A taxonomic revision of the section *Myrrhidium* of *Pelargonium* (Geraniaceae) in southern Africa

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Introduction

When De Candolle (1824) described the section *Myrrhidium*, he recognized the following species: *P. anemonifolium* Jacq., *P. bullatum* Jacq., *P. caucalifolium* Jacq., *P. coriandrifolium* (L.) L'Hér., *P. fruticosum* (Cav.) Wild., *P. lacerum* Jacq., *P. multicaule* Jacq. and *P. myrrhifolium* (L.) L'Hér. He described them as biennial or perennial herbs which are rarely suffruticose, with leaves pinnate, rarely ternate and often multifid. De Candolle had already noted that the number of petals in the section could vary from four to five and the number of fertile stamens from five to seven.


Harvey (1860) considered *Myrrhidium* as a section of *Pelargonium* and emphasized the calyx as a diagnostic feature. He described the sepals as strongly ribbed and mucronate or taper-pointed. Harvey distinguished the following species and varieties in the section: *P. myrrhifolium* with nine varieties, viz: var. *athamanthoides* (L'Hér. ex DC.) Harv., var. *betonicum* (Burm. f.) Harv., var. *intermedium* Harv., var. *longicaule* (Jacq.) Harv. and var. *synnotii* (Sweet) Harv.; *P. multicalla* Jacq., *P. senecioides* L'Hér., *P. candicans* Spreng. and *P. urbanum* (Eckl. & Zeyh.) Harv. with the var. *pinatifidum* Harv. and the var. *bipinnatifidum* Harv.

In the last revision of *Pelargonium*, Knuth (1912), recognized the same taxa in the section *Myrrhidium* as Harvey (1860) and added *P. convolvulifolium* Schltr. ex Knuth and *P. filifolium* Knuth as well as two non South African species, *P. goeszeanaum* Engl. and *P. phyltet* Baker.

The aim of this present investigation was to determine whether the section *Myrrhidium* is a natural taxon and to make a clear delimitation of the taxa within the section. A multidisciplinary approach was followed to achieve these goals. Besides the morphological study accompanied by extensive field work, anatomical, palynological and cytotaxonomic investigations were undertaken to assess the taxonomic value of these characters. The following taxa are recognized:

   (a) var. *myrrhifolium*
Diagnostic Anatomical Features
Approximately ten leaves of each taxon were studied anatomically. Transverse sections of wax embedded petioles and pinnae/leaf segments were made with a rotary microtome and stained with Fast Green and Safranin. The transverse sections were made in the middle part of the petioles and those of the pinnae/segments approximately 5 mm from their apices. Free hand paradermal sections of the pinnae/segments were also made to study the structure of the epidermis.

**Petioles** adaxially flattened or shallowly grooved. **Epidermis** a single layer of isodiametric cells, trichomes unicellular or multicellular non-glandular hairs and glandular hairs with multicellular stalks and unicellular spherical heads, stomata few. **Cortex**: hypodermis one cell layer thick, collenchymatous but in **P. caucalifolium** subsp. caucalifolium, **P. longicaule** and **P. myrrhifolium** parenchymatous; chlorenchyma 2–3 cell layers thick and rest of cortex parenchymatous. **Extraxylary sclerenchyma** cylinder outside vascular bundles continuous. **Vascular bundles** collateral, 4–5 main bundles and variable number of smaller bundles in between, 1 medullary bundle in all taxa except in **P. caucalifolium** and **P. longicaule** (Figure 1 A–F). **Pinnae/segments**: **Epidermis**: a single layer thick, anticlinal walls straight to sinuous; trichomes as on petioles; stomata anomocytic, leaves amphistomatic but usually more stomata abaxially than adaxially. **Mesophyll**: adaxially two palisade layers and abaxially several spongy layers but in **P. caucalifolium** subsp. caucalifolium adaxially and abaxially single palisade layers with spongy-like cells in between. **Veins** with one collateral vascular bundle each.

The anatomical characters of the leaves are of little taxonomic importance in the case of the section Myrrhidium. However, the absence of a medullary vascular bundle in the petioles of **P. caucalifolium** and **P. longicaule** confirms the close relationship between these two species.

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Figure 1 A, unicellular non-glandular hairs and multicellular glandular hair on the leaf of **P. candicans**; B, unicellular non-glandular hair on the leaf of **P. myrrhifolium** var. myrrhifolium; C, multicellular non-glandular hair on the leaf of **P. suburbanum** subsp. suburbanum; D, pyriform glandular hair on the pedicel of **P. multicaule** subsp. multicaule; E, transverse section of the petiole of **P. multicaule** subsp. multicaule; F, transverse section of the petiole of **P. caucalifolium** subsp. convolvulifolium; G, polar view of the pollen grain of **P. longicaule** subsp. longicaule; H, aperture of the pollen grain of **P. suburbanum**. **mv** = medullary vascular bundle.
The glandular hairs on the peduncles, pedicels, hypanths and sepals have characteristic pyriform heads (Figure 1 D). Similar glandular hairs are also found in the section Jenkinsonia (Sweet) Harv. and some representatives of the section Ligularia (Sweet) Harv. (Oosthuizen 1983). This confirms the suspected relationship between these taxa.

Pollin Morphology

Living pollen grains of all the taxa were collected and prepared by the acetolysis method, and studied with the light and scanning electron microscope. At least ten pollen grains of each taxon were studied. 

**Table 1** Pollen grain size

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Average Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>P. myrrhifolium</strong></td>
<td></td>
</tr>
<tr>
<td>(a) var. myrrhifolium</td>
<td>70 μm</td>
</tr>
<tr>
<td>(b) var. coriandrifolium</td>
<td>70 μm</td>
</tr>
<tr>
<td>2. <strong>P. candidans</strong></td>
<td>80 μm</td>
</tr>
<tr>
<td>3. <strong>P. multicaule</strong></td>
<td></td>
</tr>
<tr>
<td>(a) subsp. multicaule</td>
<td>70 μm</td>
</tr>
<tr>
<td>(b) subsp. subherbaceum</td>
<td>70 μm</td>
</tr>
<tr>
<td>4. <strong>P. subrubanum</strong></td>
<td></td>
</tr>
<tr>
<td>(a) subsp. subrubanum</td>
<td>70 μm</td>
</tr>
<tr>
<td>(b) subsp. bipinnatifidum</td>
<td>70 μm</td>
</tr>
<tr>
<td>5. <strong>P. longicaule</strong></td>
<td></td>
</tr>
<tr>
<td>(a) var. longicaule</td>
<td>80 μm</td>
</tr>
<tr>
<td>(b) var. angustipetalum</td>
<td>80 μm</td>
</tr>
<tr>
<td>5. <strong>P. caucalifolium</strong></td>
<td></td>
</tr>
<tr>
<td>(a) subsp. caucalifolium</td>
<td>80 μm</td>
</tr>
<tr>
<td>(b) subsp. convolvulifolium</td>
<td>80 μm</td>
</tr>
</tbody>
</table>

**Structure of Exine:**

Size: The pollen grains are spherical in all the taxa (Figure 1 G). 

Shape: The pollen grains are striate because some muri are on a higher level than others (Figure 1 G – H). Bortenschlager (1967) described this type of tectum as striate-reticulate. The muri on the higher level are more prominent than those on the lower level and more or less parallel to each other. The structure of the exine is similar in all the taxa studied.

**Apertures:** Three apertures are present on the equator (Figure 1 G). Each aperture consists of an outer colpus and an inner pore (Figure 1 H). The pollen grains can therefore be described as tricolporate and sonotreme. According to the system of Erdtman (1969) they can be classified as NPC 345. The size, structure and distribution of the apertures are similar in all the taxa studied.

**Chromosome Numbers**

Root tips of all the taxa were studied using the squash technique described by Albers & Van der Walt (1984). The somatic chromosome numbers for the different taxa are shown in Table 2.

Albers & Van der Walt (1984) showed that two genome types are present in the genus Pelargonium. These two genome types can be distinguished by the size of the chromosomes. The chromosomes of Myrrhidium are relatively large and it is evident that this section has the same genome type as the related section Jenkinsonia. Albers & Van der Walt also concluded that the genome type with large chromosomes, is more advanced than the genome type with small chromosomes. These cytogenetic results confirm the presumption that the section Myrrhidium is an advanced one. Within the section, it is only P. caucalifolium which is a tetraploid species. This species is clearly an advanced one.

**Section Myrrhidium:** DC., Prodromus 1: 657 (1824); Harv.: 286 (1860); Knuth: 392 (1912). Type species: *Pelargonium myrrhifolium* (L.) L’Hér.


Procumbent to decumbent to erect, short-lived perennial subshrubs, up to 1 m high and 1.5 m in diameter. **Stems**

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**Table 2** Somatic chromosome numbers for the different taxa

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Chromosome Number (2n)</th>
<th>Specimens studied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>P. myrrhifolium</strong></td>
<td>22</td>
<td>Van der Walt 430</td>
</tr>
<tr>
<td>(a) var. myrrhifolium</td>
<td>22</td>
<td>Van der Walt 417</td>
</tr>
<tr>
<td>(b) var. coriandrifolium</td>
<td>22</td>
<td>Drifhout 2616</td>
</tr>
<tr>
<td>2. <strong>P. candidans</strong></td>
<td>22</td>
<td>Van der Walt 1055</td>
</tr>
<tr>
<td>3. <strong>P. multicaule</strong></td>
<td>22</td>
<td>Hugo s.n.</td>
</tr>
<tr>
<td>(a) subsp. multicaule</td>
<td>22</td>
<td>Van der Walt 991</td>
</tr>
<tr>
<td>(b) subsp. subherbaceum</td>
<td>22</td>
<td>Kluge 50/82</td>
</tr>
<tr>
<td>4. <strong>P. subrubanum</strong></td>
<td>22</td>
<td>Olivier s.n.</td>
</tr>
<tr>
<td>(a) subsp. subrubanum</td>
<td>22</td>
<td>Van der Walt 571</td>
</tr>
<tr>
<td>(b) subsp. bipinnatifidum</td>
<td>22</td>
<td>Fischer 273</td>
</tr>
<tr>
<td>5. <strong>P. longicaule</strong></td>
<td>22</td>
<td>Van der Walt 1009</td>
</tr>
<tr>
<td>(a) var. longicaule</td>
<td>22</td>
<td>Van der Walt 1475</td>
</tr>
<tr>
<td>(b) var. angustipetalum</td>
<td>22</td>
<td>Van der Walt 2257</td>
</tr>
<tr>
<td>6. <strong>P. caucalifolium</strong></td>
<td>44</td>
<td>Volschenk 43</td>
</tr>
<tr>
<td>(a) subsp. caucalifolium</td>
<td>44</td>
<td>Vorster 2249</td>
</tr>
<tr>
<td>(b) subsp. convolvulifolium</td>
<td>44</td>
<td>Boucher 112</td>
</tr>
</tbody>
</table>
herbaceous, bases of older stems somewhat woody, with different types of non-glandular hairs as well as glandular hairs, green but sometimes flushed with red, becoming greyish or brownish with age. Leaves heteroblastic, indumentum as on stems; lamina green or greyish-green but sometimes flushed with red, usually cordiform in outline; trilobate to bipinnatisect or trifoliiolate. Pseudo-umbels with 1 - 6 flowers each. Flowers zygomorphic, protogynous. Pedicel relatively short (1 - 3 mm). Hypanthium 4 - 55 mm long, indumentum as on peduncle. Sepals 5, lanceolate, indumentum abaxially as on peduncle, green but prominently raised veins brownish or reddish. Petals 4 or 5, white or yellowish or pinkish-purple; posterior two much larger than anterior two/three, ovate to lanceolate with narrow claws, with dark markings, reflexed at less than 90° or 90° to 100°, 15 x 40 - 8 x 14 mm; anterior two/three narrowly spathulate to spathulate with long claws, slightly reflexed, 8 - 27 x 2 - 6 mm. Stamens 10, 5 or 7 fertile and 2/3 different lengths; staminal column 2 - 5 mm long; pollen yellow to orange. Ovary 5-lobed, oblong-conical, sericeous; style ca. 8 mm long, usually purple; stigma with 5 recurved branches, purple. Mericarps 5, bases 5 - 7 mm long, tails 25 - 50 mm long. 2n = 22 or 44.

