

# New taxa and a new combination in the genus *Cotyledon*

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## ABSTRACT

Five new species and one variety are described and the combination *Cotyledon tomentosa* Harv. subsp. *ladismithiensis* (V. Poelln.) Toelken is effected. The following new names are published; *C. sulphurea* Toelken, *C. occultans* Toelken, *C. similis* Toelken, *C. viridiflorum* Toelken, *C. hallii* Toelken and *C. pygmaea* Barker var. *tenuis* Toelken.

## RESUME

### NOUVEAU TAXA ET NOUVELLE COMBINAISON DANS LE GENRE COTYLEDON

On décrit cinq espèces et une variété nouvelles. La combinaison *Cotyledon tomentosa* Harv. subsp. *ladismithiensis* (V. Poelln.) Toelken est opérée. Les nouveaux noms publiés sont: *C. sulphurea* Toelken, *C. occultans* Toelken, *C. similis* Toelken, *C. viridiflorum* Toelken, *C. hallii* Toelken et *C. pygmaea* Barker var. *tenuis* Toelken.

Recent collecting has added more information to the knowledge of some rare species of *Cotyledon* from the north-western Cape Province, so that these can now be described. This has also allowed a re-evaluation of the delimitation of other species, which were previously differently interpreted.

1. *Cotyledon sulphurea* Toelken, sp. nov. a *C. occultans* foliis glabris, florescentia praecociore et ovulis ovatis differt.

Herbae perennes tuberibus subterraneis ramosis usque ad 10 cm longis, ramis succulentis laevibus pauciramosis et rare 2 cm longioribus. *Folia* alterna, oblanceolata vel spatulata, 0,5-2,5 cm longa, 0,2-0,5 cm lata, cuneata, plerumque obtusa, dorsoventraliter, complanata, leviter sulcata supra et convexa subtus, glabra sed cellulis pustuliformibus, succulenta, viridia. *Inflorescentia* thyrsus corymbiformis 1-4 dichasiis patentibus, pedunculo rigido 1-3 (-5) cm longo et tecto pilis glandulosis, pedicello 0,4-0,8 cm longo et tecto pilis glandulosis, bracteis lanceolatis deciduis. *Sepala* triangulari-lanceolata, 0,35-0,45 cm longa, acuta, tecta sparsim pilis glandulosis patentibus, succulenta, flavo-virentia. *Petala* oblonga, 1,3-1,5 cm longa, acuta, connata in tubo 0,8-1 cm longo, tecta plus minusve etiam pilis glandulosis patentibus extus et pilis aliquot tenuis intus praecipue tubi petalorum in partibus inferis, sulphurea. *Stamina* 1-1,2 cm longa et aequilonga, antheris 0,1-0,12 cm longis et filamentis rectis pilis patentibus praecipue in partibus quibus connatis petalorum tubo. *Squamae* oblongae 0,1-0,13 x 0,02-0,04 cm, plus minusve emarginatae, leviter succulentae, flavae. *Carpella* ovariiis gracilibus gradate constricta ad stylos erectos et stigmatibus terminalibus; ovarium 10-14 ovulis ovatis sine porcis verticalibus.

Type: Cape: near Pofadder, Tölken 3676A (BOL, holo.!).

Perennial with branched underground tubers up to 10 cm long, with fleshy glabrous stems little branched and rarely longer than 2 cm. *Leaves* alternate, oblanceolate to spatulate, 0,5-2,5 cm long, 0,2-0,5 cm broad, cuneate, usually obtuse, dorsiventrally compressed and slightly grooved above and convex below, succulent, glabrous but with some large bulging epidermal cells, green. *Inflorescence* a flat-topped thyrsus with one to several spreading monochasia, with wiry peduncle 1-3 (-5) cm long and covered with glandular hairs, with pedicels 0,4-

