Summary. The Western Cape petaloid geophyte *Moraea villosa* (Ker Gawl.) Ker Gawl. is described and details of its history, biology, cultivation and propagation are given, accompanied by a watercolour plate and habitat photographs.

*Moraea villosa* is certainly the most often cultivated of the ‘peacock’ moraeas, and is widely regarded as the flagship species of this alliance, although the striking white- and blue-flowered *M. aristata* (D. Delaroche) Asch. & Graebn (t. 719 above), has equally striking iridescent spots and was known to science at least 15 years earlier. *M. villosa* was initially described by C. P. Thunberg as a variety of *Iris tricuspidis* L.f. (now *Moraea tricuspidata* (L.f.) G. J. Lewis), as var. *corolla-purpurea* Thunb., in his *Dissertatio de Iride* (Thunberg, 1782). It was the English botanist John Bellenden Ker Gawler (±1764–1842) who was the first to recognize it as an independent species, though he also originally described it as an *Iris, I. villosa* Ker Gawl. in *Curtis’s Botanical Magazine* (Ker Gawler, 1802), but later transferred it to *Moraea* in the *Annals of Botany* (König & Sims), in 1805 (Goldblatt, 1986). An expert on the Iridaceae, Ker Gawler is well remembered for his *Iridearum Genera* published in Brussels in 1827, and he was the Editor of *Edwards’s Botanical Register* from 1815 to 1824. His specific epithet *villosa* is descriptive of the villous or pubescent lower leaf surfaces and stems.

*Moraea villosa* subsp. *elandsmontana* Goldblatt was discovered by Fay Anderson in 1979 at the foot of the Elandsberg Mountains within the Elandsberg Private Nature Reserve near Hermon, southwest of Tulbagh, (Fig. 2). It was described in the *Annals of the Missouri Botanical Garden* (Goldblatt, 1982) and illustrated by Fay Anderson on plate 83b of *The Moraeas of Southern Africa* (Goldblatt, 1986). The only other published painting of it is that by Elise Bodley, reproduced on plate 26 of *Bulbous Plants of Southern Africa* (Du Plessis & Duncan, 1989) from material collected by the Cape nature conservation officer Chris Burgers in 1981, and cultivated in the bulb nursery at Kirstenbosch.

*Moraea villosa* is closely allied to the orange-, red- or rarely white-flowered *M. tulbaghensis* L.Bolus, and comprises two subspecies, subsp.
moraea villosa and subsp. elandsmontana. Placed within subgenus Viusseuxia and section Viusseuxia, M. villosa has relatively long-lasting flowers that remain fresh for 3 days, and is distinctive in its large, almost round outer tepals with a prominent central yellow or orange pubescent nectar guide, surrounded by various crescent-shaped dark colour combinations, often outlined in white, yellow or orange (Goldblatt, 1986).

The subsp. villosa is known colloquially as ‘uil tjie’, an Afrikaans word meaning ‘small owl’, alluding to the prominent owl-like ‘eyes’ at the base of the outer tepal limbs (Fig. 1).

Moraea villosa subsp. villosa has the widest distribution of all the peacock moraeas, occurring from just north of Piketberg on the west coast, to Ceres in the Warm Bokkeveld and south to Gordon’s Bay, east of Cape Town. The two most important vegetation types it frequents are Swartland- and Breede Shale Renosterveld, both highly threatened, of which the former is critically endangered, 90% of it having been transformed, with very little of the remaining area conserved statutorily (Mucina & Rutherford, 2006).

The species is rather variable in outer tepal size and colouring, and in degree of leaf hairiness. Most forms of subsp. villosa are light to deep mauve-flowered with blue ‘beetle spots’, but tepal colour also ranges in shades of cream, pink, blue and purple, and spots of certain forms vary in shades of turquoise or black, sometimes outlined in white, brown, yellow or orange. A beautiful mauve form from Malmesbury has the largest black spots of all the colour variants, and a large blue-flowered form from just north of Piketberg has almost hairless leaves, compared with those from the Paardeberg near Paarl that are comparatively hairy. The subsp. elandsmontana is confined to a single site at the base of the Elandsberg Mountains and has bright orange or very rarely, white or bright yellow tepals with relatively narrow, crescent-shaped, navy blue beetle spots. Apart from colour differences and geographic isolation, the subsp. elandsmontana differs in being a diploid (2n = 12), in contrast to subsp. villosa that is tetraploid (2n = 24).

