adpressed or ascending, linear, up to 10 mm long, margins entire, slightly inrolled, adaxial surface woolly; subtending leaves  $8\text{--}16 \times 1$  mm. Capitula discoid, homogamous,  $8\text{--}9 \times 2\text{--}3$  mm, 4–5-flowered, borne individually in the 4–8 terminal leaf axils of secondary branches. Involucrial bracts 16–20, outer bracts  $\pm 3.5$  mm long, inner bracts up to 8 mm long, foliaceous bracts absent or in some florets restricted to 1 or 2 outermost bracts, basally ovate with aristate tips, upper part hyaline and spreading somewhat at maturity. Receptacle flattened, less than 2 mm diam., honeycombed, ridges shorter than 1 mm. Disc florets white, bisexual, 5-lobed, often asymmetrical, 5.0–5.5 mm long. Anther tails short and stout. Cypselas terete,  $\pm 1$  mm long, without visible ribs, papillose, annulus fairly well developed. Pappus bristles 25–30,  $\pm 5$  mm long, barbed in lower fifth, plumose in upper part, seta up to 1.5 mm long. Flowering time: December–January.

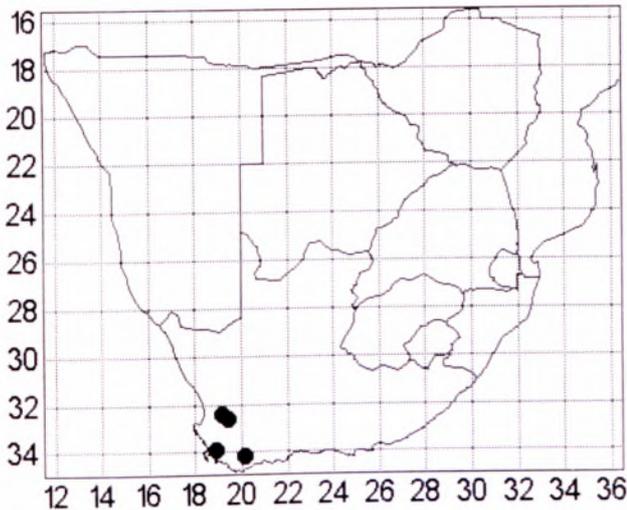


FIGURE 5.—Geographical distribution of *A. perotrichoides*. ●

**Diagnostic characters:** homogamous heads; involucre reflexed in upper third, tips aristate.

**Distribution and habitat:** known from Swellendam area and Cederberg (Figure 5). Coastal and Mountain Renosterveld.

**Conservation status:** probably endangered, together with the threatened Renosterveld.

**Number of collections known:** 8.

**Vouchers:** *Acocks* 23237; *Burchell* 7499; *Koekemoer* 602, 608.

***Amphiglossa rudolphii* Koekemoer, sp. nov.**, frutex virgatus robustus ad 1.2 m altus et 1 m diametro. *Rami* laeves perfragiles, maxime implexi, fruticem densum, sparse foliatum formantes. *Folia* breve petiolata. *Capitula* homogama, semper quinqueflora. *Bracteae involucrales* 30–35, plerumque in pagina adaxiali tomentosae. *Flosculi tubulosi* albi, hermaphroditi. *Cypselae* solum in uno e 5 flosculis evolutae, subteretes, asymmetricae, griseolae, ectocarpio libero. *Pappi setae* 20–28, basin versus perbrevis hamatae, supra plumosae. *Florescentia* Februarii–Junii. Solum ex areis paucis in provincia Capensi Occidentali nota: Botterkloof, ad meridiem pagi Nieuwoudtville, ad Loeriesfontein et prope Worcester.

**TYPE.**—Western Cape, 3119 (Worcester): 50 km S of Nieuwoudtville on R364 road to Clanwilliam, 1 km N of turn-off to Farm Lasvlei, (–CD), 1996-03-20, *Koekemoer* 1210 (PRE, holo.; NBG, S, MO, BOL, iso.). Figure 2D.

The specific epithet of this plant is to commemorate my father, Rudolph, in gratitude for his patient assistance in collecting specimens and seed of this species.