0,8 cm long and covered with glandular hairs, with lanceolate bracts deciduous. *Sepals* triangular-lanceolate, 0,35-0,45 cm long, acute, sparsely covered with glandular hairs, succulent, yellowish-green. *Petals* oblong 1,3-1,5 cm long, acute, fused into a tube 0,8-1 cm long, more or less evenly covered with spreading glandular hairs on the outside and with few fine hairs on the inside mainly where the filaments are fused to the petal-tube, sulphur-yellow. *Stamens* 1-1,3 cm long and all of equal length, with anthers 0,1-0,12 cm long, with straight filaments, with scattered hairs mainly where fused to the petal-tube. *Squamae* oblong 0,1-0,13 x 0,02-0,04 cm, more or less emarginate, slightly succulent, yellow. *Carpels* with slender ovaries gradually constricted into erect styles with terminal stigmas; ovary with 24-40 ovate ovules without distinct vertical ridges.

This species is usually found on quartzite gravel on the lower slopes of hills and has been recorded only from the vicinity of Pofadder, but here it is locally common. It flowers during November and December, a distinguishing feature between this species and *C. occultans*.

CAPE.—2919 (Pofadder): 4 km N.E. of Pofadder (-AB), Horn 1011 (NBG); Horn sub NBG 873/61 (NBG); near Pofadder (-AB), Tölken 3676A (BOL); Wisura 1961 (NBG); 11 km S.E. of Pofadder (-AB), Tölken 3679A (BOL).

2. *Cotyledon occultans* Toelken, sp. nov. a *C. sulphurea* foliis paene orbicularibus quibus tectis pilis glandulosis et florescentia serotiniore; a *C. pygmaea* ramo brevissimo et trichomatibus unicellularibus.

Herbae perennes tuberibus subterraneis pauciramosis usque ad 6 cm longae, ramis laevibus pauciramosis et usque ad 1 cm longis. *Folia* alterna, spatulata vel orbicularia, 0,4-1,2 cm longa, 0,3-1,4 cm lata, cuneata vel paene petiolata, obtusa, dorsiventraliter complanata et leviter sulcata supra, tecta dense trichomatibus erectis obtusis, succulenta, atrovirentia. *Inflorescentia* thyrsus 1 (-3) monochasiis 1-3 floribus, pedunculo rigido 0,8-1,5 cm longo et tecto pilis glandulosis, pedicello 0,5-1,3 cm longo et tecto pilis glandulosis, bracteis lanceolatis caducis. *Sepala* triangulari-lanceolata, 0,2-0,3 cm longa, acuta, tecta pilis glandulosis, succulenta, viridia. *Petala* oblonga, 1-1,2 cm longa, acuta, connata in tubo 0,6-0,8 cm longo, plus minusve etiam tecta pilis glandulosis extus et pilis aliquot tenuibus intus praecipue in partibus inferis tubi petalorum. *Stamina* 1,1-1,4 cm longa et aequilonga, antheris 0,1-0,12 cm longis, filamentis rectis pilis tenuibus sparsis praecipue in partibus quibus connatis petalorum tubo. *Squamae* oblongae, 0,11-0,13 x 0,02-0,04 cm, plerumque plus

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minusve emarginatae, succulentae, flavae. *Carpella* ovariis gracilibus gradate constrictis ad stylos erectos stigmatibus terminalibus; ovarium 10–14 ovulis ovatis sed lateriobus ad lateres et porcis verticalibus.

Type: Cape, near Bitterfontein, *H. Hall* 4289 (PRE, holo!; NBG).

Perennial with little branched underground tubers up to 6 cm long, with short glabrous stems little branched and up to 1 cm long. *Leaves* alternate, spatulate or orbicular, 0,4–1,2 cm long, 0,3–1,4 cm broad, cuneate or almost petiolate, obtuse, dorsiventrally compressed and slightly grooved above, densely covered with blunt erect trichomes, deep green. *Inflorescence* a thyrses with 1 (–3) monochasia, each with 1–3 flowers, with wiry peduncle 0,8–1,5 cm long and covered with glandular hairs, with pedicels 0,5–1,3 cm long and covered with glandular hairs, with lanceolate deciduous bracts. *Sepals* triangular-lanceolate, 0,2–0,3 cm long, acute, covered with glandular hairs, succulent, green. *Petals* oblong, 1–1,2 cm long, acute, fused into a tube 0,6–0,8 cm long and more or less evenly covered with spreading glandular hairs on the outside and with a few fine hairs on the inside mainly where the filaments are fused to the petal tube, pale yellow or yellowish-green. *Stamens* 1,1–1,4 cm long and about equally long, with anthers 0,1–0,12 cm long, with straight filaments with fine hairs mainly where fused to the petal tube. *Squamae* oblong, 0,11–0,13 × 0,02–0,04 cm, usually more or less emarginate, fleshy, yellow. *Carpels* with slender ovaries gradually constricted into erect styles with terminal stigmas; ovary with 8–20 ovules almost dumbbell-shaped and with distinct vertical ridges.