Diagnostic features
Procumbent to decumbent, short-lived perennial subshrubs. Leaves heteroblastic; lamina green or greyish-green, trilobate to bipinnatisect or trifoliolate. Pseudo-umbels with 1 - 6 flowers each. Flowers extremely zygomorphic, protogynous. Pedicel 1 - 3 mm long. Hypanthium 4 - 55 mm long. Sepals with prominently raised veins brownish or reddish. Petals 4 or 5. Fertile stamens 5 or 7. Glandular hairs on peduncle, pedicel, hypanthium and sepals with pyriform heads.

Key to the species
1a Posterior petals up to 20 mm long, hypanthium usually less than 15 mm long (exception P. multicauca subsp. subhericum)
1b Posterior petals more than 20 mm long, hypanthium usually more than 15 mm long (exception P. suberbanum subsp. suberbanum)

(a) var. myrrhifolium
Pelogonium myrrhifolium (L.) L'Hérit. in Aiton, Hortus Kewensis ed. 1, 2: 241 (1789). Type: 'Habitat in Africa', specimen in Hort. Cliff. 345.19a (BM, holo.).

Erect to decumbent, branched subshrub, up to 0.5 m high and 0.75 m in diameter. Stems herbaceous, bases of older stems woody, pubescent to villous to hirsute and with glandular hairs in between, green but soon becoming brownish or reddish with age. Leaves: lamina glabrous to pubescent to sparsely hirsute and with glandular hairs in between, green, ovate to cordiform in outline, pinnatifid to bipinnatisect, apices of segments obtuse to acute, (10 - 45 - (80) x (10 - 25 - (50) mm; petiole indumentum as on lamina, (10 - 50 - (115) mm long; stipules ovate, sometimes acuminate, indumentum as on lamina, ca. 7 - 5 mm. Inflorescence: peduncles (40 - 80 - (120) mm long, pubescent to villous to hirsute and with glandular hairs in between; involucral bracts 5 - 6, ovate to lanceolate, indumentum as on peduncles, ca. 7 x 3 mm; pseudo-umbels with 2 - 6 flowers each. Pedicel 1 - 2 mm long. Hypanthium 4 - 10 mm long, glabrous to hirsute but always with many glandular hairs. Sepals lanceolate, indumentum abaxially as on hypanthium, green to brownish-green but prominently raised veins reddish.

(a) var. myrrhifolium
Pelogonium myrrhifolium (L.) L'Hérit. in Aiton, Hortus Kewensis ed. 1, 2: 241 (1789); Willd.: 661 (1800); DC.: 657 (1824); G. Don: 731 (1831); Harv.: 286 (1860); Adamson & Salter: 519 (1950). Geranium myrrhifolium L.: 677 (1753); Burm.: f.: 59 (1759); L.: 949 (1763); Berg.: 178 (1767); L.: 512 (1774). Geraniospermum myrrhifolium (L.) Kuntze: 94 (1891).

Geranium betonicum Burm. f.: 32 (1759); Cav.: 264, t. 118, f. 1 (1787); Thunb.: 117 (1794); Thurb.: 530 (1823). Geranium myrrhifolium var. betonicum (Burm. f.) Berg.: 178 (1767). Pelargonium betonicum (Burm. f.) Jacq.: 10, t. 531 (1795); Jacq.: 127 (1797). Myrrhidium betonicum (Burm. f.) Eckl. & Zeyh.: 71 (1835). Pelargonium myrrhifolium (L.) L'Hérit. var. betonicum (Burm. f.) Harv.: 287 (1860); Knuth: 398, t. 52 (1912); J.J.A. v.d. Wall: 27, fig. (1977). Type: 'Habitat in Africa, ad promont. Bonae Spei', specimen in Collection Burman 3771/56 (G, holo.).

Pelargonium bullatum Jacq.: 10, t. 530 (1794); Jacq.: 124 (1797); DC.: 657 (1824); G. Don: 731 (1831). Myrrhidium bullatum (Jacq.) Eckl. & Zeyh.: 71 (1835). Type: Locality and collector unknown (W, holo.); specimen with Jacquin's handwriting.

Pelargonium lacerum Jacq.: 10, t. 532 (1794); Jacq.: 122 (1797); Willd.: 662 (1800); DC.: 657 (1824); G. Don: 731 (1831).


Jenkinsonia synnoti Sweet: 342, fig. (1827). Pelargonium synnoti

Figure 2 Pelargonium myrrhifolium var. myrrhifolium. A, flowering branches × 1; B, petals, × 2; C, androecium × 3; D, gynoecium × 4.
P. myrrielifolium var. myrrielifolium is very well represented in the south-western Cape, but occurs sporadically in the southern and eastern Cape (Figure 3). It is known from Clanwilliam southwards to the Cape Peninsula, and from here eastwards to the Zuurberg Pass. The greatest part of its distribution area receives winter rains, but the localities in the south-western Cape, but occurs sporadically in the southern and eastern Cape receive rain throughout the year.

It is often found on clayish soils in a variety of habitats. Flowers can be found throughout the year but there is a definite peak during September to November.

Figure 3 Geographical distribution of Pelargonium myrrielifolium var. myrrielifolium.

Specimens examined

- **3218** (Clanwilliam): 15 km SW of Clanwilliam (– BB), Van der Walt 592 (PRE, STEU); Between Rosendalfontein and Visag (– CD), Pillans 9653 (BOL); Piquetberg (– DA), Botha 8419 (BOL), Maguire 1156 (NBG), Martin 271 (NBG), Pillans 8635 (BOL); Grey’s Pass (– DB), Steyn 373 (NBG); Kapteinskloof (– DC), Boucher 87 (STEU); Versveld Pass (– DD), Drijfhost 1526 (STEU), Van der Walt 1471 (PRE, STEU); De Hoek (– DD), Barker 2562 (NBG), Steyn 602 (NBG).

- **3219** (Wupperthal): 2 km N. of Pakhuis (– AA), Hugo 544 (PRE); Between Elandskloof and Clanwilliam (– CA), Leipoldt s.n. (BOL); Kromrivier (– CB) Esterhuysen 20519 (BOL).

- **3318** (Cape Town): Hopefield (– AB), Bachmann 1538 (Z), Darling (– AD), Barker 8867 (NBG), Winkler 83 (NBG); Darling Flora Reserve (– AD), Lewis 5057 (NBG); 10 km SE of Darling (– AD), Van der Walt 1040 (PRE, STEU); Mooresburg (– BA), Bachmann 1539 (Z); Near Porterville (– BB), Steyn 607 (NBG); Near Kasteelberg (– BC), Van der Walt & Vorster 1032 (PRE, STEU); Malmesbury (– BC), Kuun s.n. (STEU), Sailer 6464 (BOL); 5 km from Malmesbury (– BC), Hugo 629 (MO, PRE); Groenkloof (– CB), Botha 4254 (BOL); Table Mountain (– CD), Ecklon 614 (E, MO, PRE), Ecklon & Zeyher 548 (SAM); Sea Point (– CD), Wilms 3072 (E); Signal Hill (– CD), Boucher 100 (STEU), Penfold 118 (NBG), Van der Walt 484 (PRE, STEU); Lion’s Rump (– CD), Thode 8517 (STE), Van der Walt 471 (PRE, STEU); Devil’s Peak (– CD), Thode 5997 (STE), Wolley 2667 (BOL); Camps Bay (– CD), Theiler 9945 (PRE), Young 365 (PRE); Between Camps Bay and Llandudno (– CD), Boucher 102 (STEU); Green Point (– CD), Zeyher s.n. (SAM); Paarl (– DB), Roberts s.n. (PRE); Paarlberg (– DB), Boucher 30 (STE), Van der Walt 658 (PRE, STEU); Volschenk 11, 32 (STEU); Agter Paarl (– DB), Boucher 55 (STEU); Wellington (– DB), Esterhuysen 9021 (PRE), Kies s.n. (NBG), Knochel s.n. (PRE), Thompson 28 (PRE); Near Wellington (– DB), Grant 2628 (MO); University of Cape Town (– DC), Esterhuysen 26470 (BOL, MO, PRE), Esterhuysen 32944 (BOL, PRE); Tygerberg Nature Reserve (– DC), Lousber 3378, 3378a (MO); Fisantekraal (– DC), Van Niekerk 263 (BOL); Above Kultsrivier (– DC), Oliver 3433, 4662 (STE); Sanddrift (– DC), Esterhuysen 15883 (BOL), Van der Walt 823 (PRE, STEU); Stellenbosch (– DD), Bezuidenhout 9 (PU), Bos 19 (STEU), Duthie 559, 1576 (STEU), Duthie s.n. (BOL), Smith 55 (STEU), Smith 3216 (PRE), Van der Walt 430, 448, 527 (PRE, STEU), Visser 17 (STEU), Volschenk 16 (STEU); Jonkershoek (– DD) Haynes 1105 (PRE), Korfkoet 5450, 5577, 5734 (STEU), Van der Walt 508, 509, 640 (PRE, STEU), Van der Merwe 951, 1220 (PRE); Stellenbosch Mountain (– DD), Bos 19 (PRE, STEU); Simon’sberg (– DD), Marloth 10650 (PRE); Blauwklippen (– DD), Gillett 580 (STE).

