Name changes in *Pelargonium*, section *Hoarea* (Geraniaceae)

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1. A new name, *Pelargonium reflexipetalum* E.M. Marais, is designated for *P. pulchellum* Salisb. (1807), non Sims (1801) and the status of *P. setosum* (Sweet) DC. is given. 2. *P bubonifolium* (Andr.) Pers., based on *Geranium bubonifolium* Andr. (1803), is the correct name for *P. namaquense* Knuth (1912) and *P. congestum* (Sweet) G. Don is also a synonym for *P. bubonifolium*. 3. *P. violiflorum* (Sweet) DC. is re-instated, as it was erroneously placed as a synonym for *P. longifolium* (Burm. f.) Jacq. var. *nivea* (Sweet) Knuth (1912). The delimitation of *P. violiflorum* is given.

Keywords: Geraniaceae, *Hoarea*, name changes, *Pelargonium*, taxonomy

A new name for *Pelargonium pulchellum* Salisb.

According to Knuth (1912) *Pelargonium pulchellum* Salisb. is of dubious origin, but the illustration of *P. pulchellum* in Salisbury's *Paradisis Londinensis* (1807) corresponds perfectly well to a species of *Pelargonium* occurring in Pakhuis Pass near Clanwilliam. According to Salisbury (1807) the illustration was made of a plant collected by J. Niven in the Cape of Good Hope. A herbarium specimen, *Niven 24*, was found in the Natural History Museum in London which corresponds well with Salisbury's illustration as well as with the plant growing in Pakhuis Pass, but the writing on this specimen concerning the locality of the collection is difficult to decipher. The name *P. pulchellum*, however, was first used in 1801 by J. Sims for a small halfshrub with a short and fleshy stem (Van der Walt 1977: 36 fig.), thus the name *P. pulchellum* Salisb. is a later homonym of *P. pulchellum* Sims and should be replaced.

Since Salisbury's illustration (1807) of *P. pulchellum* resembles that of *Hoarea setosa* by Sweet (1820), a detailed comparison of the two illustrations was made, but the apparent resemblances seem not to be real similarities. The colour of the flowers of *H. setosa* seems to be an unusual shade of pale pink, unknown in any natural species of section *Hoarea* or the genus *Pelargonium*. The flowers of *H. setosa* are larger than, and the hypanthia are twice the length of those of *P. pulchellum* Salisb. The leaves of the two illustrations also do not correspond perfectly well. Sweet (1820) did not give a decisive statement on the origin of the species, thus I agree with Knuth (1912) that *H. setosa* and therefore *P. setosum* (Sweet) DC., is most probably of hybrid origin.

Pelargonium reflexipetalum *E.M. Marais*, nom. nov.

Pelargonium pulchellum Salisb., Paradisis londinensis 1: t. 39 (1807); non Sims (1801). TYPE: *Niven 24* (BM! lecto, here designated).

A small deciduous geophyte 50–120(–150) mm tall when in flower. *Tuber*: a turnip-shaped, elongated or sometimes moniliform root covered with flaking dark brown periderms, 10–30 mm long and 8–15 mm in diameter. *Leaves* radical, juvenile leaves simple, others pinnatisect, green, petiolate; lamina elliptic in outline, 15–35 mm long, pinnae obovate, often pinnatilobe, 5–11 x 3–8 mm, apices obtuse, margins ciliate, adaxially covered with short glandular hairs and abaxially with glandular hairs and appressed stiff hairs along main veins; petiole 8–40 mm long and 0,5–1,2 mm in diameter, prostrate, densely hirsute with appressed curly hairs interspersed with short glandular hairs; stipules subulate, ciliate, adnate to petioles with only apices free, 5–8 x 1 mm. *Inflorescence*: scape 10–50 mm long, reddish green, densely covered with glandular hairs interspersed with appressed curly hairs, branched, bearing 2–3 pseudo-umbellets with 2–5(-7) flowers each; peduncles 10–90 mm long, indumentum as on scape, reddish green; bracts lanceolate, 3–6 mm long, abaxially densely hirsute with distally appressed hairs interspersed with short glandular hairs. *Pedicel ca.* 0,5 mm long. *Hypanthium* 7–12 mm long, 1,5–2 times the length of the sepals, green to greenish brown, indumentum as on peduncle. *Sepals* 5, lanceolate, apices acute, 5–8 x 1,5–3 mm, reflexed during anthesis, indumentum abaxially as on peduncle, green to reddish green, margins white. *Petals* 5, bright pink; posterior two with wine-red feather-like markings or sometimes a wine-red blotch, spathulate, 12–16,5 x 3,2–5,5 mm, length/width ratio 2,5–5, claws 5–7 x 1,5–2 mm, apices rounded, truncate or emarginate, reflexed during anthesis; anterior three patent during anthesis, spathulate, 10–13 x 2–4 mm, bases attenuate, apices rounded. *Stamens*: staminal column 1,5–2,5 mm long, smooth, white; perfect stamens 5, posterior one 5–8 mm long, lateral two 6–10 mm long, anterior two 7–12 mm long, longer than the sepals, protruding from the flower, apices pink; staminodes 2–3 mm long; anthers dark pink, 1,5 mm long, pollen orange. *Gynoecium*: ovary 2,5–4,5 mm long; style 1–4 mm long, wine-red; stigma branches recurved, 0,5–2 mm long, wine-red. *Fruit*: bases of mericarps 4–5 mm long, with glandular hairs, tails 22–23 mm long (Figure 1).

