

***Caputia*, a new genus to accommodate four succulent South African Senecioneae (Compositae) species**

BERTIL NORDENSTAM¹ & PIETER B. PELSER²

¹Department of Phanerogamic Botany
Swedish Museum of Natural History, Box 50007
SE-10405 Stockholm, Sweden
bertil.nordenstam@nrm.se

²University of Canterbury, School of Biological Sciences
Private Bag 4800, Christchurch 8140, New Zealand
pieter.pelsers@canterbury.ac.nz

Abstract

The new genus *Caputia* B. NORD. & PELSER is described, with four species confined to South Africa. Its members are succulent perennial herbs or shrubs with more or less fleshy tomentose or glabrescent leaves. The genus has tussilaginoïd as well as senecioid morphological characters, and takes strongly supported incongruent phylogenetic positions in nuclear and plastid phylogenies: sister to subtribe Brachyglottidinae or sister to the Synotoid group of Senecioninae, respectively. This suggests that the genus is potentially of hybrid origin. The four species are *Caputia medley-woodii* (HUTCH.) B. NORD. & PELSER (type), *C. tomentosa* (HAW.) B. NORD. & PELSER, *C. scaposa* (DC.) B. NORD. & PELSER and *C. pyramidata* (DC.) B. NORD. & PELSER.

Introduction

One of the most interesting of the generic entities identified in our phylogenetic survey of the tribe Senecioneae (PELSER et al. 2007, 2010, NORDENSTAM et al. 2009) is the *Senecio medley-woodii* group. There is no available generic name for this distinct assemblage of four succulent species, confined to South Africa, and some of which are quite spectacular and well known in cultivation (ROWLEY 1994, CULLEN et al. 2000, EGGLI 2002). We here suggest the new generic name *Caputia* for this assemblage, an allusion to their geographical origin. The name has provisionally already been used, e.g. in PELSER et al. (2010). The old geographical name *Caput bonae spei* was often applied not only to the Cape of Good Hope



Fig.1. *Caputia medley-woodii*.
From Flow. Pl. S. Afr. Plate 83 (1923), “*Senecio Medley-Woodii*”.

itself, but to the Cape Province or even the whole of South Africa. The generic name also alludes to *Capelio*, one of the early-diverging genera in the tribe, and herbaria with alphabetical generic order will then conveniently file these two genera close together.

Discussion

The members of *Caputia* used to be treated under *Senecio* L. (HARVEY 1865, HUTCHINSON 1923, ROWLEY 1994, 2002) and one of them sometimes in *Kleinia* MILL. (DE CANDOLLE 1838, HARVEY 1865, MARLOTH 1932). In phylogenies derived from nuclear as well as plastid DNA sequences the genus is only distantly related to *Senecio* s.str. In an ITS phylogeny of the tribe (PELSER et al. 2007), three *Caputia* species (included as *Senecio medley-woodii*, *S. scaposus* and *S. pyramidatus*) form a clade that is sister to subtribe Brachyglottidinae. This subtribe (which is not yet formally published) has a majority of genera in Australasia (*Brachyglottis*, *Bedfordia*, *Dolichoglottis*, *Haastia*, etc.), but also extensions into New Guinea (*Papuacalia*) and Chile (*Acrisione*). However, the plastid phylogeny presented by PELSER et al. (2007) indicates a close relationship between *Caputia* and the Asian genus *Synotis* in subtribe Senecioninae. This phylogenetic incongruence was later confirmed in a study that used a more extensive sampling of Senecioneae genera and characters (PELSER et al. 2010). The ITS/ETS phylogeny in the latter study places *Caputia* sister to the Brachyglottidinae (100% parsimony bootstrap support [BS]; 1.0 posterior probability [PP]). Again, plastid DNA sequence data suggest closer affinities with the Senecioninae and resolved *Caputia* sister to the Synotoid group (95% BS; 1.0 PP), which is composed of *Austrosynotis* (Tropical Africa), *Cissampelopsis* (Asia), *Dauresia* (Namibia), *Humbertacalia* plus a few related genera (Madagascar and Mascarenes), *Mikaniopsis* (Africa), and *Synotis* (E Asia especially Sino-Himalayan region).