- **3319** (Worcester): Near Saron (– AA), Van der Walt 1019 (PRE, STEU); Young 365 (PRE); Leipoldt s.n. (PRE); Between Witzenberg and Skurfseberg (– AB), Pillans 9584 (BOL); Gouda (– AC), Van Breda 557 (PRE); Romansrivier (– AC), Maguire 1755 (NBG), Van der Walt 577 (PRE, STEU); Tulbagh (– AC), Heginbotham 16 (BOL, NBG), Van der Walt 587, 924 (PRE, STEU); 3 km from Tulbagh (– AC), Boucher 56 (STEU); Tulbagh Kloof (– AC), tyson 2309 (NBG); Roodezand (– AC), Collie s.n. (STEU); Prince Alfred Hamlet (– AD), Marais 39 (STEU); Du Toit’s Kloof (– CA), Esterhuysen 24350 (BOL); 11 km NW of Rawsonville (– CA), Van der Walt & Vorster 1065 (PRE, STEU); 16 km from Worcester (– CD), Van Breda 553 (PRE); 1 km from Brandvlei Cells (– CB), Boucher 2824 (PRE); Hex River Valley (– CB), Tyson 730 (SAM); Franschhoek (– CC), Barker 4150 (NBG), Drifthost 464 (STEU), Smith 2652 (PRE); Wemmershoek (– CC), Esterhuysen 4082 (PRE); Robertson (– DD), Lewis s.n. (BOL).

- **3320** (Montagu): Montagu (– CC), Barnard 454 (SAM).

- **3323** (Willoowmore): Toowater (– CA), Peers s.n. (BOL); 74 km from Joubertina to George (– CA), Stirton 6366 (MO, PRE); 5 km from Joubertina to Avontuur (– DD), Thompson 951 (PRE).

- **3325** (Port Elizabeth): Zuurberg Pass (– BC), Van der Walt 883 (PRE, STEU).

- **3418** (Simonstown): Wynberg (– AB), Weldey 58 (BOL, PRE); Miller’s Point (– AD), Weldey 3266 (BOL); Helderberg (– BB), Galpin 12314 (PRE), Gillett 626 (STE); Hottentots Holland Mountains (– BB), Ecklon & Zeyher 549 (SAM); Sir Lowry’s Pass (– BB), Van der Walt 457 (PRE, STEU).

- **3419** (Caledon): 8 km from Caledon (– AB), Thompson 981 (PRE); Botriver (– AC), De Villiers s.n. (BOL); Stanford (– AD), Pienaar s.n. (PRE, STEU); 9 km from Caledon to Rivierersonderend (– BA), Stirton 6135 (PRE); 8 km NW of Rivierersonderend (– BB), Heinibushoam 94 (NBG).

- **3420** (Bredasdorp): 4 km from Stormsvlei (– AA), Stirton 6138 (MO, PRE); Hessequas Kloof (– AA), Zeyher 2060 (BOL); 25 km W. of Heidelberg (– BB), Van der Walt 617 (PRE, STEU).

- **3421** (Riversdale): Albertinia (– BA), Van der Schaff 7255 (PRE).

(b) var. *coriandrijolium* (L.) Harv.


*Geranium coriandrijolium* L. : 949 (1763); L. : 512 (1774); Cav. : 263, t. 124, fig. 1 (1787); Thunb. : 116 (1794); Thunb. : 530 (1823).

*Pelargonium coriandrijolium* (L.) L’Hér. : 421 (1789); Jacq. : 10, t. 523 (1794); Salsib. : 313 (1796); Jacq. : 142 (1797); Willd. : 663 (1800); Moench. : 297 (1802); Pers. : 230 (1806); Willd. : 703 (1809); Sweet : 34 (1820); DC. : 657 (1824); G. Don : 731 (1831). *Myriandrion coriandrijolium* (L.) Eckl. & Zeyh. : 72 (1835) (Figure 4).

P. *myrrielifolium* var. *coriandrijolium*, occurs in the western and south-western Cape (Figure 5). It is known from the Kamiesberg near Garies, south-eastwards to the district of Bredasdorp. The distribution area receives rain predominantly
during the winter months and the summers are hot and dry. It is often found on sandy soil derived from sandstone, and it usually grows in association with mountains although several localities are known from lowland areas.

Figure 4 Pelargonium myrrhifolium var. coriandrifolium. A, flowering branch × 1; B, petals × 2; C, androecium × 2; D, gynoecium × 2; E, schizocarp × 1; F, mericarp × 1.
This variety flowers from August to February with a peak during September to November.

We decided to allocate varietal status to these two taxa, because they are very closely related and sympatric. The most reliable character to distinguish between the two varieties is the structure of the leaves, the leaves of var. *coriandrifolium* being more finely divided with leaf segments which are rarely wider than 2 mm. The floral structure of the two varieties is practically identical, although the flowers of var. *coriandrifolium* tend to be somewhat larger than those of var. *myrrhidifolium*. Furthermore, the typical pinkish-purple colour of the flowers which is found in certain parts of the distribution area of var. *coriandrifolium* (e.g. Clanwilliam area), is never found in var. *myrrhidifolium*.

**Specimens examined**

- 3018 (Kamiesberg): Kamiesberge near Garies (– CA), *Esterhuysen* 23710 (BOL).
- 3218 (Clanwilliam): Near Graaffwater (– BA), *Leipoldt* 3216 (BOL); *Wieltskloof* (– BD), *Hugo* 678 (PRE).
- 3219 (Wupperthal): Pakhuis (– BA), *Esterhuysen* 3383 (BOL); *Niewoudt Pass* near Algeria (– AC), *Hugo* 430 (PRE); Algeria (– AC), *Galpin* 10533 (PRE), *Hugo* 637 (PRE), *Sailer* 7577 (BOL), *Taylor* 2919 (NBG), *Van der Walt* 9424 (PRE, STEU); *Middelberg* (– AC), *Pocock* 272 (PRE, STE); *Duiwelskloof* (– AC), *Stokoe* s.n. (SAM); *Elandskloof* (– CA), *Hugo* 568 (PRE); *Kromrivier* (– CB), *Esterhuysen* 20541 (BOL, PRE).
- 3318 (Cape Town): Dasklip Pass (– BB), *Van der Walt* 902 (PRE, STEU); *Near Bishopscourt* (– CA), *Sailer* 9650 (BOL); Above Camps Bay (– CD), *Schönberg* s.n. (PRE); *Claremont* (– CD), *Schlechter* 219 (Z); *Kennworth* (– CA), *Sailer* 6457 (BOL); *Kennworth Racecourse* (– CD), *Drimmer* 169 (E), *Van der Walt* 544 (PRE, STEU); *Klein Leeukoppie* (– CA), *Van der Walt* 487 (PRE, STEU); *Kirstenbosch* (– CD), *Zeyher* s.n. (SAM); *Bellville* (– DC), *Rogers* s.n. (MO); *Blackheath* (– DC), *Drifhout* 2016 (STEU), *Van der Walt* 439 (PRE, STEU); *Near Kliphuewul* (– DC), *Boucher* 54 (STEU); *Kraalfontein* (– DC), *Compton* 20085 (NBG); *Annandale* (– DC), *Rautanen* s.n. (Z); *Red Hill* (– DC), *Steyn* 668 (NBG); *Stellenbosch flats* (– DD), *Dadthi* 1073, 1534 (STEU); *Groot Drakenstein* (– DD), *Sailer* 6498 (BOL); *Lynedoch* (– DD), *Taylor* 10681 (NBG).
- 3319 (Worcester): *Elandskloof* (– AC), *Compton* 16174 (NBG); *Ceres* (– AD), *Rogers* s.n. (Z); *Hex River Valley* (– BD), *Pillans* 91/79 (BOL); *Witelsriver flats* (– CA), *Boucher* 3278 (MO); 11 km NW of Rawsonville (– CA), *Van der Walt & Vorster* 1068 (PRE, STEU).

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**Figure 5 Geographical distribution of Pelargonium myrrhidifolium var. coriandrifolium.**

2. **Pelargonium candidans** Spreng., *Systema Vegetabilium* 3 : 57 (1826) ex descr.; Harv. : 288 (1860); *Knuth* : 399 (1912); *Adamson & Salter* : 517 (1950). Type: Cape Province, Greyton Nature Reserve, *Vorster* 2911 (PRE!, neo., here designated; BOL!, K!, STEU!).


**Pelargonium rogersii** S. Moore : 226 (1921). Type: Cape Province, French Hoek, *Rogers* 17519 (PRE, holo.!, BM!, Z!).

Decumbent to procumbent, much-branched subshrub, up to 0,3 m high and 0,4 m in diameter. Stems herbaceous, bases of older stems somewhat woody, hirsute and with glandular hairs interspersed, green but becoming reddish-brown with age. Leaves: lamina soft to the touch, sericeous and with glandular hairs interspersed, greyish-green, narrowly cordiform in outline, trilobate to trisect to trifoliolate with the terminal segment/pinna much larger and variously incised, base cordate, apices of segments/pinnae obtuse, margins crenate, (15-)30(-75) mm long; petiole indumentum as on stems, (17-)35(-75) mm long; stipules ovate to triangular, cuspitate, indumentum as on lamina, ca. 4 x 5 mm.

*Inflorescence*: peduncles (30-)55(-60) mm long, indumentum as on stems; involucral bracts narrowly ovate to lanceolate, cuspitate, indumentum as on lamina, margin finnivate, ca. 4 x 2 mm; pseudo-umbels with 1–4 flowers each. *Pedicel* ca. 1–1,5 mm long. *Hypanthium* 5–8 mm long, sparsely hirsute but with many glandular hairs. *Sepals* lanceolate, cuspitate, abaxially hirtellous and with many glandular hairs, green but prominently raised veins often reddish.

*Petals* 4, white to pink (R.H.S. 75B); posterior two asymmetric-obovate with narrow claws, with dark red markings, (15-)20(-30) x (13-)20(-25) mm; petiole indumentum as on stems, (17-)35(-75) mm long; stipules ovate to triangular, cuspitate, indumentum as on lamina, ca. 4 x 5 mm.

**Diagnostic features**

Decumbent to procumbent subshrub, lamina sericeous, greyish-green, trilobate to trisect to trifoliolate with the terminal segment/pinna much larger and variously incised. Pseudo-umbels with 1–4 flowers each. Flowers with 4 white to pink petals, posterior two with dark red markings, anterior two with a pink blotch, fertile stamens 5.