Wiry, robust shrub up to 1.2 m tall and 1 m wide. *Branches* smooth and very brittle, rarely more than 5 mm diam., very much entangled to form dense, sparsely-leaved bushes; older branches bare with conspicuous leaf scars. *Leaves* very shortly petiolate, ascending, linear to narrowly oblong, twisted  $\pm 270^{\circ}$ – $360^{\circ}$ , greyish green, margins entire, slightly inrolled, adaxial surface woolly,

generally 6–10  $\times$  1–2 mm, on new shoots to 30  $\times$  5 mm, probably persistent for one season only. *Brachyblasts* generally absent, except on new, actively growing branches and then only 2–4-leaved shoots. *Capitula* discoid, homogamous, 7–10 mm long, 1–2 mm wide, consistently 5-flowered; heads developing in the 2–7 terminal leaf axils of a branch, linear when young, involucre spreading in upper half at maturity, lower part remaining tubular. *Involucre* with 30–35 bracts, bearing characteristically tomentose markings on adaxial surfaces, fairly uniform in texture and appearance, becoming progressively longer from outer to inner bracts. *Outer involucral bracts* scale-like, 1.5–2.0 mm long and almost as wide, thus very widely ovate in shape, following series widely ovate, up to 2.5 mm long, next two series ovate, up to 4 mm long and 5 mm long respectively, innermost series lanceolate to linear, up to 8 mm long. *Inner involucral bracts* 10–15, in 4 or 5 series, scarios along margins, with multicellular glands, 6.0–7.5 mm long, linear to narrowly oblong, those in outer series remaining green around midrib, hyaline towards apex, those in innermost series hyaline in upper half, mucronate, as long as pappus. *Receptacle* flattened, less than 2 mm diam., honey-combed, ridges shorter than 1 mm. *Disc florets* white, bisexual, 5-lobed, 6–7 mm long; lobes 0.8–1.0 mm long. *Anthers* basally feathery-tailed. *Cypselas* subterete, asymmetric,  $\pm 1$  mm long, greyish coloured, papillose, indistinctly ribbed, with 3 ribs visible, developing in only 1 of the 5 florets; ectocarp loose, easily removable, 1 cell layer thick; endocarp darker and thicker, forming a cavity filled with a hygroscopic gel-like substance, which expands rapidly when it comes into contact with water, causing the seedcoat to burst; cotyledons dark purplish; released in a cluster together with entangled pappus at maturity. *Pappus bristles* 20–28,  $\pm 5.5$  mm long, barbed for a very short distance at base, plumose in upper part, seta up to 1 mm long. *Flowering time:* February–June.

**Diagnostic characters:** large bush; branches brittle; leaves widely spaced; capitula small, terminal on branches; involucre spreading to release fluffy pappus; usually only one fairly large, subterete seed per capitulum.

**Distribution and habitat:** known from a few areas only: Botterkloof, south of Nieuwoudtville, Loeriesfontein and Worcester area (Figure 6). Rocky terrain in Mountain Renosterveld.

**Conservation status:** not threatened.

**Number of collections known:** 5.

**Vouchers:** *Conradie s.n.*; *Hartman* 12947; *Koekemoer* 1210, 1211, 1214.

***Amphiglossa susannae* Koekemoer, sp. nov.**, frutex virgatus multicaulis lignosus fumosus, ad 0.5 m altus. *Apices foliorum* rotundati. *Capitula* homogama, quinqueflora, nitore claro flavo-viridi. *Bracteae involucrales* 20–28, cum strictura circa quinta parte infra apicem; bracteae intimae apicibus cochlearibus. *Flosculi tubulosi* albi, hermaphroditi. *Cypselae* subteretes, badiae, ectocarpio ut videtur libero. *Pappi setae* 20–26, in quinta parte basali hamatae, supra plumosae. *Florescentia* Novembris

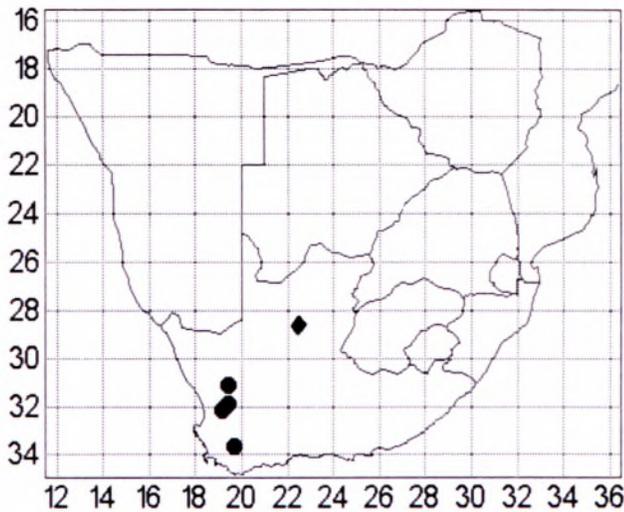


FIGURE 6.—Geographical distribution of *A. rudolphii*, ●; and *A. tecta*, ◆.