PELSER et al. (2010) suggested that ancient hybridization is the most likely explanation for the incongruent phylogenetic position of *Caputia*. Morphology provides some, although admittedly limited, support for this hypothesis. Subtribe Brachyglottidinae is characterized by ‘tussilaginoid’ features and among these are anthers with a cylindrical filament collar and polarized endothelial cell walls. In subtribe Senecioninae, however, mostly ‘senecioid’ features are found and these include balustriform filament collars and radial endothelial cell walls. The anthers of *Caputia* appear to be somewhat intermediate. Their filament collar is subcylindrical or weakly balustriform and the endothecium is transitional with radial and polarized thickenings. The disc-floret styles have continuous stigmatic areas, a feature characteristic of tussilaginoid genera and less common among the senecioid taxa.

Taxonomy and Descriptions

Caputia B. NORD. & PELSER, gen. nov.

Erect branching shrubs, shrublets or thick-stemmed herbs. Leaves alternate, sessile, subcarnose to strongly succulent, flattened and thickish to terete, entire or coarsely dentate, mostly thinly to densely tomentose, sometimes glabrescent, sometimes persistently silvery white-felted. Capitula large, solitary or few to many in corymbose or thyrsoïd synflorescences, radiate or discoid. Involucre cupshaped; phyllaries 8–13, uniseriate. Receptacle flat, glabrous, alveolate. Ray-florets absent or 8–13(–14), female, yellow; lamina strapshaped. Style bilobed. Cypsela ellipsoid-oblong, glabrous or with few scattered trichomes, sometimes more densely puberulous basally. Pappus bristles numerous, barbellate, white, persistent. Disc-florets numerous, hermaphroditic; corolla tubular, somewhat widening distally, 5-lobed; lobes triangular-ovate, midlined, apically subcucullate and somewhat papillate. Anthers basally obtuse to shortly sagittate; endothecium transitional with radial and polarized thickenings; filament collar subcylindrical or weakly balustriform; apical appendage ovate, flat. Style bifurcate with continuous stigmatic area inside the branches, apically subtruncate with few and short sweeping-hairs. Cypsela fusiform-ellipsoid, glabrous or puberulous. Pappus bristles numerous, white, persistent. Chromosome no. 2n = 20 (x = 10) with large chromosomes.

Four species, distributed in mostly arid parts of Western and Eastern Cape Province, KwaZulu-Natal and Swaziland.

Type species: *Caputia medley-woodii* (HUTCH.) B. NORD. & PELSER.

Key to the species of Caputia

- 1a. Stems and leaves with a dense silvery-white persistent tomentum. Capitula discoid 2. *C. tomentosa*
- 1b. Plants araneose-tomentose, glabrescent. Capitula radiate 2
- 2a. Leaves flattened, obovate—rhomboid 1. *C. medley-woodii*
- 2b. Leaves terete (cylindrical, fusiform, sometimes apically flattened) 3
- 3a. Stemless or short-stemmed shrublets. Capitula few (1—6) in racemose synflorescence 3. *C. scaposa*
- 3b. Shrubs up to 180 cm high. Capitula numerous in conical or elongated synflorescence 4. *C. pyramidata*



Fig. 2. *Caputia tomentosa*, flowering in National Botanic Gardens, Kirstenbosch, South Africa. Photo: B. NORDENSTAM 2007.



Fig. 3. *Caputia tomentosa*. From Curtis Bot. Mag. 6063 (1873), “*Senecio Haworthii*”.

1. *Caputia medley-woodii* (HUTCH.) B. NORD. & PELSER, comb. nov.

Basionym: *Senecio medley-woodii* HUTCH., Fl. Pl. S. Afr. Plate 83 (1923).