Diagnostic features and affinities

P. reflexipetalum is a small geophyte with bright pink flowers with reflexed posterior petals, hence the specific epithet, and prostrate, pinnatisect to bipinnatilobed leaves. Young plants usually have simple leaves. The anterior stamens are longer than the sepals and protrude from the flower during anthesis. The prostrate pinnatisect leaves of *P. reflexipetalum* resemble those of *P. glabriphyllum* E.M. Marais, although the latter has larger leaves (petiole: 30–85 mm long; lamina: 40–60 mm long; Marais 1996a) than *P. reflexipetalum*. *P. glabriphyllum* also has very large tubers (25–150 mm in diameter) and the stamens are shorter than the sepals and concealed within the floral sheath, whereas *P. reflexipetalum* has small tubers and anterior stamens longer than the sepals.

The bright pink flowers of *P. reflexipetalum* resemble those of *P. chelidonium* (Houtt.) DC., *P. petroselinifolium* G. Don and *P. triphyllum* Jacq. in respect of the colour and size of the flowers. Both *P. chelidonium* and *P. petroselinifolium* have spathulate petals as in *P. reflexipetalum*, but they have short stamens which are concealed within the floral sheath. *P. chelidonium* has prostrate simple to tripartite leaves (Marais 1990), and *P. petroselinifolium*