Decembrisque. Crescit in provincia Capensi Occidentali, in planitie alta montis Swartuggens.

TYPE.—Western Cape, 3219 (Wuppertal): Kaggera Kamma Nature Reserve, SE of chalets in red sand, (–DA), 1995-11-24, *Koekemoer 1115* (PRE, holo.; MO, NBG, BOL, K, S, iso.). Figure 2E.

The specific epithet of this plant is to commemorate my mother, Susan, who very enthusiastically helped to collect specimens at Kaggera Kamma.

Wiry, erect, multistemmed, woody, yellowish grey shrub, up to 0.5 m tall. *Stems* up to 2 mm diam., bare in lower parts. *Leaves* 3–7 mm long, sessile, mostly solitary, but sometimes in small fascicles in young growth, ascending, linear, margins entire, slightly inrolled, adaxial surface woolly, leaf tips rounded; young leaves yellowish green, older leaves fading to dark grey and dropping off easily. *Capitula* discoid, homogamous, 6–7 × 2 mm, 5-flowered, terminal, solitary or in groups of up to 4, their bright, greenish yellow colour contrasting with the darker leaves. *Involucre* of 20–28 bracts, increasing in length from outer to inner series, 5.5–6.0 mm long, with a constriction at about one fifth from tip and yellowish below constriction. *Outer involucral bracts* broadly ovate, with acute hyaline tips, not foliaceous, following series with hyaline part above constriction, gradually increasing in width and resulting in a membranous, spoon-shaped tip in innermost bracts. *Receptacle* conical, less than 2 mm diam., honeycombed, ridges shorter than 1 mm. *Disc florets* white, bisexual, 5-lobed, 4.5–5.0 mm long, outer lobes of closed florets very glandular. *Cypselas* subterete, ± 1 mm long, chestnut-coloured, inconspicuously ribbed, papillose, appearing to have a loose ectocarp, with a small attachment area between endo- and ectocarp at the base. *Pappus* bristles 20–26, ± 4.5 mm long, barbed in lower fifth, plumose in upper part, seta up to 1.5 mm long. *Flowering time*: November and December.

*Diagnostic characters*: yellowish sheen to leaves and capitula; terminal heads small; involucre yellowish in lower parts with tips hyaline; innermost involucre with spoon-shaped tips.

*Distribution and habitat*: on plateau on Swartuggens Mountain in the Ceres-Karoo (Figure 7). Deep red or white sand in level areas between TMS outcrops.

*Conservation status*: not threatened.

*Number of collections known*: 5.

*Vouchers*: Esterhuysen 29338; *Koekemoer 609, 1115, 1116*; Taylor 12106.

***Amphiglossa tecta* (F.Bruse) Koekemoer, comb. nov.**

*Pterothrix tecta* F.Bruse in *Bothalia* 20: 67 (1990), syn. nov. Type: Northern Cape, 2822 (Glen Lyon): Hay Dist., Witsand, some 70 km SW of Postmasburg, (–CB), 1989-11-26, *Bruse 5629* (PRE, holo.; AD, B, BAF, BH, BM, BOL, BR, BRI, C, CAN, CANB, COI, E, EA, G, GH, GRA, HBG, J, K!, L, LD, LG, LISU, LMA, M, MEL, MO, NBG!, NH, NSW, NU, O, P, R, S!, SRGH, U, UC, UPS!, US, W, WAG!, WIND, Z, iso.). Figure 2F.