*P. candidans* has a fairly wide distribution in the southern part of the Cape Province (Figure 7). It occurs from the Cape Peninsula eastwards in a strip along the coast to the district of Humansdorp. Gydouw near Ceres is the most northern locality known. Although it is often found in a mountainous
Figure 6 Pelargonium candicans. A, flowering branches × 1; B, petals × 2; C, androecium × 2; D, gynoecium × 3.
habitats, it also occurs on the lowlands. It grows on a variety of soil types and the greater part of its distribution range receives rain during the winter months.

Flowers can be found throughout the year, but there is a definite flowering peak during September to November.

**P. candidans** is clearly related to *P. myrrothiolium* and specifically to the var. *myrrothiolium*. It is sometimes very difficult to distinguish between these two taxa on leaf characters alone. Although a diploid species, it shows advanced characters alone. Although a diploid species, it shows advanced flowering peak during September to November.

**Specimens examined**

- **3318** (Cape Town): Sea Point (-CD), Schlechter 816 (Z), Kalbaskraal (-DA), Werdemann & Oberdey 305 (PRE), Barkleg (-DB), Kroger 37 (STEU), Van der Merwe 1127 (PRE), Van der Walt 656 (PRE, STEU); Stellenbosch Mountain (-DD), Van der Walt 686 (PRE, STEU).

- **3319** (Worcester): Gydow (-AB), Leipoldt 4000 (BOL), Marais 43 (STEU); Bocleg near Worcester (-BD), Compton 9925 (NBG); 11 km NW of Rawsonville (-CA), Van der Walt 1065 (PRE, STEU); Worcester (-CB), Taylor s.n. (BOL), Sandhills (-CB), Van der Walt 538 (PRE, STEU); Franschhoek (-CC), Rogers 17519 (BM, PRE, Z); Franschhoek Forestry Reserve (-CC), Esteyhausen s.n. (BOL); Hex River Pass (-DA), Compton 22847 (NBG), Rehmyn 2278 (Z); Between De Wet and De Doorns (-DA), Boucher 92 (STEU); Near De Wet (-DA), Schonkne 161 (STEU); Langeberg (-DB), Esteyhausen 24576 (BOL); Eerdracht (-DB), Walgate s.n. (BOL); Dassieshoek Pass (-DB), Wissara 462 (NBG).

- **3320** (Montagu): Keurkloof (-BC), Lewis s.n. (BOL), Donkerkloof (-BC), Lewis 1776 (SAM); Near Leeuwenberg (-CB), Esteyhausen 24576 (BOL, PRE); Near Ashton (-CC), Fischer 251 (STEU); Langeberg near Swellendam (-DC), Barnard s.n. (SAM), Warris 234 (NBG); 22 km W. of Barrydale (-DC), Thomson 2677 (PRE); Near Barrydale (-DC), Compton 164 (BOL), Morris 164 (NBG), Tradouw Pass (-DC), Barnard s.n. (SAM), Van der Walt 828 (PRE, STEU), Willems 107 (NBG); Between Barrydale and Montagu (-DC), Van Niekerk 381 (BOL).

- **3321** (Ladismith): Garcia Pass (-CC), Bolus 11250 (BOL, Z), Thorne s.n. (SAM); Farm Langberg (-DC), Van der Walt 838 (PRE, STEU); Cloete Pass (-DD), Muir 2197 (PRE), Schieben & Ellis 12346 (PRE).

- **3322** (Oudtshoorn): Groot Drakenrivier (-CC), Thorne s.n. (SAM); Ruitersbos (-CC), Van Niekerk 7 (BOL, PRE), Oetiniqua Pass (-CD), Van der Walt 1129 (PRE, STEU); Near Kleinplaat (-DC), Fourcade 2572 (BOL); Karatara Pass (-DD), Thompson 599 (STE).

- **3323** (Willowmore): 8 km from Avontuur (-CA), Gillett 1506 (BOL); Louterwater (-DC), Compton 5218 (NBG); 15 km from Joubertina (-DD), Van der Walt 858 (PRE, STEU); Joubertina (-DD), Esterhuysen 24227 (BOL).

- **3324** (Steytaville): Suuransys (-CD), Fourcade 3035 (STEU); Hills NE of Assegaiabos (-CD), Fourcade 4416a (MO, PRE, STEU); 20 km from Humansdorp on Joubertina road (-DD), Van der Walt 866 (PRE, STEU).

- **3325** (Port Elizabeth): Otterford Forestry Station (-CC), Schonkne 128 (STEU).

- **3418** (Simonstown): Miller's Point (-AD), Wolley Dod 780 (BOL); Steenbros (-BB), Rogers 11041 (Z); Helderberg (-BB), Parker 3571 (BOL, NBG); Kogelberg (-BD), Boucher 1900 (PRE).

- **3419** (Caledon): Caledon (-AB), Lamb 1583 (SAM), Leipoldt s.n. (BOL), Watt 9452 (NBG); Swartberg near Caledon (-AB), Bolus 7378 (BOL); Near Caledon (-AB), Van der Walt 793 (PRE); Greyton Nature Reserve (-BA), Vorster 2911 (STEU); Near Greyton (-BA), Taylor 9529 (PRE), Tygerhoek (-BB), Van der Walt 521 (PRE, STEU); Riviersonderend (-BB), Compton 7366 (NBG); Riviersonderend Mountains (-BB), Lewis 3909 (SAM), Willman 969 (BOL, PRE); 7 km NW of Napier (-BD), Thompson 3208 (PRE).

- **3420** (Bredasdorp): Stormsvlei (-AA), Esteyhausen 4298 (NBG, PRE), Lewis s.n. (BOL), Taylor 4060 (MO, NBG, PRE), Van Breda 565 (PRE), Zeyher 2062 (MEL, PRE, SAM, W); 4 km from Stormsvlei (-AA), Stirton 6136 (MO, PRE, SRGH); 9 km from Stormsvlei (-AA), Stirton 6151 (MO, PRE, SRGH); Swellendam (-AB), Barnard 608 (PRE), Liebenberg 6521 (PRE, STEU); 15 km from Swellendam on Suurbraak road (-AB), Marsh 1001 (STEU); 10 km E. of Swellendam (-AB), Marsh 1134 (STEU); Bontebok National Park (-AB), Van der Walt 540, 613, 1329 (PRE, STEU); Suurbraak (-BA), Galpin 3812 (GRA, PRE); Buffeljagsrivier (-BA), Zeyher 2067 (SAM); Near Heidelberg (-BB), Morris 275 (NBG); Potberg (-BC), Maguire 2606 (NBG), Pillans 9249 (BOL), Walgate 509 (NBG, PRE); Bredasdorp (-CA), Esteyhausen 3070 (BOL).

- **3421** (Riversdale): Riversdale (-AB), Bolus 11229 (BOL), Ecklon & Zeyher 26 (PRE); 1 km from Riversdale (-AB), Stirton 6379 (PRE); 32 km from Riversdale to Still Bay (-AD), Thompson 690 (SRGH).

- **3422** (Mossel Bay): Rheebok (-AA), Van der Walt 674 (PRE, STEU).

- **3423** (Knsyna): Knsyna (-AA), Duthie s.n. (SAM), Rehnman 460 (Z), Rogers 24905 (PRE); Noetzie (-AA), Middlemost s.n. (SAM); Formosa (-AB), Fourcade 1483 (BOL, GRA, SAM, STE); Plettenberg Bay (-AB), Rogers & Smart 24913 (PRE); Keurboomsrivier (-AB), Fourcade s.n. (STE).

### 3. Pelargonium multicale Jacq.

**Icones Plantarum Rariorum** 3:10, t. 534 (1795). Type: Locality and collector unknown (W, holo., specimen with Jacquin's handwriting).

Procumbent, much-branched subshrub, up to 0.3 m high and 1 m in diameter. Stems herbaceous, bases of older stems somewhat woolly, sometimes angular, hirtellous to hirsute and with glandular hairs and sometimes longer hairs interspersed, green but sometimes flushed with red and becoming greyish-brown with age. Leaves: lamina sparsely hirtellous to strigose and with glandular hairs interspersed, green but sometimes flushed with red, narrowly cordiform to cordiform in outline, trilobulate or trifid to pinnatifid with the pinnae/segments irregularly incised, base of lamina cordate, apices of segments obtuse, margins irregularly crenate, (20-40) - (80) x (15-) - 30(-40) mm; petiole indumentum as on stems, (10-) - 30(-130) mm long; stipules ovate, sometimes cuspidate, indumentum as on stems, ca. 6 x 5 mm. Inflorescence: peduncles (30-) - 80(-150) mm long, hirtellous and densely interspersed with glandular hairs; involucral bracts ovate, densely covered with glandular hairs and margins ciliate, ca. 5 x 3 mm; pseudo-umbels with 2-5 flowers each. Pedicel 1-2 mm long.
Hypanthium 8–25 mm long, indumentum as on peduncle. *Sepals* lanceolate, indumentum abaxially as on peduncle, green but prominently raised veins dark green to brownish to red. *Petals* 4, white to pinkish or dark pinkish-purple with light coloured claws; posterior two asymmetric-ovobate with narrow claws, with pinkish or dark purple streaks and a white blotch at base of plate, reflexed at ca. 90°, ca. 20 × 8 mm; anterior two narrowly spathulate to spathulate with long claws, slightly reflexed, ca. 12 × 4 mm. *Fertile stamens* 7 (4 long, 1 medium, 2 short), protruding below anterior petals, staminal column ca. 2 mm long, pollen orange. *Mericarps* as yet unknown. 2n = 22.

Diagnostic features
Procumbent, perennial subshrub, lamina green but sometimes flushed with red, trifoliolate or trifid to pinnatifid with the pinnae/segments irregularly incised. Pseudo-umbels with 2 – 5 flowers each. Flowers with 4 white to pinkish or dark pinkish-purple petals, hypanthium 8–25 mm long. Fertile stamens 7, protruding below anterior petals.

Key to the subspecies
1a Flowers dark pinkish-purple, leaf segments usually less than 5 mm wide, hypanthium usually 8 – 15 mm long, occurring in Cape Province, Orange Free State and Lesotho

1b Flowers white to pinkish, leaf segments usually more than 5 mm wide, hypanthium usually 15 – 25 mm long, occurring in Transvaal and Natal

(a) subsp. *multicaule*

Pelargonium multicaule Jacq.: 10, t. 534 (1795); Jacq.: 126 (1797); Willd.: 662 (1800); Willd.: 702 (1809); DC.: 658 (1824); Spreng.: 56 (1826); G. Don: 732 (1831); Steud.: 288 (1841); Harv.: 286 (1860); Knuth: 394 (1912); Batten & Bokelmann: 87, t. 74 (1966); J.J.A. v.d. Walt & Vorster: 97, fig. (1981). 