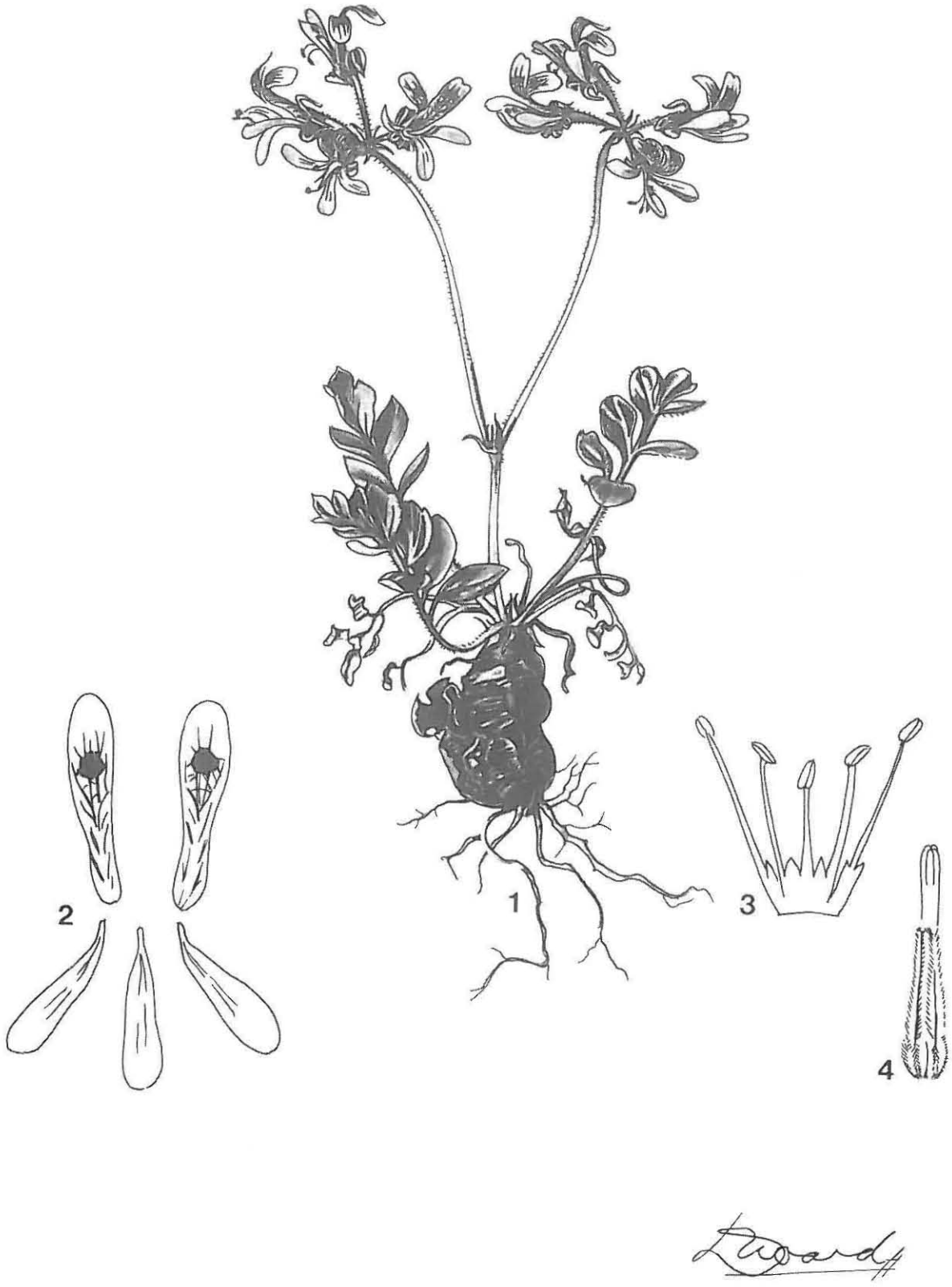

Figure 1 *Pelargonium reflexipetalum*. 1, flowering plant x1; 2, petals x2; 3, androecium x3; 4, gynoecium x3.

has erecto-patent, irregularly bipinnatifid leaves (Marais 1995). In both *P. triphyllum* and *P. reflexipetalum* the flowers have long protruding stamens, but they differ in respect of the auriculate claws of the posterior petals present in *P. triphyllum*, which are lacking in *P. reflexipetalum*.

The way in which the petals of *P. reflexipetalum* are presented during anthesis, as well as the long protruding stamens resemble *P. tripalmatum* E.M. Marais (Marais 1996b). Both species have spathulate posterior petals (length/width ratio smaller than five) with reflexed apices and in both species the anterior stamens are longer than the sepals and protrude from the flower. The pollen morphology of the two species is identical. They differ, however, in that *P. tripalmatum* has yellow flowers and large tripalmate leaves (Marais 1996b), whereas *P. reflexipetalum* has bright pink flowers and small pinnatisect leaves.

Geographical distribution and ecology

Except for the type specimen, of which the locality is unknown, the latest collections of *P. reflexipetalum* are only from Pakhuis Pass where dense populations occur in mountain fynbos (Figure 2). It is predominantly a winter-rainfall area with an average precipitation of 300–400 mm per annum. *P. reflexipetalum* flowers from September to November with the peak of the flowering time in October. In nature the plants seldom have leaves at flowering time, but in the Botanic Garden at Stellenbosch leaves are often present when the flowers appear.

Material studied

—3219 (Wuppertal): Pakhuis Pass (-AA), *Bolus 8943* (BOL); *Compton 9604* (NBG); *Esterhuysen 3382* (BOL); *Esterhuysen 21936* (BOL, K); *Galpin 11089* (K, PRE); *Gibby & Crompton 24* (BM); Summit of Pakhuis Pass (-AA), *Leighton 3158* (BOL); *Marais 185, 203, 205, 302, 396* (STEU); *Van der Walt s.n.* (STEU 805); Pakhuis Pass, 20 km from Clanwilliam (-AA), *Fischer 112* (STEU).

Without locality: *Niven 24* (BM).