So far this small *Cotyledon* has been recorded from quartzite gravel near Bitterfontein and Steinkopf, but the fact that these two localities are so far away from each other suggests that the species is probably widely distributed over the little known eastern foothills of the Kamiesberg. Mr H. Hall, the very observant collector, was the first to draw attention to this small plant. In addition, the species flowers in February and March, the driest period in the Namaqualand, so that it is rarely seen in flower.

CAPE.—2917 (Springbok): 11 km S. of Steinkopf (–BD), *Toelken* 4272 (BOL). 3118 (Vanrhynsdorp): near Bitterfontein (–AB), *H. Hall* 3960 (PRE): 4289 (NBG, PRE).

3. *Cotyledon pygmaea* *Barker* in *Flow. Pl. S. Afr.* 10: t. 396 (1930). Type: Cape, Vanrhynsdorp, Vigne sub NBG 2267/29 (K, holo!).

var. *pygmaea*.

Stems robust and usually (0,4–) 0,5–1 cm in diameter, with pale yellow rarely greyish bark which is smooth or peeling in older plants. *Leaves* densely covered with heart-shaped trichomes. *Squamae* transversely oblong to square, 0,08–0,1 × 0,1–0,13 cm.

Characteristic of *C. pygmaea* are the multicellular trichomes which consist of two larger basal cells and a smaller glandular cell at the apex. The basal cells are bulging which gives them the heart-shaped appearance at least on the leaves of var. *pygmaea*. The petals are covered with trichomes with oblong basal cells and the terminal cell is very small. The latter type of trichomes are found on all parts of the plants of var. *tenuis*.

Although extreme forms of the two varieties may differ in several characters such as the diameter of stems and their bark, a considerable range of variation has been recorded and both varieties were found near Koekenaap. The plant of the typical variety (*Hall* sub NBG 587/54) from that area shows somewhat

intermediate characters, but its pollen shows no abnormality to indicate that the two varieties hybridize in this region.

var. *tenuis* *Toelken*, var. nov., a var. *pygmaea* squamis oblongis differt.

Caules tenues 0,2–0,3 (–0,4) cm in diametro, cortice griseo plus minusve porcata et non chartaceo. *Folia* trichotomis oblongis sparsim tecta. *Squamae* oblongae 0,09–0,12 × 0,04–0,06 cm.

Type: Cape, near Holrivier Station, *H. Hall* 3925 (PRE, holo!; NBG!).

Stems slender 0,2–0,3 (–0,4) cm in diameter, with grey bark more or less ridged and not peeling. *Leaves* sparsely covered with erect oblong trichomes. *Squamae* oblong 0,09–0,12 × 0,04–0,06 cm.

CAPE.—3118 (Vanrhynsdorp): near Holrivier Station (–AD), *Hall* 3925 (NBG, PRE); 4273 (PRE); Koekenaap (–CB), *Hall* 2786 (NBG); *Hall* sub NBG 72/56 (NBG); Vanrhynsdorp (–DB); *Compton et al* sub NBG 842a/48 (NBG).

4. *Cotyledon similis* *Toelken*, sp. nov. a *C. pygmaea* foliis glabris et pilis longissimis in fauce tubi petalorum differt.