Myrrhidiun triangulare Eckl. & Zeyh.: 71 (1835). Pelargonium triangulare (Eckl. & Zeyh.) Steud.: 290 (1841). Type: Cape Province, . . . . 'prope Hermanuskrâ'; ad ripas fluminis 'Vishrivier' (Albany). *Ecklon & Zeyher* 533 (BOL! lecto., here designated, G!; K!; L!; M!; MEL!, P!; S!; SAM!, W!) (Figure 8).

P. multicaule subsp. *multicaule* is widely distributed in the southern part of the Cape Province, and it is also known from a single locality in the Orange Free State and several localities in Lesotho (Figure 9). It occurs from the district of Worcester in the west, north-eastwards to the districts of Clocolan and Maseru. It is particularly common in the Langkloof and eastern Cape, especially in the vicinity of Grahamstown. This distribution area includes both winter and summer rainfall regimes. It is mostly associated with a mountainous or rocky habitat with well-drained soil.

This subspecies flowers sporadically throughout the year with a definite peak from October to December.

Specimens examined
- 2827 (Senekal): Sherwood, Clocolan (- DC), *Slam s.n. (WAG).*
- 2927 (Maseru): Teyateyaneng (- BA), *Collett 475 (PRE); Mamathes (- BB), *Hem s.n. (PRE); Roma (- BC), *Ruch 1627, 2339 (PRE), Schmitz 121, 469 (PRE); Makhaeso Mountain (- DA), *Dieterleu 989 (PRE).*
- 3026 (Aliwal North): *Aliwal North (- DA), Bolus 49 (BOL); Elandschoek near Aliwal North (- DA), Bolus 96 (STEU, Z).*
- 3123 (Victoria West): *Murraysburg (- DD), Tyson 447 (GRA), Tyson 503 (SAM).*
- 3124 (Hanover): *Loostberg Pass (- DC), Acocks 15857 (PRE), Hilliard & Burt 10636 (MO), Theron 2163 (PRE), Van der Walt 990, 991 (PRE, STEU); Wapadberg Pass (- DD), *Maguire 714 (NBG), Taylor 5680 (NBG, STE); Rooihooget (- DD), *Hutchinson 3125 (GRA, PRE).*
- 3125 (Steynsburg): *Middelburg (- AC), Sidey 488 (MO).*
- 3126 (Queenstown): *Queenstown (- DD), Cooper 433 (Z), Galpin 8296 (PRE); Lesseyton near Queenstown (- DD), Galpin 2008 (BOL, GRA, PRE).*
- 3222 (Beaufort West): *Beaufort West (- BC), Guthrie 3478 (NBG);* 
- 3223 (Graaff-Reinet): *Houd Constant Pass (- AA), Olivier 5277 (PRE); Graaff-Reinet (- BC), Bolus 151 (BOL); Ouiberg (- DD), Bolus s.n. (MO).*
- 3225 (Somerset East): *Mortimer (- BC), Kentsis s.n. (BOL); Boschberg (- DC), Macowan 650 (NH, Z).*
- 3226 (Fort Beaufort): *Seymour (- DB), Giffen 1136 (PRE); Amatola Mountains (- DB), Wilson s.n. (NBG).*
- 3227 (Stutterheim): *Cathcart (- AK), Kemp s.n. (NBG); Keiskammaheoek (- CA), Stayner 57 (GRA).*
- 3319 (Worcester): *Hex River Pass (- BD), Goldblatt 3213 (PRE), Naudesberg (- DA), Middlemost 2041 (NBG); Between McGregor and Stormsvlei (- DD), Estherhuysen 4301 (BOL).*
- 3320 (Montagu): *Fisantekraal (- BC), Compton 21116 (BOL, NBG).*
- 3321 (Ladismith): *Huisrivier Pass (- CB), Barker 20598 (BOL); Garcia’s Pass (- CC), Hafström & Acocks 1995 (PRE).*
- 3322 (Oudtshoorn): *Near Kango Caves (- AC), Gillett 180 (STE); Swartberg Pass (- AC), Hafström & Acocks 752 (BOL, PRE), *Stokoe 9045 (BOL);* Kango Valley (- AC), Moffett 359 (STEU); Groothuijs (CA), Thorne s.n. (NBG); Schoemanskloof (- AD), Venier 7448 (STEU); 40 km SE of Oudtshoorn (- CB), Story 3640 (GRA, PRE).*
- 3323 (Willowmore): 8 km from Avontuur (- CA), Gillett 1588 (STE); Near Avontuur (- CA), Van der Wal 853 (PRE, STEU); Uniondale Poort (- CA), Fourcade 3579 (BOL); Top of Prince Alfred’s Pass (- CA), Fourcade 2071 (BOL); Baviaanskloof (- CA), Boucher 39 (STEU); Ongeléé (- CB), Stirton 6542 (MO, PRE); Between Haarlem and Misgund (- CB), *Boucher 108 (STEU); Paardekop (- CC), Compton 719 (NBG); Prince Alfred’s Pass (- CC), Thompson 3319 (PRE); Keeboomrivier (- CD), Fourcade 1638 (BOL, GRA, PRE, STE); Misgund (- CD), Fourcade 1339 (BOL, STE); 5 km N. of Misgund (- CD), Fourcade 4252 (BOL); Joubertina (- DD), Estherhuysen 24271 (BOL, PRE), Stirton 6359 (PRE); Near Joubertina (- DD), Fourcade 2381 (STEU).*
- 3324 (Steynville): 49 km NW of Patensie (- CB), Van der Wal & Oudtshoorn 1378 (PRE, STEU); Baviaanskloof (- DA), Estherhuysen 24993 (BOL).*
- 3325 (Port Elizabeth): *Addo National Park (- BC), Archibald 3840 (PRE); Suurberg (- BC), Dregé 74860 (PRE); Swartkoprivier near Uitenhage (- CD), Ecklon & Zeyher 532 (MEL, SAM), Zeyher 1704, 2006 (PRE, SAM); Coega (- DC), Bayliss 2253 (NBG, Z).*
- 3326 (Grahamstown): 5 km SE of Curlidle Bridge (- AB), Acocks 17625 (Z); Hounslow (- AB), Galpin 149 (GRA, PRE); Highlands (- AD), Bayliss 3601 (MO, NBG, Z); Near Committees (- BB), Dyre 1695 (GRA, PRE), *Fish River (- BB), Ecklon & Zeyher 553 (BOL, G, K, L, M, MEL, P, S, SAM); 30 km NE of Grahamstown (- BB), *Olivier 1406 (STEU);* 16 km S. of Grahamstown (- BC), Bayliss 8636 (MO); Grahamstown (- BC), Britton 2808 (GRAH), Hill s.n. (GRA), *Ward-Hilhorst s.n. (STEU);* 12 km from Grahamstown (- BC), Leighton 3076 (BOL, PRE); 16 km E. of Grahamstown (- BC), Taylor 3637 (NBG); Manley 1811 (BC), Compton 1920 (NBG); 35 km from Pelide on Grahamstown road (- BC), Commins 1709 (GRA, PRE, Z); 40 km E. of Grahamstown (- BC), Maguire 649 (NBG); Alexandria (- CB), Archibald 6139 (PRE); Bathurst (- DB), Sidey 3807 (PRE); Port Alfred (- DB), Rogers 990 (GRA).*
- 3420 (Bredasdorp): 13 km from Heidelberg to Witsand (- AB), *Marsh 837 (PRE, STE).*
- 3421 (Riversdale): *Riversdale (- AB), Bolus 11225 (BOL, Z), Schlechter 1972 (Z).*
- 3423 (Knysna): *Knysna (- AA), Fourcade 1638 (BOL).*
- 3424 (Humansdorp): *Humansdorp (- BB), Rogers 2979 (Z).*
(b) **subsp. subherbaceum** (Knuth) J.J.A. v.d. Walt, subsp. nov. Type: Transvaal, Houtboschberg, *Schlechter 4430* (B, holo.†, BOL!, lecto., here designated, PRE!, Z!).

*Pelargonium subherbaceum* Knuth : 232 (1923) (Figure 10).

This subspecies is rather widely distributed in the central and eastern parts of the Transvaal, from the Soutpansberg in the north to Barberton in the south. It is also known from a single locality in Natal (Figure 9). It is confined to a mountainous habitat and occurs on north, south or east facing slopes. The distribution range falls entirely in the summer rainfall region.

Like the subsp. *multicaule*, it flowers sporadically throughout the year with a definite peak during November to January.

**Figure 8** *Pelargonium multicaule* subsp. *multicaule*. A, flowering branch × 1; B, petals × 2; C, androecium × 2; D, gynoecium × 3.
Figure 9 Geographical distribution of *Pelargonium multicava*; subsp. *multicaule*; subsp. *subherbaceum*.

The type specimens of the subsp. *subherbaceum* are unfortunately atypical in the sense that they are not representative of the taxon as a whole. The leaves of the type specimens are more finely divided and the hypanthium of the flowers much shorter than usual. Stem cuttings of plants from the type locality were made, and in cultivation the leaf segments grew much wider and the hypanthium of the flowers much longer in comparison with those in the natural habitat. The atypical characters of the plants in the type locality can therefore be ascribed to local environmental conditions.

**P. whytei** Bak. (type from Malawi), *P. goetzeanum* Engl. (type from Tanzania) and probably also *P. gallense* Chiov. (type from Ethiopia) are closely related to *P. multicava* subsp. *subherbaceum* and may even be conspecific. We came to this conclusion after having studied the type specimens of *P. whytei* and *P. goetzeanum* before a decision could be made.

**Specimens examined**
- 2229 (Waterpoort): Soutpansberg (- DD), Compton 18075 (PRE); Soutpansberg at Hangklip (- DD), Meuse 10172 (PRE).
- 2329 (Pietersburg): Houtboschberg (- DD), Rehmann 6327 (Z), Schlechter 4430 (BOL, PRE, Z).
- 2330 (Tzaneen): Wolburg (- CC), Meuse 9888 (PRE); Woodbush Forest Reserve (- CC), Visser s.n. (STEU); Duivelskloof at Westfalia Estate (- CD), Scheepers 1074 (K, MO, PRE, SRGH).
- 2430 (Pelgrimsrust): The Downs (- AA), Rogers 20176 (Z); Ohrigstad Nature Reserve (- DC), Jacobsen 1797 (PRE), Theron 3342 (PRE, PRU).
- 2529 (Witbank): Loskopdam at Renosterhoek (- AD), Theron 1455 (PRE, PRU); Middelburg at Doornkop (- CB), Du Plessis 1042 (PRE, PRU).
- 2531 (Komatiport): Barberton (- CC), Galpin 437 (PRE), Rogers 24069 (PRE); Saddleback Hill (- CC), Thornicroft 858 (NH).
- 3030 (Port Shepstone): Dunisa (- AD), Rudais 978 (E).