Correct name for Pelargonium *namaquense* Knuth

By comparing living specimens of *P. namaquense* from different localities with the illustrations of *Geranium bubonifolium* in Andrews' Botanist's Repository (1803) and *Hoarea congesta* by Sweet (1826a) I am convinced that *G. bubonifolium* Andr., *H. congesta* Sweet and *P. namaquense* are conspecific, with *G. bubonifolium* as the oldest name. The correct name therefore for *P. namaquense* is *P. bubonifolium* (Andr.) Pers. Although Knuth had a fine set of herbarium specimens at his disposal when he described *P. namaquense* in 1912, he never visited South Africa and did not have the opportunity to compare the illustrations of Andrews and Sweet with living material. In studying section *Hoarea* it is of great importance that the illustrations of species, originally described in illustrated books without existing type specimens, should be compared with both living and herbarium specimens. Since *P. bubonifolium* is well documented and illustrated in Van der Walt & Vorster (1988) as *P. namaquense*, only the nomenclature, diagnostic features, affinities and distribution are given here.

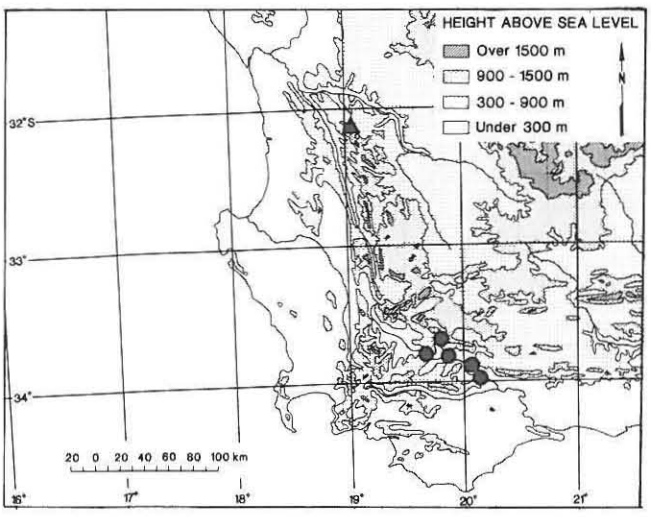

Figure 2 Known distribution area of *P. reflexipetalum* ▲, and *P. violiflorum* ●.

Pelargonium bubonifolium (*Andr.*) *Pers.*, Synopsis plantarum 2: 227 (1806); Ait. f.: 163 (1812); DC.: 652 (1824); Spreng.: 53 (1826); Loudon: 570 (1829); G. Don: 727 (1831); Loudon: 271 (1832); Steud.: 677 (1840); Steud.: 284 (1841); Harv.: 270 (1860); Knuth: 347 (1912). TYPE: Andrews, The Botanist's Repository 5: t. 328 (1803).

Geranium bubonifolium Andr.: t. 328 (1803); Poir.: 758 (1812).

Hoarea bubonifolia (Andr.) Sweet: 75 (1826b).

Geraniospermum bubonifolium (Andr.) Kuntze: 94 (1891).

Hoarea congesta Sweet: t. 302 (1826a). TYPE: Sweet, Geraniaceae 4: t. 302 (1826a).

Pelargonium congestum (Sweet) G. Don: 727 (1831); Loudon: 271 (1832).

Pelargonium namaquense Knuth: 342 (1912); Van der Walt & Vorster: 103, fig. (1988). TYPE —Northern Cape Province: Near Klipfontein, Namaqualand. *Bolus 448* (B†, holo, Z, lecto!, designated here, BM!, BOL!, E!, Gx2!, K!, NH!, P!, PRE!, SAM!, UPS!, W!, Z!).

Diagnostic features and affinities

P. bubonifolium is a geophyte with small tubers and regularly pinnatisect erect leaves with irregularly incised pinnae. The white or pink petals are larger than the sepals. The androecium of *P. bubonifolium* resembles that of *P. auritum* (L.) Willd., *P. leipoldtii* Knuth and all the other two-petalled species of section *Hoarea*. In all these species the five fertile stamens are almost of the same length, and are longer than the sepals, and protrude from the flower. The staminal columns of all of them are papillate, a characteristic that delimits these species as a group within section *Hoarea*. The epithet *bubonifolium* refers to the resemblance between the leaves of this species and those of the genus *Bubon* L., a synonym for *Athamanta* L., which are carrot-like plants of the Apiaceae.