Erect, robust, single or multistemmed shrub, to 0.6 m tall, aromatic. *Stems* gnarled, dark grey, up to 40 mm diam., often buried in sand towards base; secondary branches up to 5 mm thick, bark thin, golden chestnut-brown to reddish brown or reddish in places, glabrous or with golden flakes peeling off; tertiary branches white-tomentose when young, becoming golden-yellow, glabrous and peeling when older. *Leaves* alternate, sessile, linear, 1.0–11.0 × 0.7–2.2 mm, broadest at base, ascending but spreading in upper half, margins involute; upper surface canaliculate, woolly-white; abaxially glabrous, epidermis sloughing off and becoming folliculate, especially at base; midrib raised, particularly at base, apex obtuse, mucro very small, inconspicuous. *Capitula* discoid, solitary, terminal, sessile, homogamous, discoid, cylindrical, 7.0–8.0 × 2.5–3.5 mm, 10–12-flowered. *Involucral bracts* 20–26, becoming progressively longer inwardly, tips hooded, pellucid, bronze, innermost bracts glabrous, lanceolate, up to 6.0 × 0.8–1.0 mm, remaining bracts ovate, 1.5–6.0 × 1.5–2.0 mm, stereomes entire, with conspicuous white-tomentose patches at apices. *Receptacle* honeycombed, ridges between cypselas bases shorter than 1 mm. *Disc florets*

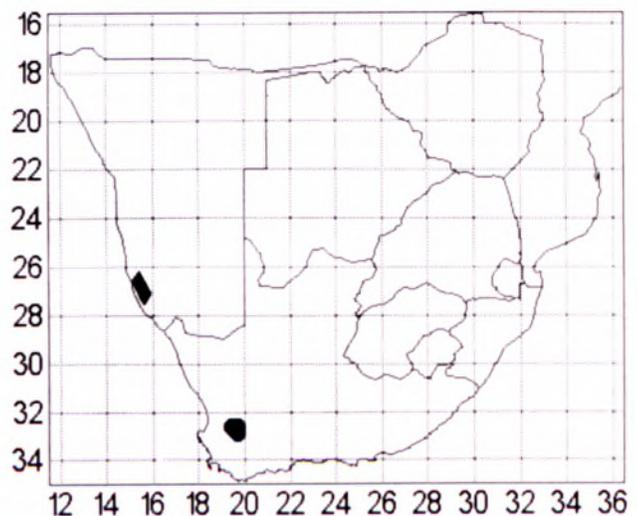


FIGURE 7.—Geographical distribution of *A. susannae*, ●; and *A. thuja*, ◆.

bisexual and fertile,  $\pm 7$  mm long; corolla white or pale mauve from above,  $\pm 5.5$  mm long, 5-lobed; tube cylindrical and widening towards apex, 5 mm long, purplish above, becoming pale greenish below; lobes deltoid, acute, spreading. *Nectary* present. *Cypsela* subterete, 1.0–1.8 mm long, glabrous, papillose, cream-coloured, 5-ribbed, apex with thickened ring, does not seem to have a loose ectocarp or cavity filled with gel-like substance. *Pappus* bristles free, plumose, but base barbed, 3.5–4.5 mm long. *Flowering time*: mainly November, but also recorded in January, March and July.

*Diagnostic characters*: capitula 10–12-flowered; involucre with conspicuous white tomentose patches abaxially; innermost bracts with tips hooded; restricted to Witsand.

*Distribution and habitat*: it has a restricted distribution in the northwestern area of the Witsand dune complex, 70 km southwest of Postmasburg in the Northern Cape (Figure 6). White sand dunes of Aeolian origin, deposited during the Middle and Upper Pleistocene, as were the red Kalahari sands. The water table in the dune complex is high and acts as a reservoir to support vegetation in the basin.

*Conservation status*: not threatened. The Witsand area is now being conserved by Cape Nature Conservation and as long as the habitat is protected, there is no threat of extinction. Although it is localised, it is abundant in the area.

*Number of collections known*: 10.

*Vouchers*: *Brusse* 5629; *Koekemoer* 1066; *Leistner* 1170, 1390, 1614; *MacDonald* 76/43.

***Amphiglossa thuja* (Merxm.) Koekemoer, comb. nov.**

*Pterothrix thuja* Merxm. in Mitteilungen der Botanischen Staatssammlung, München. Heft 2: 36 (1954). Type: Karasburg, Rotkop, *Dinter* 6008 (M, holo.; BM!, PRE!, K!, S!, G!, E!, iso.). Figure 2G.