Plants resembling *P. multicava* in many respects, occur in the eastern Cape (specimens listed below). These plants have more characters in common with the subsp. *subherbaceum* than with the subsp. *multicaule*, although they grow almost sympatrically with the latter. Their flowers are whitish, relatively large, and their hypanthia are longer than 25 mm. The origin and taxonomic status of these populations are not yet clear. It is possible that they are of hybrid origin.

**Specimens examined**
- 3227 (Stutterheim): Fort Cunynghame (- AD), Bolas 8817 (BOL); Komga (- DB), Flanagan 1201 (BOL, GRA, PRE, SAM).
- 3324 (Steyterville): 10 km from National Road on Melk­houtboom road (- DD), Story 2610 (GRA, PRE).
- 3335 (Port Elizabeth): Palmietriver (- CA), Scharff 1363 (PRE).
- 3336 (Grahamstown): Near Grahamstown (- BC), Ward s.n. (STEU).

**4. Pelargonium suburbanum** Clifford ex Boucher, nom. nov. Type: Cape Province, ‘Terra lignea . . . apud urbem “Uiten­hage” ’, Eckl. & Zeyher 546 (SAM!, lecto., here designated, BOL!, M!, MEL!, S!, W!).


Procumbent, branched subshrub, up to 0.3 m high and 1 m in diameter. **Stems** herbaceous, bases of older stems somewhat woody, tomentose to villous and with glandular hairs interspersed, green but becoming reddish-brown and eventually greyish with age. **Leaves**: lamina sparsely pilose to villous and with glandular hairs interspersed, green, oblong-cordiform in outline, pinnatifoliate to pinnatisect or bipinnatifoliate to bipinnatisect but sometimes trifoliolate with the terminal pinna relatively large, base of lamina cordate, apices of segments obtuse to acute, margins crenate, (15–40)–(80) × (20–) 25–(60) mm; petiole indumentum as on stems, (15–)30–(100) mm long; stipules ovate, indumentum as on lamina, relatively large, ca. 10 × 8 mm. **Inflorescence**: peduncles (65–)100–(120) mm long, villous to hirsute and with glandular hairs in between; involucral bracts narrowly ovate, indumentum as on peduncles, ca. 8 × 3 mm; pseudo-umbels with 3–6 flowers each. **Pedicel ca.** 1 mm long. **Hypanthium** 8–45 mm long, sparsely hirsute but with many glandular hairs. **Sepals** lanceolate, abaxially hirsute and with many glandular hairs, green but prominently raised veins often reddish. **Petals** 4 or 5, white to yellowish (R.H.S. 11D) or dark pink-purplish (R.H.S. 70B); posterior two asymmetric-ovate with narrow claws, with dark red markings, reflexed at less than 90°, ca. 20 × 30–9 × 14 mm; anterior two/three narrowly spatulate, slightly reflexed, ca. 15–17 × 2–6 mm. **Fertile stamens** 7 (4 long, 1 medium, 2 short), staminal column ca. 5 mm long, pollen orange. **Mericarps**: bases ca. 6 mm long; tails ca. 40–50 mm long. 2n = 22.

**Diagnostic features**
Procumbent, perennial subshrub; lamina green, sparsely pilose to villous, pinnatifoliate to pinnatisect or bipinnatifoliate to bipinnatisect; stipules relatively large (ca. 10 × 8 mm). Pseudo-umbels with 3–6 flowers each. Flowers with 4 or 5 white to yellowish or dark pink-purplish petals, posterior two with dark red markings, fertile stamens 7.

**Key to the subspecies**
1a Leaves pinnatifoliate to pinnatisect, flowers dark pink-purplish, hypanthium shorter than 15 mm, confined to the eastern Cape
1b Leaves mostly bipinnatifoliate to pinnatisect, flowers white to yellowish, hypanthium longer than 15 mm, confined to the south-western and southern Cape

(a) **subsp. suburbanum**

**Pelargonium urbanum** (Eckl. & Zeyh.) Steud. var. **pinnatifidum**

Harv. : 288 (1860); Knuth : 400 (1912) (Figure 11).
This subspecies is confined to the coastal area in the eastern Cape from Humansdorp in the west to Port Elizabeth in the east (Figure 12). It is often found in openings in low scrub on sand dunes. It flowers from June to January with a peak during October to December.

*Figure 10 Pelargonium multicaule* subsp. *subherbaceum*. A, flowering branch × 1; B, sepals × 2; C, petals × 2; D, androecium × 2; E, gynoecium × 2.
Specimens examined
— 3325 (Port Elizabeth): Uitenhage (– CD), Ecklon & Zeyher 546 (BOL, M, MEL, S, SAM, W); Swartkops Bridge (– CD), Troughton 136 (GRA); Swartkopsrivier (– DC), Olivier 1687 (STEU); Port Elizabeth (– DC), Drège 438 (GRA), Laidley 116 (Z); Humewood (– DC), Holland 3725 (BOL, GRA), Paterson 786 (GRA, Z); University Campus (– DC), Van der Walt 571 (PRE, STEU); Near Port Elizabeth (– DC), Zeyher 2089 (PRE, W, Z).

— 3424 (Humansdorp): Eersterivier (– AA), Fourcade 1969a (BOL), Leighton s.n. (BOL); Slangrivier (– BA), Fourcade 1857 (BOL), Phillips 3387 (PRE); Klipdrift (– BA), Thode A2466 (PRE); Humansdorp (– BB), Christie 31 (GRA, Z), Rogers 2978 (BOL); Jeffreys Bay (– BB), Fourcade 3300 (BOL, STE), Taylor 5138 (NBG); Seekoeirivier (– BB), Montgomery 54 (STEU).

— 3425 (Skoenmakerskop): Near Sea View (– AB), A cocks 21449 (PRE); Cape Recife Reserve (– BA), Olivier 2378 (STEU).

Figure 11 Pelargonium suburbanum subsp. suburbanum A, flowering branch × 1; B, petals × 1; C, androecium × 1.5; D, gynoecium × 2.
Decumbent to procumbent, much-branched subshrub, up to 0.5 m high and 1 m in diameter. Stems herbaceous, bases of older stems somewhat woody, glabrescent to pubescent to villous to hirsute and with glandular hairs in between, green and becoming greyish with age. Leaves: lamina indumentum variable as on stems, green but sometimes flushed with red, narrowly cordiform in outline, entire to pinnatifid with narrow segments, base of lamina cordate, apices of segments obtuse to acute and often reddish, margins irregularly incised, (35 – 350 – 100) x (25 – 40 – 60) mm; petiole indumentum as on stems, (15 – 350 – 120) mm long; stipules ovate to cordate and sometimes cuspidate, ca. 7 x 6 mm. Inflorescence: peduncles (25 – 70 – 100) mm long, hirtellous to hirsute and densely interspersed with glandular hairs; involucral bracts lanceolate, hirtellous, ca. 8 x 2 mm; pseudo-umbels with 2 – 6 flowers each. Pedicel 1 – 3 mm long. Hypanthium 8 – 55 mm long, indumentum as on peduncle. Sepals lanceolate, hirsute and with many glandular hairs; green but prominently raised veins reddish. Petals 4 or 5, white to yellowish to pink to mauve or pinkish-yellow; posterior two obovate or oblong-lanceolate to ovate with narrow claws, with red or dark purple streaks, reflexed at less than 90°, 25 – 40 x 8 – 12 mm long; anterior two/three spatulate to narrowly lanceolate, slightly reflexed, ca. 20 x 4 mm. Fertile stamens 7 (4 long, 1 medium, 2 short), staminode column ca. 5 mm long, pollen orange. Mericarps: bases ca. 5 mm long; tails ca. 30 mm long. 2n = 22.

Diagnostic features

Decumbent to procumbent subshrub. Leaves pinnatifid to bipinnatifid with narrow segments, glabrescent to pubescent to villous to hirsute. Pseudo-umbels with 2 – 6 flowers each (usually 3 or 4). Petals 4 or 5, white to yellowish to pink to mauve or pinkish-yellow, posterior two relatively large (longer than 25 mm). Fertile stamens 7.

Key to the varieties

1a. Posterior petals obovate, ca. 25 x 12 mm, white to yellowish to pink to mauve ................................. (a) var. longicaule

1b. Posterior petals oblong-lanceolate, ca. 40 x 5 mm, pinkish-yellow ................................................. (b) var. angustipetalum

(a) var. longicaule


Pelargonium emarginatum Moench : 296 (1802); ex descr. Type: Unknown.


Pelargonium myrrhifolium (L.) L’Hér. var. intermediate Harv. : 287 (1860); Knuth : 397 (1912). Type: Cape Province, near Simonstown, Wright s.n. (CD), here designated, specimen with Harvey’s handwriting (Figure 14).

P. longicaule var. longicaule has a wide distribution in the south-western Cape Province (Figure 15). It is known from the Gifberg near Varnhynsdorp in the north to the district of Bredasdorp in the south. It is mainly confined to mountainous habitats where it grows on sandy soil. The distribution
area receives rain predominantly during the winter. Occasional flowers are found throughout the year, but the peak flowering period stretches from September to November. The leaves of plants from northern localities such as Gifberg, Graafwater and Hopefield are larger, more hairy and their segments are wider than those of southern localities.

Specimens examined
— 3118 (Vanrhynsdorp): Gifberg (– DC), Esterhuysen 22089 (BOL).
— 3218 (Clanwilliam): Graafwater (– BA), Compton 24213 (NBG), Van Breda 560 (PRE); Piquetberg, Versfeld Pass (– DA), Van der Walt 1473 (PRE, STEU); Kapteinskloof (– DA), Pillars 8049.

Figure 13 *Pelargonium suburbanum* subsp. *bipinnatifidum*. A, flowering branches × 1; B, petals × 1; C, androecium × 2; D, gynoecium × 2.
(BOL); Piekenierskloof Pass (DB), Pearson 5220 (BOL); Piet-quetberg, Versfeld Pass (DD), Van der Walt 1474 (PRE, STEU).