Moraea villosa is pollinated by beetles, almost exclusively by hopliine scarab beetles of the family Scarabaeidae, which are attracted to the dark ‘beetle spots’ at the base of the outer tepal limbs. The beetles visit the flowers for pollen and mating; pollinating beetle species recorded
thus far include *Anisochelus inornatus, Anisonyx ditus, A. ursus, Lepithrix lebisii, L. ornatella* and *Peritrichia rufotibialis* (Steiner, 1998; Goldblatt *et al.*, 2006).
Fig. 2. *Moraea villosa* subsp. *elandsmontana* in habitat, Elandsberg Private Nature Reserve near Hermon, southwestern Cape. Photograph: Graham Duncan.
**Moraea villosa** favours stony, fertile shale soils in full sun on flats and lower hill slopes. The plants grow in small to large colonies amongst low scrubby growth, often in association with other petaloid geophytes. At a site south of Tulbagh, a bluish-mauve form grows together with a multitude of other spring-flowering bulbous, cormous and tuberous plants including the wine-red *Babiana villosa* (Aiton) Ker Gawl. and *Geissorhiza erosa* (Salisb.) R. C. Foster, the light blue *Lachenalia unifolia* Jacq. and the bright pink orchid, *Satyrium erectum* Sw.

Agricultural expansion for winter cereal crops, vineyards, orchards, as well as the devastating effects of housing development, road construction, eutrophication and the spread of alien plants, have decimated more than 80% of the habitat of subsp. *villosa*; it is probably known from fewer than 20 sites today and has a conservation status of Vulnerable (Raimondo & Goldblatt, 2009). Although the subsp. *elandsmontana* is protected within the Elandsberg Private Nature Reserve, it is known from only one population, and it too qualifies for the Vulnerable threat category (Goldblatt & Raimondo, 2009).

**Cultivation.** The cultivation of *Moraea villosa* presents no difficulty in suitable conditions and it is grown in the same manner as *M. aristata*, *M. loubseri* and *M. tulbaghensis*. Its corms are not quite as resilient as those of *M. aristata* but it has the same requirements of full sun or bright light, deep containers 25–30 cm in diam., a well drained medium containing equal parts of silica sand or river sand and finely sifted, well decomposed organic matter, heavy drenching throughout the winter growing period and spring flowering period, and a completely dry summer rest. Where temperatures do not fall below freezing for extended periods in winter, it can be grown in outdoor bulb beds or dedicated rock garden pockets that are kept dry in summer, provided they have been securely lined with wire mesh to exclude mole rats, but in cold climates it requires the protection of the cool greenhouse (Duncan, 2010). One of the most outstanding forms for cultivation is a deep mauve-flowered form of subsp. *villosa* from Malmesbury, now sadly almost extinct there due to housing development, which has especially large black ‘eyes’, illustrated by Barbara Jeppe on plate 50a of *Spring and Winter Flowering Bulbs of the Cape* (Jeppe & Duncan, 1989). Its corms are long-lived (up to 10 years or more in ideal conditions) and with sufficient moisture at flowering time, is in bloom for at least 3 weeks from early to
late September. Subsp. *elandsmontana*, a plant whose beauty defies description, I have found to be less vigorous than the typical sub-species, less inclined to reproduce vegetatively and requiring more frequent repotting to encourage flowering every year. When growing *M. villosa* in close proximity to other peacock moraeas, it is necessary to isolate the plants and cross-pollinate by hand, as hybrids readily occur between this species, *M. aristata* and *M. loubseri* where insects have free access.