*P. thuja* Merxm.: 407 (1954), nomen.

*P. trifurcata* C.A.Sm. ex Merxm. in sched. herb. Kew, nomen. Cited specimen: Namibia, Rote Kuppe, alt. 800 m, *Dinter* 1025 (K!).

Erect woody, single-stemmed, brownish grey, strongly aromatic, compact dwarf shrub, up to 0.2 m tall; very old plants up to 0.45 m tall but then breaking up, with main branches prostrate. *Bark* of older stems becoming greyish and flaky with age, tearing off in strips to uncover a chestnut-coloured stem; older main stems up to 30 mm diam., tending to split and appearing very uneven when seen in cross section, dead wood persistent on plant for a long time. *Main branches* up to 5 mm diam., profusely branching into very fine shoots, less than 1 mm diam., with active growth restricted to very tips of fine branches, which are covered in minute leaves. *Leaves* up to 1.5 mm long, scale-like, adpressed, sessile, greyish green, alternate, about a leaf length apart, margins entire, slightly inrolled, adaxial surface woolly. *Capitula* discoid, small, up to  $7 \times 2$  mm, homogamous, 3–4-flow-

ered, terminally borne on branchlets, linear when young, involucre spreading at maturity to release pappus and seeds. *Outer involucral bracts* 22–28, 1–6 mm long, ovate with acuminate tips, becoming progressively longer inwards, outermost scale-like. *Inner involucral bracts* linear, membranous in upper fifth, this part slightly ascending, apex shortly mucronate. *Receptacle* conical, less than 2 mm diam., honeycombed, ridges shorter than 1 mm. *Disc florets* white, bisexual, 5-lobed, 5.0–5.5 mm long. *Cypselas* subterete,  $\pm 1$  mm long, greyish, inconspicuously ribbed, papillose, often only one per capitulum, appearing to have a loose ectocarp, but cavity with gel-like substance not obvious as in *A. rudolphii*. *Pappus* bristles 18–23,  $\pm 5$  mm long, barbed in lower fifth, plumose in upper part, seta up to 1.5 mm long. *Flowering time*: January–March.

*Diagnostic characters*: compact shrub with branches copiously branched into very fine, secondary branches; leaves and twigs pleasantly aromatic when crushed.

*Distribution and habitat*: restricted to Kosis Mountain near Lüderitz in Namibia, possibly also on other mountains in the area (Figure 7). In sand on granite mountains.

*Conservation status*: not threatened.

*Number of collections known*: 7.

*Vouchers*: *De Winter & Hardy* 7898; *Dinter* 6008; *Koekemoer* 1200.

***Amphiglossa tomentosa* (Thunb.) Harv. in Harv. & Sond., Flora capensis 3: 276 (1894). Type: Thunberg (sheet 20103 UPS!). Figure 2H.**

*Relhania tomentosa* Thunb.: 640 (1823). *Athrixia tomentosa* Less.: 364. (1832). *Pterothrix tomentosa* DC. 280. (1838).

*Amphiglossa nitidula* DC.: 259. (1838). syn. nov. Type: in Africa australi ad Zwarte Onder Bokkeveld et Zeederbergen, alt. 2–300 ped. 1835, *Drège* 2781 (G-DC!, P!).

*Pterothrix flaccida* Schlechter in sched. Cited specimen: Brandvlei, 1896-01-08, *Schlechter* 1655 (K!, NBG!, PRE!, S!).

*Amphiglossa tomentosa* (Thunb.) Harv. var. *breviligulata* Merxm., syn. nov., nomen. Cited specimen: Brandvlei, 1897-01-08, *Schlechter* 9923 (M, holo.; P!, E!, G! (4 $\times$ ), NBG!, K!, iso.).

*Pteronia engleriana* Muschl.: 98 (1911). *Pterothrix engleriana* (Muschl.) Hutch. & E. Phillips: 277 (1917). Type: Aus, G.S.W.A., 1 400 m, *Dinter* 1107 (K!, SAM!).

*Pterothrix flaccida* Schltr. ex Hutch. & E. Phillips: 379 (1917). syn. nov., nomen.