Herbae perennes tuberibus subterraneis pauciramosis usque ad 5 cm longis, caulibus erectis rare remosis et usque ad 12 cm longis et usque ad 0,4 cm in diametro, griseis et porcis nigris verticalibus. *Folia* alterna, elliptica vel oblonga, 0,5–1,3 cm long, 0,2–0,4 (–0,5) cm lata, acuta vel obtusa, teretia vel leviter complanata, glabra sed cellulosis pustuliformibus, viridia et saepe rufo-striata. *Inflorescentia* monochasium 1 (–3) floribus, pedunculo glabro 0,8–3 cm longo, pedicello glabro 0,4–0,6 cm longo, bracteis lanceolatis deciduis. *Sepala* triangulari-lanceolata, 0,15–0,25 cm longa, acuta, glabra, succulenta, viridia. *Petala* oblonga, 0,8–1 cm longa, acuta, connata in tubo 0,6–0,8 cm longo, extus glabra et intus pilis longis tenuis praecipue in fauce tubi petalorum, pallide flavo-virentia vel eburnea. *Stamina* 0,7–1 cm longa et aequilonga, antheris 0,08–0,1 cm longis, filamentis rectis pilis patentibus praecipue in partibus quibus connatis tubo petalorum. *Squamae* anguste oblongae, 0,12–0,14 × 0,02–0,03 cm, plerumque penitus emarginatae, leviter succulentae, croceae ad flavam. *Carpella* ovariis gracilibus gradate constricta ad stylos erectos et stigmatibus terminalibus; ovarium 10–14 ovulis ovatis sed latioribus ad lateres et porcis verticalibus.

TYPE: Cape, N. of Grootmis, *Wisura* 1303 (NBG, holo!).

Perennial with branched underground tubers up to 5 cm long, each with an erect stem; stems rarely branched, up to 12 cm long and up to 0,4 cm in diameter, grey with black vertical ridges. *Leaves* alternate, elliptic to oblong 0,5–1,3 cm long, 0,2–0,4 cm broad, acute or obtuse, terete or almost so, glabrous but with irregularly bulging epidermal cells, green, often with reddish-brown stripes. *Inflorescence* a monochasium with 1 (–3) flowers, with glabrous peduncle 0,8–3 cm long, with glabrous pedicels 0,4–0,6 cm long, with deciduous lanceolate bracts. *Sepals* triangular-lanceolate, 0,15–0,25 cm long, acute, glabrous, succulent, green. *Petals* oblong, 0,8–1 cm long, acute, fused into a tube 0,6–0,8 cm long, glabrous on the outside and with long fine hairs in the throat of the petal tube, pale yellowish-green to cream. *Stamens* 0,7–1 cm long and all about the same length, with anthers 0,08–0,1 cm long, with straight filaments with spreading hairs mainly where fused to the petal tube. *Squamae* narrowly oblong, 0,12–0,14 × 0,02–0,03 cm, usually deeply emarginate, slightly fleshy, orange to yellow.

*Carpels* with slender ovaries gradually constricted into erect styles and terminal stigmas; ovary with 10–14 ovules almost dumbbell-shaped and with vertical ridges.

Plants of this species were found either in east-facing crevices on exposed rock ledges or on quartzite gravel on hills mainly west of the mountains between Komaggas and the Orange River.

The slender grey stems bear leaves only for a very short period, so that this delicate plant is easily overlooked. The slender stems are superficially similar to those of *C. pygmaea* var. *tenuis*.

CAPE.—2816 (Oranjemund): Numees mountain (–BD), *Tölken* 3312 (BOL); Holgat River (–DB), *Tölken* 1857 (BOL). 2917 (Springbok): Augrabies (–AA), *Hall* 1362A (NBG); N. of Grootmis (–AC), *Wisura* 1303 (NBG); 48 km S.E. of Port Nolloth (–AC), *Acocks* 14235 (PRE); 46 km E. of Port Nolloth (–AD), *M. Schlechter sub SUG 6870* (BOL); Ratelpoort (–BD), *Littlewood sub (NBG) 434 69* (NBG); Komaggas (–CD), *Tölken* 2026 (BOI).