3219 (Wupperthal): Krakadouw Pass (AA), Baker 8132 (NBG); Algeria (AC), Bos 497 (WAG), Lewis s.n. (BOL); Uitkyk

Figure 14 Pelargonium longicaule var. longicaule. A, flowering branch × 1; B, branch × 1; C, petals × 1; D, androecium × 1.5; E, gynoecium × 2.
Pass (−AC), Boucher 58 (STEU), Gillett 4118 (BOL), Leighton 21577 (BOL); Elslandskloof (−CA), Lewis 22054 (BOL); Skoongesig, Ceres (−CC), Hanekom 979 (PRE, STE, SRGH); Grassuqens (−CC), Pillans s.n. (BOL); Berghof near Ratelrivier (−CC), Thompson 1451 (PRE, STE).

— 3318 (Cape Town): Near Hopefield (−AB), Bachmann 1540 (BOL); 15 km NE of Yzerfontein (−AC), Acoks 20717 (PRE); Between Yzerfontein and Langebaan (−AC), Marais 22 (STE); Plattekloof (−AD), Ecklon & Zeyher 530 (MEL, PRE, W), 4890 (MO); 4 km NW of Darling (−AD), Acoks 20706 (PRE); Dasklip Pass (−BB), Van der Walt 903 (PRE, STEU); Mamre (−CB), Baur s.n. (PRE); Cape Town (−CD), Marloth 8 (PRE), Rogers 27226 (Z); Table Mountain (−CD), Ecklon & Zeyher 549 (SAM), 550 (SAM, WA); Jamieson 47 (NBG), Young 141 (PRE), Zeyher s.n. (SAM); Signal Hill (−CD), Sidey 2192 (MO); Above Camps Bay (−CD), Galpin 3809 (PRE); Camps Bay (−CD), Zeyher s.n. (SAM); Aberg Bengkobusho (−CB), Hutchinson 18 (BOL); Paaulberg (−DB), Déregie s.n. (SAM); Near Killarney (−DC), Salter 6442 (BOL); Doornhoogte (−DC), Ecklon & Zeyher 554 (BOL, MO); Kuikrivierv (−DC), Zeyher 181 (MEL); Jonkershoek (−DD), Garside 987 (STEU), Kerfoot 5276, 5410 (STE), Van der Merwe 22–68 (PRE, STEU), Van der Walt 426, 451, 452, 502, 514 (PRE, STEU), Werdermann & Oberdieck 343 (PRE), Werger 1214 (PRE); Banhoo (−DD), Stokoe s.n. (SAM); Botmaskspoor (−DD), Van Rensburg 373 (PRE, STE); Stellenbosch (−DD), Garside s.n. (STEU); Blaauwklip (−DD), Gillett 607 (STE).

— 3319 (Worcester): Twenty Four Rivers (−AA), Estherhuysen 23767 (BOL); Winterhoekberg (−AA), Zeyher 2057 (SAM); Tullbagh (−AC), Davis s.n. (SAM), Ecklon & Zeyher 20 (PRE), Van der Walt 923, 927 (PRE, STEU); Ceres (−AD), Kasnner 1226 (E); Du Toit’s plot (−CA), Barker 3535 (NBG), Compton 20106 (NBG), Estherhuysen 24531 (BOL), Hugo 750 (PRE, Tyson s.n. (SAM); E. of Bainskloof (−CA), Taylor 4021 (MO, NBG); Bainskloof Pass (−CA), Bolus 2727 (BOL), Gillett 195 (STE), Leighton 3149 (BOL), Van Breda 688 (PRE), Van der Walt 585 (PRE, STEU), Farm Elkeboom near Rawsonville (−CA), Van der Walt & Vorster 1667 (PRE, STEU), Sebastianskloof (−CB), Compton 11647 (NBG); Franschoek (−CC), Boucher 2254 (PRE, STE); Klein Drakenstein Mountain (−CC), Kruger 764 (STE), Franschoek Forest Reserve (−CC), Estherhuysen s.n. (BOL), Salter 7004 (NBG); Zachariashoek (−CC), Smith 13 (PRE, STE); Wemmershoek (−CC), Van der Walt 638 (PRE, STEU), Wasserfall 526 (NBG); Waterkloof E. of Villiersdorp (−CD), Oliver 5499 (STE).

— 3418 (Simonstown): Karbonkelberg (−AB), Barker 1695 (NBG); Constantianek (−AB), Barker 3183 (NBG), Pillans 10505 (MO); Hout Bay (−AB), Gillett 417 (STE); Kalk Bay (−AB), Groovenor 70 (SRGH); Muizenberg (−AB), Bolus 2274 (PRE), Schlechter 643 (Z), Scott Elliot 181 (E); Clovely (−AB), Rogers 29862 (Z); Ocean View (−AB), Boucher 103 (STEU); Oranjeboom (−AB), Schlechter 719 (Z), Wolley Dod 2796 (BOL); Red Hill (−AB), Leighton 3059 (PRE); Wynberg (−AB), Estherhuysen s.n. (BOL), Wolley Dod 3076 (BOL); Wynberg Hill (−AB), Bolus s.n. (MO, PRE), Pillans 10501 (MO); Chapmans Peak (−AB), Van Niekerk 456 (NBG), Klaas Jagersberg (−AB), Salter 6478 (BOL); Near Simonstown (−AB), Wright s.n. (TCD); Simonstown (−AB), Wright s.n. (MEL); Cape Flats (−BA), Schinz s.n. (Z); Faure (−BB), Boucher 35 (STEU); Sir Lowry’s Pass (−BB), Stokoe s.n. (SAM); Farm Lourensford, Somerset West (−BB), Vorster & Van der Walt 2928 (PRE, STEU); Harold Porter Botanic Garden, Betty’s Bay (−BD), Ebersohn s.n. (NBG); Betty’s Bay (−BD), Van der Schijff 7432 (PRE).

— 3419 (Caledon): Kleinmond (−AC), Barker 1148 (NBG); Voëlvli, Hermanus (−AC), Barker 1691 (NBG), Helmsm s.n. (STEU); Hermanus (−AC), Galpin 3830 (GRA, PRE, Gurtire 279 (NBG), Rogers 24901 (PRE), Van der Walt 599 (PRE, STEU); Near Hermanus (−AC), Gillett 5 (STE); Hemel en Aarde (−AC), Gillett 65 (STE); Onrusrivier (−AC), Van Niekerk 341 (BOL); Mosselrivier (−AD), Compton 23645 (NBG), Maguire 1254 (NBG); Vogelat Kloof (−AD), Williams 2007 (MO); Genadendal (−BA), Galpin 3829 (PRE); Greynot (−BA), Van der Walt 802 (PRE, STEU), Vorster 2915 (PRE, STEU); Frikiesbaai (−CA), Compton 18205 (NBG); Strandskloof (−CB), Van der Walt 605 (PRE, STEU); Near Gansbaai (−CB), Stokoe 7398 (BOL); Between Franskraal and Strandskloof (−CB), Leighton s.n. (BOL).

— 3420 (Bredasdorp): Farm Kleinheuwel near Bredasdorp (−CA), Van der Walt 608 (STEU).

(b) var. angustipetalum Boucher, var. nov.

var. angustipetalum Boucher var. nov. characteribus vegetativis et habitu plusminusve var. longicauli similimis, sed petalis posterialibus longioribus angustioribus et proprie subroseoflavis.

Decumbent to procumbent subshrub. Lamina coriaceous in outline, pubescent to hisurate, pinnaatifid to pinnaatissect. Pseudo-umbels with 2–6 flowers each. Pedicel 1–3 mm long; hypanthium 40–55 mm long, hisurate. Petals 4 or 5, pinkish-yellow with red streaks; posterior two oblancoate, ca. 40 × 8 mm; anterior two/three narrowly lanceolate, ca. 20 × 4 mm. Fertile stamens 7. Type: Cape Province, Piquetberg, farm Tweefontein on Gryskop, Van der Walt 1475 (PRE, holo!, K1, STEU!) (Figure 16).

So far this variety has only been observed in the vicinity of the type locality on Piquetberg (3218 DA) at an altitude of ca. 760 m (Figure 15). It is locally very common and apparently a well-established taxon producing many viable seeds. It grows in well-drained soil derived from Table Mountain sandstone. The distribution area receives rain predominantly during the winter months.

This variety flowers from October to December.

The status of variety has been allocated to this taxon because it grows sympatrically with the var. longicaule.


Decumbent to procumbent, much-branched subshrub, up to 1 m high and 1.5 m in diameter. Stems herbaceous, bases of older stems somewhat woody, sparsely striose to strigose and with long straight hairs and glandular hairs in between, green but becoming brownish with age. Leaves: lamina glabrescent to striose or densely striose and with glandular hairs interspersed, green or greyish-green, corifidom or ovate in outline, pinnaatifad to pinnaatissect with the basal segments sometimes irregularly incised, base of lamina truncate to cordate, apex acute, margins irregularly crenate-dentate,
(10−)30(−40) × (5−)15(−35) mm; petiole indumentum as on lamina, (0−)12(−40) mm long; stipules asymmetric-triangular, sometimes cuspidate, indumentum as on lamina, ca. 4 × 1.5 mm. Inflorescence: peduncles (10−)25(−70) mm long, sparsely hirsute to hirsute or strigose and with glandular hairs interspersed; involucral bracts 2, ovate, narrowly ovate or lanceolate, sometimes cuspidate, indumentum as on lamina, ca. 7 × 12 mm; reduced pseudo-umbels with 1(−2) flowers each. Pedicel 0.5−2 mm long. Hypanthium 10−50 mm long, sparsely hirsute to hirsute and with many glandular hairs.

Figure 16 Pelargonium longicaule var. angustipetalum. A, flowering branch × 1; B, sepals × 1; C, petals × 1; D, androecium × 2; E, gynoecium × 3.
Sepals lanceolate, indumentum abaxially as on hypanthium, brownish-green but prominently raised veins of reddish colour.

Petals 4(-5), cream, pale pink to pink or pinkish-purple; posterior two asymmetric-ovate with narrow claws, with narrow wings.
dark reddish-purple markings, reflexed at less than 90°, ca. 25 × 12 mm; anterior two/three narrowly spatulate, with long claws, slightly reflexed, ca. 17 × 4 mm. **Fertile stamens** 7 (4 long, 1 medium, 2 short), staminal column ca. 4 mm long, pollen yellow to orange. **Mericarps**: bases ca. 5 mm long; tails ca. 25 mm long, 2n = 44.

Diagnostic features

Decumbent to procumbent shrub, lamina glabrescent to sparsely strigose or strigose, pinnatifid to pinnatisect. Reduced pseudo-umbels with 1–2 flowers each. Flowers with 4−5 cream, pale pink to pink or pinkish-purple petals, hypanthium 10–50 mm long, fertile stamens 7.