Woody, compact, multistemmed dwarf shrubs, up to 0.6 m tall, but very often with growth stunted and then  $\pm 0.2$  m tall. *Stems* up to 3 mm diam., smooth, wiry and brittle, produced from a well-developed rootstock, older dead stems persistent; stems bare for largest part, leaf cluster scars prominent, profusely and very finely branched in upper parts, young growth often with zigzag appearance. *Leaves* sessile, in fascicles; subtending leaves up to  $15 \times 1$  mm, about twice as long as others in fascicle, ascending, linear, straight or twisted, margins entire, slightly inrolled, adaxial surface woolly; fascicles widely spaced, at least a leaf length apart, leaving

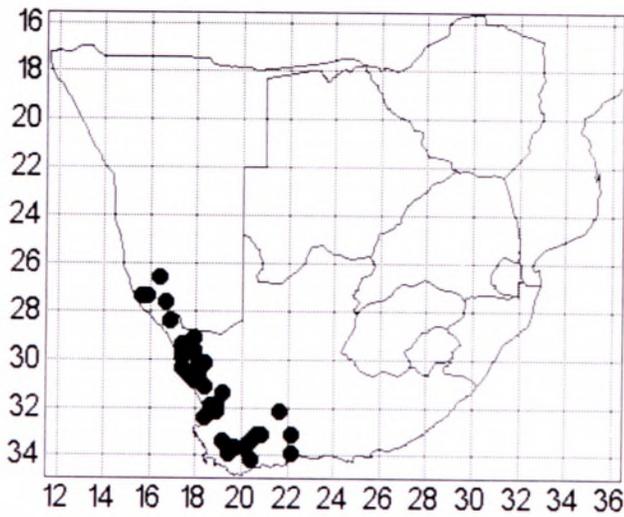


FIGURE 8.—Geographical distribution of *A. tomentosa*, ●.

branches exposed. *Capitula* radiate, heterogamous, 8.5–10.0 × 2.5–3.5 mm, 8–9-flowered, with more disc than ray florets; one to three heads terminally borne on each of the last 2–4 nodes of branches, linear when young, involucre spreading at maturity. *Involucral bracts* 30–35, scarious, often tinged wine-red, with very distinct white-tomentose patches on abaxial side, all very similar except for difference in size, foliaceous bracts limited to 2–5, outer bracts  $2.5\text{--}3.0 \times \pm 1.5$  mm, tomentose patch fairly large in upper half, inner bracts to  $8 \times \pm 1$  mm, tomentose patch becoming increasingly smaller and almost disappearing in innermost bracts. *Receptacle* flattened, less than 2 mm diam., honeycombed, ridges shorter than 1 mm. *Ray florets* white or pink, female, 3–4 (–5), lamina 2.8–3.5 × 1.8 mm, 3-lobed; tube 5.2–5.4 mm long. *Disc florets* white or pink, bisexual, 5-lobed, 5.5–6.5 mm long. *Cypselas* subterete, ± 1 mm long, greyish coloured, inconspicuously ribbed, papillose, with distinct annular ridge. *Pappus bristles* 20–28, ± 5 mm long, barbed in lower fifth, plumose in upper part, seta up to 1.5 mm long. *Flowering time*: September–December.

*Diagnostic characters*: compact shrub; 3–5 ray florets; wiry, brittle branches; involucre with conspicuous tomentose patches abaxially.

*Distribution and habitat*: from Lüderitz southwards to the Western Cape and inland to Oudtshoorn (Figure 8). Sandy soils, often in deep red sand and on granite outcrops.

*Conservation status*: not threatened.

*Number of collections known*: 75.

*Vouchers*: Acocks 8583; Compton 3201; Esterhuysen 19291; Koekemoer 1097, 1104; Merxmüller & Giess 32122.

***Amphiglossa triflora* DC.**, Prodrômus 6: 258. (1838). Type: C.B.S. ad Zwart Kei auf der Fläche, alt. 4–5000 ped, *Drège* 3679 [G-DC!, K!, S!, P (4×)!]. Figure 2I.

*Pterothrix spinescens* DC.: 280. (1838), syn. nov. Type: C.B.S. in regionibus interioribus inter flumen Gariet et urbem Litakun detexit, Burchell 1845 (G-DC!, PRE!, K!).

*Helichrysum armatum* Dinter ex Merxm. nom. nud.