Germination of fresh seeds harvested from the immediately preceding season is excellent and takes place within 5 weeks. They are best sown at a depth of 3–4 mm in deep pots or seed beds, and allowed to remain undisturbed for a second season before planting into permanent positions at the beginning of their third season, during which flowering can be expected for the first time. Like those of *Moraea aristata*, the corms of *M. villosa* produce cormlets at the tips of subterranean stolons and these are easily removed once large enough and potted-up in early autumn. The hairy leaves and stems of *M. villosa* are much less prone to aphid attack than species with smooth surfaces, but the flower buds and developing fruits are subject to aphid infestation, and the leaf undersides sometimes fall prey to attack by red spider mites as temperatures rise in late spring. Mole rats, Namaqua rock mice and Cape porcupines are partial to the corms, and an insufficiently dry summer rest phase can result in fungal rotting of the corms.

**Moraea villosa** (Ker Gawl.) Ker Gawl., Annals of Botany (König & Sims) 1: 240 (1805).


Type: South Africa, Cape, precise locality unknown, *Thunberg s.n.* (UPS, Herb. Thunberg), nom. inval.

*Iris villosa* Ker Gawl., Curtis’s Botanical Magazine 16, t. 571 (1802).


**DESCRIPTION.** Deciduous, winter-growing geophyte 130–410 mm high. Corm globose, 13–15 mm in diam., solitary, white, forming cormlets at apices of subterranean stolons; outer tunics fairly hard, light brown, apices fasciculate; cataphylls 2, membranous. Leaf solitary, linear, 200–550 × 2–4 mm, basal, suberect or spreading, bright green, bifacial, lower surface and margins minutely pubescent. Stem erect, minutely pubescent, sometimes 1–2-branched, stem
nodes 3, prominent; stem bracts 2, 30–65 mm long, sheathing, apices attenuate, brown; spathe bracts 2, overlapping, apices attenuate, brown, outer bract 25–45 mm long, inner bract 45–70 mm long; pedicel light green below, shading to brown above, 40–62 mm long, mostly obscured by spathe bracts. Inflorescence a rhipidium, sometimes 1–2-branched, producing 1–3 flowers per branch at staggered intervals. Flowers light to deep mauve, purple, pink, orange, rarely white, cream or bright yellow; outer tepals suborbicular, 25–30 × 20–40 mm, spreading, claws suberect, 10–14 × 7–15 mm, upper surface pubescent, nectar guides yellow or orange, with a prominent iridescent light to deep blue, turquoise or black spot, sometimes outlined in white, orange, brown, yellow or orange; inner tepals tricuspidate, 18–28 × 2 mm long, lower portion suberect, firm, free upper central lobe linear, lateral lobes obtuse, 2 × 2 mm, upper surface plain or with purple markings. Filaments fused almost to apex, 4–5 mm long, bluish white; anthers 6–7 × 1 mm, linear; pollen maturing to bright orange. Ovary cylindrical, 10–15 × 2–3 mm, protruding above spathe bracts, light green or brown; style branches suberect, 5–8 × 4–6 mm, white, light orange or rarely yellow, crests white or orange; stigmas recurved, 1 × 1 mm. Capsule cylindrical, 18–30 × 3–6 mm. Seeds angular, 1 × 1 mm, light brown. Chromosome number: 2n = 24 (subsp. villosa); 2n = 12 (subsp. elandsmontana) (Goldblatt, 1982).

DISTRIBUTION. North of Piketberg to Ceres and Gordon’s Bay, in the western and southwestern part of the Western Cape.

HABITAT. Lower hill slopes and flats in stony clay soil amongst low scrub, in full sun.

FLOWERING TIME. Late August to late September, with a peak in mid-September.

REFERENCES


© The Board of Trustees of the Royal Botanic Gardens, Kew 2011.


MORAEA LOUBSERI
Iridaceae

Graham Duncan

Summary. The history, ecology, conservation status, cultivation and propagation requirements of the highly threatened and extremely localised Western Cape endemic irid *Moraea loubseri* Goldblatt are discussed, accompanied by a botanical description, photographs in cultivation.