Key to the subspecies

1a Lamina glabrescent to strigose, bipinnatisect, green, petal white, cream, pink or pinkish-purple, hypanthium 15–50 mm long ............................................ (a) subsp. caucalifolium

1b Lamina strigose to densely strigose, usually pinnatifid, greyish-green, petals cream, pale pink to pink, hypanthium 10–40 mm long ........................................ (b) subsp. convolvulifolium

(a) subsp. caucalifolium

**Pelargonium caucalifolium** Jacq.: 10, t. 529 (1794); Jacq.: 145 (1797); Willd.: 663 (1800); DC.: 658 (1824). **Geranium caucalifolium** (Jacq.) Poir.: 750 (1812) (Figure 17).

**P. caucalifolium** subsp. caucalifolium occurs in the southwestern, southern and eastern Cape. It is known from Cape Hangklip (between Gordons Bay and Betty’s Bay) in the west to the district of Humansdorp in the east (Figure 18). It grows on mountain slopes or at least in association with mountains, and is often found in close proximity to streams. The western part of its distribution range receives predominantly winter rains while the eastern part receives rain throughout the year.

Flowering material of this subspecies has been collected in virtually every month of the year, but there is a definite flowering peak during the summer months of October to January.

**Specimens examined**

— 3319 (Worcester): Hex River Pass (− BD), Boucher 94 (STEU).
— 3330 (Montagu): Witteberg (− AD), Adamson s.n. (BOL), Compton 2804 (BOL), 1257 (BOL, NBG), Fischer 244 (STEU); Rietkloof (− BB), Lewis 1162 (SAM); Near Drew (− CC), Van der Walt 1328 (PRE, STEU); 22 km W. of Barrydale (− DC), Thompson 2675 (PRE, STE).
— 3321 (Ladismith): Ladismith (− AD), Bayliss 4138 (NBG, Z); Van Staden s.n. (PRE); Waterkloof near Ladismith (− AD), Gillett 1923 (STE), Van der Walt 625, 1122 (PRE, STEU); Between Kruiswagensdrit and Hoekoe (− AD), Gillett 1923 (STE), Van der Walt 625, 1122 (PRE, STEU); Between Kruiswagensdrit and Hoekoe (− AD), Gillett 1923 (STE), Van der Walt 625, 1122 (PRE, STEU); Between Kruiswagensdrit and Hoekoe (− AD), Gillett 1923 (STE), Van der Walt 625, 1122 (PRE, STEU); Between Kruiswagensdrit and Hoekoe (− AD), Gillett 1923 (STE), Van der Walt 625, 1122 (PRE, STEU); Between Kruiswagensdrit and Hoekoe (− AD), Gillett 1923 (STE), Van der Walt 625, 1122 (PRE, STEU); Between Kruiswagensdrit and Hoekoe (− AD), Gillett 1923 (STE), Van der Walt 625, 1122 (PRE, STEU).
— 3322 (Oudtshoorn): 30 km from Kango Caves on Calitzdorp road (− AD), Gillett 1670 (STE); Nooitgedacht, Kango Valley (− AC), Hugo 39 (PRE, STE); Fonteinplaas, Kango Valley (− AC), Moffett 243 (STEU); Farm Bassonsrus, Kango Valley (− AC), Moffett 416 (STEU); Farm Boomplaas (− AC), Moffett 1055 (STEU); Van der Walt 407 (PRE, STEU); Kliphuisvlei, Swartberg (− AC), Pocock 339 (BOL), 383 (PRE, STE); Swartberg (− AC), Stokoe s.n. (SAM); Swartberg Pass (− AC), Van der Walt 733, 1314 (STEU); Groot Kruis (− AD), Thorne 16 (NBG); Rooi Krantz (− CA), Hops 3 (PRE); Near Oudtshoorn (− CA), Wells 3710 (GRA); Moerasrivier (− CC), Barker 7725 (NBG), Esterhuysen 19470 (BOL); Klipdrift (− CD), Schlechter 2280 (Z); Langeberg (− DC), Muir 1380 (BOL, PRE), 1413 (PRE).
— 3323 (Willowmore): Stryphneberg (− AC), Esterhuysen 6317 (BOL); Farm Oudepost (− AC), Van der Walt 724 (PRE, STEU); Brakkloof near Uniondale (− AD), Bolus 22774 (BOL); Georgiqa (− AD), Esterhuysen 6387 (BOL); 5 km N. of Avontuur (− CA), Theron 1702 (PRE); Near Avontuur (− CA), Fourcade 2484 (STEU); Avontuurpoort (− CA), Fourcade 4269 (BOL); Baviaanskloof (− CA), Boucher 36 (STEU); Haarlem (− CB), Thode A2429 (NH, PRE); Near Haarlem (− CB), Fourcade 1326 (BOL, STE); Ongelegen (− CB), Bond 924 (NBG), Stirling 6334 (PRE); De Vlugt (− CC), Phillips s.n. (BOL); Keurboomrivier (− CD), Fourcade 3373 (BOL, STE); Vleikloof NE of Smutsberg (− DB), Oliver 4622 (STE).
— 3324 (Steytlerville): Zuurbron (− DD), Fourcade 4910 (BOL).
— 3418 (Simonstown): Hangkloof (− BD), Taylor 5891 (NBG).
— 3419 (Caledon): Caledon (− AB), Rogers 29929 (Z); Between Caledon and Riviersonderend (− BB), Maguire 459 (MO, NBG, STE); 16 km from National Road on road to Stanford (− BB), Van der Walt 666 (PRE, STEU); 8 km from Riviersonderend (− BB), Heginbotham 64 (NBG); Riviersonderend bridge (− BB), Esterhuysen 4316 (BOL, PRE); Riviersonderend (− BB), Ecklon & Zeyher 357 (SAM), Heginbotham 132 (NBG); Rietpoel (− BD), Compton 10238 (NBG); Klipdale station (− BD), Smith 2583 (PRE); Near Elim (− DA), Oliver 3345 (PRE); 8 km from Elim (− DA), Volschek 43 (STE).
— 3420 (Bredasdorp): Stormsvlei (− AA), Barker 8747 (NBG), Compton 7367 (NBG); 4 km from Stormsvlei (− AA), Stirton 6137 (MO, PRE, SRGH); 9 km from Stormsvlei (− AA), Stirton 6150 (PRE, SRGH); Between McGregor and Stormsvlei (− AA), Esterhuysen 4299 (BOL); 4300 (BOL, PRE); Swellendam (− AB), Zeyher 2059 (PRE, Z); De Hoop Nature Reserve (− AD), Hugo 886 (PRE, STE); Between Bredasdorp and Malgas (− BC), Esterhuysen 4339 (BOL); 5 km from Malgas (− BC), Van der Walt 543 (PRE, STEU); Farm Noetsie near Bredasdorp (− BC), Verster 2893 (PRE, STEU); Near Bredasdorp (− CA), Bolus 20523 (BOL); Between Napier and Bredasdorp (− CA), Burtt-Davy 12541 (PRE); Prinskraal (− CA), Thompson 3417 (MO).
— 3423 (Knysna): Knysna (− AA), Ecklon & Zeyher s.n. (PRE).

(b) subsp. **convolvulifolium** (Schltr. ex Knuth) J.J.A. v.d. Walt, comb nov.

**Pelargonium convolvulifolium** Schltr. ex Knuth : 400 (1912). Synotypes: Cape Province ‘Riversdale in Gebüsch en unter 100 m’, Schlacter 1668 (Z, lecto., here designated, BOL, GRA); ‘Mossel Bay, am Robinson Pass’, Taylor 309 (BOL!) (Figure 19).
*Pelargonium caucalifolium* subsp. *convolvulifolium* has a restricted coastal distribution in the southern Cape from Bredasdorp in the west to Mossel Bay in the east (Figure 20). It occurs in Coastal Renosterveld and it is largely confined to soils derived from shales of the Bokkeveld Group. Its distribution area receives an annual rainfall of approximately 300 mm which is spread throughout the year. Temperatures are high during summer and light frost could occur during the winter. This subspecies flowers from November to April with a peak during December and January.

Figure 19 *Pelargonium caucalifolium* subsp. *convolvulifolium*. A, flowering branch × 1; B, petals × 1.5; C, androecium × 1.5; D, gynoecium × 2.
Specimens examined
— 3321 (Ladismith): Garcia’s Pass (– CC), Marloth 3561 (PRE); West end of Riversdale dam (– CC), Thompson 699 (PRE).
— 3322 (Oudtshoorn): Robinson Pass (– CC), Taylor 309 (BOL).
— 3420 (Bredasdorp): Whitesands (– BD), Boucher 112 (STEU); 1 km from Whitesands (– BD), Boucher 111 (STEU); Bredasdorp (– CA), Gaipil 11246, 11351 (PRE).
— 3421 (Riversdale): Swartheuwels (– AA), Thompson 1640 (STE); Riversdale (– AB), Schlechter 1968 (BOL, GRA, Z), Wall 2333 (NBG); Near Still Bay (– AD), Esterhuysen 19544 (BOL); 8 km from Still Bay (– AD), Boucher 106 (STEU); Near Albertinia (– BA), Compton 22584 (NBG); Akkoordskop (– BC), Oliver 5744 (STE).
— 3422 (Mossel Bay): Mossel Bay (– AA), Moran s.n. (BOL).

The characteristic feature of *P. caucalijolium* is the pseudumbral which is normally reduced to only one flower. The floral structure of the two subspecies is identical. We decided that the umbel which is normally reduced to only one flower. The specimen is very poor.

*Pelargonium meijo/ium* (1912). Type specimen possibly handwriting, but the specimen is very poor. Pelargonium myrrhijolium

**Doubtful species**

1. *Pelargonium athamanthoides* L’Hérit. ex DC., Prodromus 1: 660 (1824) Possible type specimen in G – DC with De Candolle’s handwriting, but the specimen is very poor. Possibly a synonym of *Pelargonium myrrhijolium* (L.) L’Hérit. var. *coriandrijolium* (L.) Harv.


3. *Pelargonium filifolium* Knuth in Botanischer Jahrbucher 44: 25 (1909); Knuth : 402 (1912). Type: Cape Province, ‘Inter frutices im convalle flum Hex’, Bolus 13049 (B, †, BOL, K1). This species is only known from the type specimen. Knuth (1912) suggested that it is a hybrid between *P. senecioides* L’Hérit. and *P. myrrhijolium* (L.) L’Hérit. var. *coriandrijolium* (L.) Harv.

**Excluded species**

*Pelargonium senecioides* L’Hérit. in Aiton, Hortus Kewensis ed. 1,2 : 420 (1789).

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