Erect woody, densely entangled, greyish shrub, up to 0.4 m tall, with many stems developing from a well-developed, underground rootstock. *Stems* rigid, up to 2 mm diam., old, dry stems persistent; young active shoots to 2.5 mm diam., often white-tomentose; terminal branches frequently spinescent; young spines leafy, older spines bare, 8–25 mm long. *Leaves* sessile, up to 8 mm long, basally adpressed, ascending in upper part, at least half a leaf length apart, narrowly triangular, margins entire, inrolled, midrib prominent, adaxial surface woolly, persistent for at least two seasons, young leaves yellowish green, older leaves fading to grey. *Capitula* discoid, homogamous, 8–9 × 1.5–2.5 mm, 4–5-flowered; heads terminally borne, solitary or in groups of up to 8. *Involucral bracts* 20–25, up to 7.5 mm long, increasing progressively in length from outer to inner series, outer broadly ovate, inner linear, hyaline in upper part, tips aristate, tomentose patch on abaxial side. *Receptacle* flattened, less than 2 mm diam., honeycombed, ridges shorter than 1 mm. *Disc florets* white, bisexual, 5-lobed, 5.0–5.5 mm long. *Cypselas* subterete, ± 1 mm long, papillose, with a distinct annulus. *Pappus bristles* free, caducous, 25–32, ± 5 mm long, barbed in lower fifth, plumose in upper part, seta up to 1.5 mm long. *Flowering time*: mainly October–March, occasionally in September, April and June.

*Diagnostic characters*: compact, dense, spiny shrub with small, linear capitula.

*Distribution and habitat*: Namibia, Northern Cape, North-West, Lesotho, Free State, Gauteng and Mpumalanga (Figure 9). Sandy soils, most often on limestone outcrops or sandstone koppies, frequently in disturbed or overgrazed veld.

*Conservation status*: not threatened.

*Number of collections known*: 80.

*Vouchers*: Edwards 4175; Giess 12566; Hilliard & Burt 10669; Koekemoer 1057, 1064.

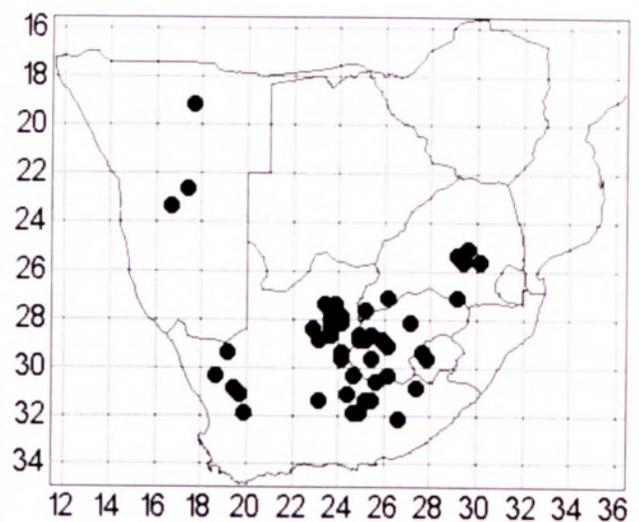


FIGURE 9.—Geographical distribution of *A. triflora*, ●.

## NAMES EXCLUDED

*Amphiglossa alopecuroides* Sch.Bip. = *Stoebe alopecuroides* (Lam.) Less.

*Amphiglossa kolbei* Bolus = *Disparago kolbei* (Bolus) Hutch.

*Pterothrix cymbaefolia* Harv. Does not belong to *Amphiglossa* or any other related genus. An almost leafless twig with two old capitula was seen in S. The leaves are 10–20 × 4–5 mm, shortly petiolate, flat, not involute and slightly tomentose on the abaxial surface.

## ACKNOWLEDGEMENTS

This revision is part of a larger research project on the systematics of the *Metalasia* group (Gnaphalieae, Relhaniinae, Asteraceae) and the support of my supervisor, Prof. B-E. van Wyk of the Rand Afrikaans University, is acknowledged. The financial support and use of facilities at the NBI is acknowledged in appreciation. Fieldwork assistance of my parents and generous overall support are valued dearly. Adela Romanowski is thanked for the miracles in the darkroom, Dr H.F. Glen for the Latin diagnosis, Dr S.M. Perold for proofreading the manuscript, the editors of the journal and the referees for valuable comments.

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