5. *Cotyledon viridiflorum* Toelken, sp. nov. a *C. fragile* petalis pubescentibus intra et extra et foliis dorsoventraliter complanatis glabrescentibus differt.

Fruticuli basis tuberosis, ramis paucis succulentis usque ad 35 cm longis, erectis, tectis pilis glandulosis glabrescentibus. *Folia* alterna, oblanceolata vel elliptica, 2–4 cm longa, 0,8–1 cm lata, cuneata, plerumque apicibus obtusis, dorsiventraliter complanata et leviter sulcata supra, tecta pilis glandulosis vel glabrescentia, succulenta, viridia. *Inflorescentia* thyrsum spiciformis (1–) 3–5 floribus, pedunculo 0,8–4 cm longo et pedicello glabro 0,5–1 (–2,5) cm longo, bracteatis squamosis. *Sepala* triangulari-lanceolata, 0,5–0,6 (–1) cm longa, acuta, tecta pilis glandulosis patentibus, succulenta, viridia. *Petala* oblonga, 2,4–2,6 cm longa, acuta, connata in tubo 1,8–2 cm longo, apicibus recurvis, tecta pilis plus minusve glandulosis intra et extra, leviter succulenta, viridia vel flavovirentia. *Stamina* 1,4–1,9 cm longa, antheris nigris 0,4–0,6 cm longis, filamentis pilis patentibus et saepe flexibus infra antheras. *Squamae* oblongae, 0,1–0,12 × 0,03–0,05 cm, leviter emarginatae, succulentae, flavae. *Carpella* 1,2–1,5 cm longa, ovariis gracilibus gradate constrictis ad stylos erectos stigmatibus terminalibus; ovarium 8–12 ovulis elongato-ovatis porcis verticalibus.

TYPE: Cape, near Modderfontein, *Tölken* 5327 (PRE, holo!).

Shrublet with tuberous bases, with few brittle fleshy branches up to 35 cm long, erect, covered at first with glandular hairs, later glabrescent. *Leaves* alternate, oblanceolate to elliptic, 2–4 cm long, 0,4–1 cm broad, each with cuneate base and obtuse apex, dorsiventrally compressed and slightly grooved above the central vein, covered with glandular hairs when young becoming glabrous later. *Inflorescence* a spike-like thyrse with (1–) 3–5 flowers, with peduncle 0,8–4 cm long and pedicels 0,5–1 (–1,5) cm long, with scale-like bracts. *Sepals* triangular-lanceolate, 0,5–0,6 (–1) cm long, acute covered with spreading glandular hairs, succulent, green. *Petals* oblong 2,4–2,6 cm long, acute, fused into a tube 1,8–2 cm long, with apices recurved or recoiling, covered with recurved hairs, more or less glandular on the outside and inside, slightly fleshy, yellowish-green. *Stamens* 1,4–1,9 cm long, with black anthers 0,4–0,6 cm long, filaments with spreading hairs and often with right-angled outward bend below anthers. *Squamae* oblong 0,1–0,12 × 0,03–0,05 cm, slightly emarginate fleshy, yellow. *Carpels* with slender ovaries gradually constricted into erect styles with terminal stigmas; ovary with 8–12 ovules with vertical ridges. Like *C. fragilis* and *C.*

*vetricosa*, this species grows in the shade of overhanging rocks and usually on the south aspect of mountains.

CAPE.—2817 (Violsdrif): near Modderfontein (–CC), *Tölken* 5327 (PRE).

6. *C. hallii* Toelken, sp. nov. a *C. pearsonio* habitato erecto-fastigiato et usque ad 40 cm alto, foliorum cicutricibus paene indistinctis et floribus erectis differt.

*C. pearsonii* sensu Jacobsen, Hand. Succ. Pl. 1: 289, fig. 286 (1960); Sukk. Lex. 135, t. 40, 5 (1970), non Schönl. *C. racemosa* sensu Friedr. in Prodr. Fl. S.W. Afr. 52: 10 (1968), non Harv.