A branched shrub 0.5–2 m tall; stems thick, fleshy, often red or purplish, white-felted when young, glabrescent. Leaves sessile, obovate to rhomboid, 3–6 cm long, 1.5–3 cm wide, flattened but carnose, margins entire to coarsely dentate especially distally and somewhat undulate, apically mucronate-apiculate, basally somewhat cuneate, white-tomentose when young, becoming glabrous. Peduncle 10–20 cm long with 1–4 capitula in corymbose arrangement, with small scattered bracts. Capitulum large, radiate. Involucre campanulate, with a few minute calyculus bracts; phyllaries 8–13, uniseriate, lanceolate–elliptic-ovate, 12–15 mm long, 3–6 mm wide, somewhat woolly, subcoriaceous, obtuse. Receptacle flat to somewhat convex, minutely alveolate with shortly fringed margins and a small central pit. Ray-florets ca. 12 (10–14), tube cylindric, 5–6 mm long, glabrous or with scattered short trichomes, lamina 1.5 cm long, bright yellow, 6–8-veined. Disc-florets 30–70, corolla 12 mm long, yellow or brownish-yellow, gradually widening upwards; lobes 1.5 mm long with a median resin duct. Style branches 2 mm long, apically truncate and minutely penicillate. Cypsela 6–7 mm long, fusiform, glabrous, 5-ribbed. Pappus bristles 9–10 mm long, white, persistent. Chromosome no. $2n = 20$ (AFZELIUS 1967). – Fig. 1.

Selected collections (herbarium abbreviations as in HOLMGREN et al. 1990):

SOUTH AFRICA, NATAL: /2930DA Pietermaritzburg/, Craiglea, opposite Monteseel to the E and Table Mountain to the W, edge of escarp, 19.VI.1977, P. C. V. DE TOIT 2437 (K); Oribi Flats, top of Oribi Gorge, IV.1937, A. P. D. McCLEAN 563 (K); Ngotshe, Lebombo Mts, Majezind area, 1750 ft, 8.VII.1962, C. J. WARD 4183 (K); /3030 Port Shepstone/, granite hill 4 miles inland Umtentweni, 6.VIII.1967, R. G. STREY 7617 (K, S); Natal, Port Shepstone, Fairacres Estate on Oribi Flats, krans overlooking deep Umzimkulwana Valley, 22.VII.1953, R. A. DYER 5416 (K); near Murchison, recd. X.1884, MEDLEY-WOOD 3065 (K); Krantz Kloof, 23.VIII.1915, J. M. WOOD 13247, “*Medley-Woodii* HUTCHINSON n.sp.” (K 1 specimen, annotated by HUTCHINSON, syntype); Natal, Inanda, comm. VIII.1879, J. M. WOOD 555, “*S. Medley-Woodii* HUTCH.” (HUTCHINSON scripsit, K several specimens, syntypes).

C. medley-woodii is near-endemic in KwaZulu-Natal, occurring also in neighbouring Eastern Cape and Swaziland. The habitats are granite and other rocky outcrops, river gorges etc. at lower altitudes up to 600 m.s.m. (HILLIARD 1977).

HUTCHINSON (1923) named it for JOHN MEDLEY WOOD (1827–1915), a Natal botanist of distinguished repute. The species is widely cultivated as a handsome succulent in greenhouses (ROWLEY 1994, 2002).



Fig. 4. *Caputia scaposa*. From Curtis Bot. Mag. 4011 (1843),
“*Senecio calamifolius*”.



Fig. 5. *Caputia pyramidata*. From Curtis Bot. Mag. 5396 (1863), “*Senecio pyramidatus*”.

2. *Caputia tomentosa* (HAW.) B. NORD. & PELSER, comb. nov.

Basionym: *Kleinia tomentosa* HAW., Syn. Pl. Succ.: 314 (1812).

Syn.: *Cacalia tomentosa* HAW. Misc. 189 (1803) non JACQ. 1775 (= *Adenostyles alba*) nec non VILL. 1779 nec non L.fil. 1782.

Cacalia canescens WILLD., Enum. Hort. Berol. Suppl. 427. (1814).

Cacalia haworthii SWEET, Hort. Brit. (Loudon): 336 (1830).

Kleinia haworthii DC., Prodr. 6: 338 (1838); HARVEY, Fl. Cap. 3: 318 (1865).

Kleinia cana DC., Prodr. 6: 338 (1838), HARVEY, Fl. Cap. 3: 319 (1865).

K. cana was said to be allied to *haworthii* but with shorter leaves, ca. 17–19 mm long (HARVEY 1865). ROWLEY (1994) noted that the type of *K. cana* DC. has flattened leaves which are narrowly elliptic to obovate and have rounded or pointed tips. MARLOTH in Flora of South Africa (1932: 269) remarked that difference in foliage “does not count” and synonymized *K. cana* with *K. haworthii*.