Geographical distribution and ecology

P. bubonifolium is known from Witputs in the extreme southern part of Namibia, and from Steinkopf and Okiep in Namaqualand. This is a semi-desert area with an annual rainfall of less than 100 mm. It grows in stony places in clay in low succulent vegetation, where it appears to be locally abundant. Flowering time is from August to October with the peak in September. This is also an early-flowering species of section *Hoarea* and leaves are still alive when flowers appear.

Material studied

—2716 (Witputs): S. of Witputs (-DA), *Lavranos & Pehlemann 21693* (STEU).

—2917 (Springbok): Near Klipfontein, Namaqualand (-BA), *Bolus 448* (BM, BOL, E, Gx2, K, NH, P, PRE, SAM, UPS, W, Zx2); *Hall 840* (NBG); *Herre 12177* (STE); between Klipfontein and Kookfontein (-BA), *Bolus 6530* (BOL, K); Gunhill, Steinkopf (-BA), *Drijfhout 2970* (STEU); *Ward-Hilhorst 264a* (NBG); 8 km W. of

Figure 3 *Pelargonium violiflorum.* 1, flowering plant x1; 2, gynoecium x7; 3, androecium x5; 4, petals x3.

Steinkopf (-BA), *Drijfhout 2971* (STEU); 4,8 km W. of Steinkopf (-BA), *Goldblatt 2774* (MO); 2 km N.E. of Rabas (-BA), *Van Berkel* (NBG); 7 km from Steinkopf to Port Nolloth (-BA), *Perry 3180* (NBG); *Van Jaarsveld 4230* (STEU); Steinkopf (-BC), *Acocks 19534* (K); *Lewis 5500* (NBG); *Williamson 3731* (NBG); Near Okiep (-DB), *Morris s.n.* (BOL).

The delimitation and the reinstatement of *P. violiflorum* (Sweet) DC.

By comparing living plants and herbarium specimens with the type specimen of *Geranium heterophyllum* Thunb. (1800) and illustrations of *Hoarea violaeflora* (Sweet 1822) and *Hoarea nivea* (Sweet 1823), I am convinced that they are conspecific, with *G. heterophyllum* as the oldest name. As the name *P. heterophyllum* Jacq. (1791) has already been used in another context, *P. violiflorum* (Sweet) DC. is the correct name for this species. Knuth (1912) regarded *P. violiflorum* as a synonym for *P. longifolium* (Burm. f.) Jacq. var. *nivea* (Sweet) Knuth.

Pelargonium violiflorum (Sweet) DC., Prodromus 1: 652 (1824) (as 'violaeflorum'); Loudon: 570 (1829); G. Don: 727 (1831); Loudon: 271 (1832); Steud.: 291 (1841); Harv.: 270 (1860). TYPE: Sweet, Geraniaceae 2: t. 123 (1822).
Hoarea violaeflora Sweet: t. 123 (1822); Sweet: 75 (1826b); Eckl. & Zeyh.: 63 (1835).
Geraniospermum violaeflorum (Sweet) Kuntze: 95 (1891).
Pelargonium longifolium (Burm. f.) Jacq. var. *nivea* (Sweet) Knuth: 324 (1912).

Geranium heterophyllum Thunb.: 113 (1800); Thunb.: 515 (1823); non (Jacq.) Poir.: 746 (1812). TYPE: 'Cap. bon Spei', *Thunberg s.n.* (UPS, holo!).
Hoarea heterophylla (Thunb.) Eckl. & Zeyh.: 63 (1835).
Pelargonium heterolobum DC.: 680 (1824): substitute name for *G. heterophyllum* Thunb.: 113 (1800); G. Don: 742 (1831); Steud.: 286 (1841).
Pelargonium variifolium Steud.: 678 (1840); Steud.: 291 (1841): substitute name for *G. heterophyllum* Thunb.: 113 (1800).

Hoarea nivea Sweet: t. 182 (1823); Sweet: 75 (1826b); Eckl. & Zeyh.: 63 (1835). TYPE: Sweet, Geraniaceae 2: t. 182 (1823).
Pelargonium niveum (Sweet) Loudon: 568 (1829); G. Don: 727 (1831); Loudon: 271 (1832); Steud.: 288 (1841).
Pelargonium longifolium (Burm. f.) Jacq. var. *nivea* (Sweet) Knuth: 324 (1912).