Fruticuli perennes caulibus succulentis usque ad 5 cm in diametro et leviter ventricosis ad basim, multiramosi et ramis erectis vel paene fastigiata. *Folia* alterna, lineari-lanceolata, 0,8–3,5 cm longa, 0,3–0,5 cm lata, acuta, teretia vel interdum sulcata supra, sparsim tecta pilis glandulosis sed glabrescentia, viridia vel glaucescentia. *Inflorescentia* thyrsum 1–4 monochasiis, pedunculo lignescente 1,5–3,5 cm longo, pedicello tenace 1–3 cm longo tecto pilis glandulosis, bracteatis foliiformibus. *Sepala* triangularia, 0,4–0,9 cm longa, acuta, tecta pilis glandulosis patentibus, succulenta, viridia. *Petala* oblonga, 1,7–2 cm longa, plerumque acutissima, connata in tubo 1–1,4 cm longo, apicibus recurvis sed erectis in fructu, tecta pilis glandulosis patentibus extus et pilis sparsis tenuibus intus, leviter succulenta, viridia vel flavo-viridia. *Stamina* 1,6–2 cm longa, antheris 0,3–0,5 cm longis, filamentis paene glabris et plerumque flexibus infra antheras. *Squamae* oblongae 0,12–0,15 × 0,04–0,06 cm, emarginatissimae, succulentae ad basim, flavae. *Carpella* ovariis gracilibus gradate constrictis ad stylos erectos stigmatibus terminalibus; ovarium 30–36 ovulis ovatis sed latioribus ad lateres et papillosis plerumque serialis.

TYPE: Cape, De Hoop, *H. Hall* 1300 (NBG, holo!).

Perennial shrublet with fleshy stems up to 5 cm in diameter and slightly swollen towards the base, much branched and branches erect and almost fastigiate. *Leaves* alternate, linear-lanceolate, 0,8–3,5 cm long, 0,3–0,5 cm broad, acute, terete or sometimes with a groove on the upper surface, sparsely covered with glandular hairs but becoming glabrous, green or yellowish-green. *Inflorescence* a thyrse with one to several monochasia, with glandular rarely glabrescent peduncle 1,5–3,5 cm long and glandular pedicels 1–3 cm long, with leaf-like bracts. *Sepals* triangular 0,6–0,9 cm long, acute, covered with stout spreading glandular hairs, fleshy, green. *Petals* oblong, 1,7–2 cm long, usually very acute, fused into a tube 1–1,4 cm long, with apices recurved but straightened out again when fruiting, covered with glandular hairs along the outside and in particular the centre of each petal, with scattered fine hairs or rarely papillose on the inside, slightly fleshy, green to yellowish-green. *Stamens* 1,6–2 cm long, with anthers 0,3–0,5 cm long, with filaments almost glabrous and usually with a right-angled outward bend below the anthers. *Squamae* oblong, 0,12–0,15 × 0,04–0,06 cm, strongly emarginate, succulent towards the base, yellow. *Carpels* with slender ovaries gradually constricted into erect styles and with terminal stigmas; ovary with 30–45 elongate ovules which are usually dumbbell-shaped and with papillae often arranged in irregular rows.

This species occurs on rocky slopes in the mountains on either side of the Orange River of Violsdrif.

S.W.A.—2717 (Chamaites): near Aiais (–CD), *Pillans* 65 8 (BOL). 2816 (Oranjemund): Kahanstal (–BB), *Dinter* 8152 (BOL, K, PRE, SAM); *De Winter & Giess* 6360 (PRE).

CAPE.—2817 (Violsdrif): De Hoop (–AA), *Hall* 1300 (NBG); 20 km E. of Eksteenfontein (–CD), *Leistner* 3373 (PRE); 32 km S.W. of Violsdrif (–CD), *Wenger* 405 (PRE).

7. *Cotyledon tomentosa* Harv. in Fl. Cap. 2: 373 (1862); Schonl. in Rec. Albany Mus. 3: 146 (1915). Type: Cape, between Groot River and Trumpeter's Poort, Zeyher 1085 (S, holo!).

subsp. *tomentosa*.