Senecio quinquangulatus SCH.BIP., Flora 28: 500 (1845).

Senecio haworthii (DC.) SCH.BIP., Flora 28: 500 (1845) (STEUDEL, Nomencl. Bot., ed. 2, 2: 561, 1841, nomen).

Because of its discoid capitula this species was treated in *Kleinia* by several authors (HAWORTH, DE CANDOLLE, HARVEY, MARLOTH). *Kleinia tomentosa* HAW. is here regarded as a new name dating from 1812, not a new combination since the earlier potential basionym is illegitimate.

An erect succulent sparingly branched shrublet densely silvery-white-tomentose throughout. Leaves 2–6–10) cm long, 6–12 mm thick, terete, fusiform to cylindrical, apiculate, rarely slightly flattened with a few minute lobes near the apex. Capitula solitary on an erect scape 8–10 cm long and with a few small bracts, discoid. Involucre cupshaped, phyllaries 8–9. Disc-florets 30–40, yellow. Floral details as in generic description. Style branches truncate. Pappus bristles ca. 15 mm long, white. Cypsela puberulous. Chromosome no. $2n = 20$ (AFZELIUS 1967). – Figs. 2, 3.

This species has a complicated nomenclatural history, which is only partly described by BUTTERFIELD (1954) and ROWLEY (1994). Very popular in cultivation because of its fleshy terete or fusiform leaves with a dense silvery or snow-white tomentum, but rarely flowering. A photograph of a flowering specimen in Kirstenbosch was published in NORDENSTAM et al. (2009) and here (Fig. 2). Curtis Bot. Mag. Plate 6063 was based on a flowering specimen from Sir THOMAS

HANBURY's garden in Italy (Palazzo Orengo near Mentone), where it flowered in 1873.

The native habitat is in Namaqualand in the Northern Cape, e.g. in the Richtersveld, where the largest-leaved and whitest form has been found (cultivar 'Hans Herre' in ROWLEY 1994, 2002). Also recorded from the Great Karoo (W and E Cape), e.g. near Laingsburg and Camdeboo (MARLOTH 1932).

3. *Caputia scaposa* (DC.) B. NORD. & PELSER, comb. nov.

Basionym: *Senecio scaposus* DC., Prodr. 6: 403 (1838).

Syn.: *Senecio calamifolius* Hook., in Curtis Bot. Mag. 69, Plate 4011 (1843).

Stemless shrubs (var. *scaposa*), or erect branching short-stemmed shrub up to 0.4 m high (var. *caulescens*); stems and branches pale green and somewhat downy. Leaves alternate, fascicled (subrosulate) in basal bunches, cylindrical, up to 12 cm long and 0.5–1 cm thick, somewhat curved, terete and obtuse or apically flattened and spoon-like and lobed (var. *addoensis*), cobwebby-tomentose or white-felted, glabrescent. Capitula several or rarely solitary, terminal in a long-pedunculate capitulescence with reddish, sparsely tomentose, nude or shortly bracteate peduncles. Capitula heterogamous, radiate, yellow-flowered. Involucre cupshaped, calyculate; phyllaries 8–12, araneose. Ray-florets 7–13, female; lamina strap-shaped. Disc-florets hermaphrodite, corolla distally campanulate, 5-lobed. Floral details as in generic description. Cypselas puberulous or subglabrous. Chromosome no.: $2n = 20$ (AFZELIUS 1967). – Fig. 4.

This Eastern Cape species ranges from the Gamtoos River in Humansdorp eastwards to Grahamstown and Victoria East, where it grows in arid lands. It was introduced to Kew from a collection by BOWIE (likely collected in 1820–1822), where it thrived anonymously for many years until it was named in 1843 by HOOKER as *Senecio calamifolius*. However, it was published earlier as *Senecio scaposus* in 1838 by DE CANDOLLE, who is the name-bringing author.