A geophyte 160–260 mm tall when in flower. *Tuber*: a turnip-shaped or elongated root 20–40 mm long and 10–30 mm in diameter. *Leaves*: juvenile leaves simple, others trifoliolate, pinnate to irregularly bipinnatisect, dark green, petiolate; laminae of simple leaves spathulate, 20–70 x 8–20 mm; laminae of compound leaves elliptic or trullate in outline, 25–120 x 40–100 mm, pinnae spathulate or linear to laciniate, 20–60 mm long, 3–12 mm wide, apices acuminate, margins entire, adaxially glabrous, ciliate, abaxially hirsute with long stiff appressed hairs; petiole 10–110 mm long and 1,3–3 mm in diameter, rigid, erect, densely hirsute with appressed hairs interspersed with short glandular hairs; stipules subulate, adnate to petioles for one to two thirds of their length, 12–27 x 2 mm, ciliate. *Inflorescence*: scape 70–200 mm long, 1,5–3 mm in diameter, branched, bearing 3–6 pseudo-umbellets with 7–14 flowers each; peduncles 30–80 mm long, 1–2 mm in diameter, covered with very long soft hairs interspersed with short glandular hairs; bracts subulate, 4–7 x 1–2 mm, adaxially and abaxially hirsute. *Pedicel ca.* 0,5 mm long. *Hypanthium* 8–11 mm long, densely covered with glandular hairs. *Sepals* 5, lanceolate, apices acute, 5–7,5 x 1–2,5 mm, patent, green, indumentum abaxially as on hypanthium. *Petals* 5, white, apices recurved during anthesis; posterior two spathulate, 7–12 x 2,5–4 mm, length/width ratio 3–4,6, bases cuneate, apices rounded or emarginate; anterior three spathulate, bases attenuate, apices rounded, 6–9,5 x 1,2–2 mm. *Stamens*: staminal column 1,5–2 mm long, white; perfect stamens 5, concealed in floral sheath, posterior one 2–3 mm long, lateral two 2,5–4 mm long, anterior two 3–5 mm long, shorter than the sepals, white; staminodes 2–3 mm long; anthers pink, 1,5 mm long, pollen orange. *Gynoecium*: ovary 2–3,5 mm long; style 0,2–1 mm long, dark pink; stigma branches 0,8–2 mm long, dark pink. *Fruit*: bases of mericarps 4-6 mm long, without glandular hairs, tails 21–28 mm long (Figure 3).

Diagnostic features and affinities

P. violiflorum is a geophyte with rigid upright petioles and laminae varying from pinnate to bipinnatisect. The leaf structure is very similar to that of *P. leptum* L. Bol. and *P. undulatum* (Andr.) Pers. In *P. violiflorum* the lamina outline varies from elliptic (like *P. undulatum*) to trullate (like *P. leptum*). The indumentum of the leaves of the three different species is the same. *P. violiflorum* is characterized by the pompon-like pseudo-umbellets formed by a rather large number (7–14) of small white flowers with short hypanthia (8–11 mm long). According to Sweet (1822) the specific epithet *violiflorum* refers to the flowers resembling that of white violets. The structure of the flower resembles that of *P. pinnatum* (L.) L'Hérit., both species have spathulate petals and short stamens which are concealed within the floral sheath. The flowers of *P. violiflorum* are considerably smaller than those of *P. pinnatum* and the apices of the petals in the former are recurved during anthesis whereas those of *P. pinnatum* are patent.

Geographical distribution and ecology

P. violiflorum is known from a small area around Ashton, Robertson and Bonnievale (Figure 2) where it grows in mountain renosterveld or karroid shrubland on shale or sandstone. This is mainly a winter-rainfall area with an annual precipitation of 200-500 mm. *P. violiflorum* is one of the spring flowering species of section *Hoarea* and flowers during September and October before the leaves wither.

Material studied

—3319 (Worcester): 1 km from Langvlei to Noree (-DB), *Fischer 217* (STEU); Langvlei, 16 km from Robertson (-DC), *Fischer 216* (STEU); Nuy, road from Vink to Eilandia (-DC), *Walters 2712* (NBG); 2 miles from Robertson (-DD), *McMurtry NBG407/67* (NBG).
—3320 (Montagu): Ashton (-CC), *Barker 1301* (BOL, NBG); between Stormsvlei and Bonnievale (-CC), *Leighton 21158* (BOL); Bonnievale Hills (-CC), *Marloth 11824* (PRE, STE).

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