*C. tomentosa* Harv. in Fl. Cap. 2: 373 (1862). *C. ladismithiensis* sensu Boom in Succulenta, Amst. (1958) 17; sensu Jacobsen, Handb. Succ.Pl. 1: 284, fig. 278 (1960); Sukk. Lex. 134, T.39, 1 (1970), non V.Poelln.

Shrublets with slender branches, much branched. Leaves oblanceolate 1,5–2,5 (–3,5) cm long, 0,8–1,4 (–1,7) cm broad, with 3–5 (–10) apical teeth, more or less dorsiventrally compressed.

*C. tomentosa* is a little known species, which is poorly represented in herbaria and at known localities one finds only a few plants. However, the main obstacle in interpreting the identity of *C. tomentosa* was that Harvey did not mention in his description the three distinct teeth at the apex of the leaves. The type locality given by Zeyher was rather vague, but it must be sought somewhere east of Steytlerville, which lies on the Gamtoos River (alias Groot River). The plant was recently collected in the mountains just north of Steytlerville (Tölken 1778).

Then *C. heterophylla* Schoenl. non Roxb. was described from the vicinity of Ladismith, but being a later homonym it must be replaced by the name *C. ladismithiensis* V.Poelln. The latter taxon is here considered to be a separate subspecies of *C. tomentosa*, which is distinguished from the typical subspecies by its longer almost terete leaves as described below. The number of teeth on the leaves varies greatly on the same and different plants, and juvenile plants of both subspecies seem to have leaves with 1–3 teeth. The leaves of juvenile plants and of plants of the subsp. *tomentosa* growing in deep shade are villose, while

those of the subsp. *ladismithiensis* are tomentose, but no seedlings have been seen.

Subsp. *tomentosa* has been recorded from near Calitzdorp, Willowmore and Steytlerville, where it occurs on the slopes of sheltered kloofs. Plants of the subsp. *ladismithiensis* occur on rock outcrops between Laingsburg and the northern slopes of the Langeberg near Muiskraal.

subsp. *ladismithiensis* (V.Poelln.) Toelken, comb. nov. et stat. nov.

*C. ladismithiensis* V. Poelln. in Jahrb. Deutsch.Kakt. Ges. 1: 94 (1936); in Fedde Repert. 42: 40 (1937). Type: Cape, between Ladismith and Laingsburg, *E. Pillans* sub N.S. Pillans 968 (GRA, holo!; BOL). *C. heterophylla* Schoenl. in Rec. Albany Mus. 2: 150 (1907), non Roxb. (1814); in Rec. Albany Mus. 3: 146 (1915). Type: same as for *C. ladismithiensis*.

Shrublet with rigid spreading branches, little branched. Leaves oblong-elliptic (3–) 3,5–5,5 (–8) cm long, 0,8–1,2 cm broad, with 1 (–3) apical teeth, usually almost terete and only occasionally the upper surface is compressed.

CAPE.—2033 (Montagu): Anysberg (–DB), *Stokoe* 8708 (BOL); western Touwsberg (–DB), *Wurts* 1467 (NBG). 2133 (Ladismith): Ladismith (–AD), Joubert s.n. (BOL); Huisrivierpas (–BC), *Marloth* 13128 (PRE); Ockertskraal (–CA), *Hall* 1224 (NBG); 16 km S. of Ockertskraal (–CA), *Tölken* 1699 (BOL); Adamskraal (–CC), *Muir* sub *BOL* 30962; Muiskraal (–CC), *Muir* sub *Marloth* 12185 (PRE); between Laingsburg and Ladismith, *E. Pillans* sub *N.S. Pillans* 968 (BOL, GRA).

UITTREKSEL

*Vyf nuwe spesies en een variëteit word beskryf en die nuwe kombinasie Cotyledon tomentosa Harv. subsp. ladismithiensis (V.Poelln.) Toelken word teweeggebring. Die volgende nuwe name is gepubliseer: C. sulphurea Toelken, C. occultans Toelken, C. similis Toelken, C. viridiflorum Toelken, C. hallii Toelken en C. pygmaea Barker var. tenuis Toelken.*