Selected collections:

CAPE PROVINCE: Uitenhage, Zwartkops River, J. F. DRÈGE, ZEYHER 2983 (BM, K, S), ECKLON & ZEYHER 519 (K); between Bethelsdorp and Uitenhage, 27.XII.1813, BURCHELL 4405 (herb. HOOKER, K); Tambukiland, righthand side of Keyrivier between Windvogelberg and Zwartkey, ECKLON & ZEYHER 572 (S); Prope Grahamstown, 2000 ft, IX.1869, MACOWAN 1490 (BM, K); Uitenhage, 200 ft, 13.I.1933, F. R. LONG 895 (K); Humansdorp, 2 m. W of Gamtoos River drift on road from Humansdorp to Hankey, 100 ft, III.1928, FOURCADE 3623 (K); Uitenhage, on the Capetown road hill, I.1840 A. PRIOR s.n. (K); farm Naudes Hoek near Keskama River, Victoria East, H. GIFFEN 725 (K).

HARVEY recognized two varieties, viz. var. *acaulis*, with very short or scarcely any stem and var. *caulescens*, with a developed stem up to 40 cm and branched (= *S. calamifolius* HOOK.). A third variety is var. *addoensis* (ROWLEY 1994), based on *Senecio addoensis* COMPTON. This differs by the flattened and lobed leaf-tips. Because of their morphological distinction and popularity in cultivation, the varieties deserve valid names as follows.

3a. *Caputia scaposa* (DC.) B. NORD. & PELSER var. *scaposa*.

Syn.: *Senecio scaposus* var. *acaulis* HARV., Fl. Cap. 3: 406 (1865).

3b. *Caputia scaposa* (DC.) B. NORD. & PELSER var. *caulescens* (HARV.) B. NORD. & PELSER, comb. nov.

Basionym: *Senecio scaposus* DC. var. *caulescens* HARV., Fl. Cap. 3: 406 (1865).

Syn.: *Senecio calamifolius* HOOK. in Curtis Bot. Mag. Plate 4011 (1843).

3c. *Caputia scaposa* (DC.) B. NORD. & PELSER var. *addoensis* (COMPTON) B. NORD. & PELSER, comb. nov.

Basionym: *Senecio addoensis* COMPTON, J. Bot. 72: 48 (1934).

Syn.: *Senecio scaposus* DC. var. *addoensis* (COMPTON) G. D. ROWLEY, Cact. Succ. J. (Los Angeles) 62(6): 283 (1990).

4. *Caputia pyramidata* (DC.) B. NORD. & PELSER, comb. nov.

Basionym: *Senecio pyramidatus* DC., Prodr. 6: 402 (1838).

A succulent short-stemmed suffrutex or shrub up to 1.8 m high with araneose-tomentose glabrescent stems and branches, becoming glaucous. Leaves alternate, mostly crowded basally, sessile, cylindrical and succulent, entire, 8–15 cm long, about 0.5(–1) cm thick, acute. Capitula numerous in thyrsoid elongated or conical synflorescence, large, heterogamous, radiate, yellow-flowered, on bracteolate pedicels. Involucre hemispherical–cupshaped; phyllaries uniseriate, white-tomentose with brownish tips and margins. Ray-florets ca. 13 (10–14), female; style bilobed. Disc-florets numerous, hermaphrodite; corolla tubular, distally widening, 5-lobed; lobes narrowly ovate. Cypselas glabrous. Pappus bristles numerous, white. Chromosome no. unknown. – Fig. 5.

Selected collections:

CAPE PROVINCE: Uitenhage, BOWIE 3 (BM); Uitenhage, ZEYHER 941 (BM); Zoutpanshoogde, BURKE s.n. (BM); Uitenhage, XII.1847, A. PRIOR s.n. (K); Somerset Div., mtn. above the spring at Commadagga, 6.VII.1813, BURCHELL 3341 (K); Peddie Div., begin River Valley opposite Wooldridge, 1000 ft, 15.X.1945, ACOCKS 11852 (K); Peddie Div., near Peddie, dry *Euphorbia* scrub, 1800 ft,

7.VIII.1953, L. E. CODD 1977 (K); Algoa Bay, St. George's Strand, 20.XI.1932, F. R. LONG 862 (K); Port Elizabeth, recd. 9.III.1906, ETHEL WEST 20 (K); Albany, Pluto's Vale, 3–4 miles N of Botha's Hill, 1500 ft, X.1027, R. A. DYER 1058 (K).

This is a very striking species, as testified e.g. by HARVEY (1865): "A very fine species" and HOOKER in Bot. Mag. Plate 5396 stated: "perhaps among the most ornamental of the genus" (i.e. *Senecio*).

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