*Moraea loubseri* attracted a lot of attention at the time of its discovery recently near the resort town of Langebaan on the Cape west coast, for two reasons. Firstly, its exceptionally attractive violet-mauve outer tepals, contrasted with a blue iridescent nectar guide and very unusual large black beard over the tepal bases and claws captured the imagination of growers of indigenous Cape geophytes, and secondly its apparent endemism to a single, very localized locality, a striking feature of numerous species within the Cape geophyte flora, stimulated the interest of conservationists. Its home was a granite outcrop that was being extensively quarried for ballast for use in the construction of a new iron ore harbour terminal in adjacent Saldanha Bay. The plant was found in 1973 on a granite outcrop named Olifants Kop (literally translated to ‘elephant’s head’) by an experienced grower of Cape geophytic species, Johan Loubser, and several years later it was named in his honour in the South African botanical magazine *The Flowering Plants of Africa*, accompanied by a watercolour painting by Fay Anderson (Goldblatt, 1977).

Despite searches of surrounding granite outcrops, no further populations were encountered, and up until the present this has continued to be the case. Although the relevant authorities on whose land the plants occur were alerted to its precarious position, robust measures to fence off the area and protect the remaining individuals in a small nature reserve, did not come to fruition. Fortunately, plants were initially cultivated by Johan Loubser and subsequently, corms and seeds were donated to the bulb collection in the nursery at Kirstenbosch. Here the plants have thrived and multiplied to the extent that in 1980, I was able to make 135 packets of surplus seeds available for distribution to members of the Botanical Society of South Africa, and seeds were and subsequently distributed to members on numerous...
occasions (Duncan, 1981). *M. loubseri* is now well established in bulb collections in this country and abroad, including Australia, France, New Zealand, the UK and the USA, and seeds harvested from hand-pollinated plants grown at Kirstenbosch are lodged in long-term cold storage at the Millennium Seed Bank at Wakehurst Place in Sussex.

*Moraea loubseri* belongs to the group of species popularly known as ‘peacock’ moraeas that form part of subgenus *Vieusseuxia*, whose members have relatively long-lasting blooms (3 days) with brightly coloured, large outer tepals with prominent iridescent spots. The species is thought to be most closely allied with *M. villosa* (Ker Gawl.) Ker Gawl. that has similarly shaped inner tepals and a similar pubescent stem and leaf. *M. loubseri* has such distinctive flowers that it would be difficult to confuse it with any other, (Figs 1 & 2); the only one that comes close to it is another striking bluish-mauve species from the Saldanha Bay area, to which *M. loubseri* is undoubtedly related, the endangered *M. calcicola* Goldblatt that was also discovered by Johan Loubser, in 1976, just 3 years after his discovery of *M. loubseri*. *M. calcicola* is also limited to a single known population and is endemic to rocky limestone deposits on a large granite outcrop just above the town of Saldanha, a short distance to the northwest of Langebaan. It has similar black-bearded tepal claws and outer tepal bases, and pubescent leaf lower surfaces, but differs mainly in its much larger, orbicular outer tepals and taller stature, and it flowers later in the season, from mid-to late September (Goldblatt, 1986).

Actual pollinator sightings for *Moraea loubseri* have not been recorded, and it seems unlikely they ever will be, unless sufficient numbers of plants make a re-appearance or we are able to re-introduce plants to the original site. However, it can safely be assumed that hopliine beetles (family Scarabaeidae) are the probable pollinators, in accordance with other members of subgenus *Vieusseuxia* that possess prominent beetle marks and are pollinated by these insects (Goldblatt et al., 2006).

*Moraea loubseri* is endemic to sandy, granite-derived soil of the Saldanha Granite Strandveld vegetation type that is only found on the Cape west coast stretching from St Helena Bay in the north to Langebaan in the south, and its adjacent peninsula. The vegetation is always associated with granite domes and comprises small to medium-sized scrubby growth, interspersed with a rich succulent
Fig. 1. *Moraea loubseri* in cultivation at Kirstenbosch. Photograph: Graham Duncan.
and geophyte flora (Mucina & Rutherford, 2006). Probably the most critically endangered of all cormous plants in South Africa, up until very recently, the possibility existed that *M. loubseri* may have become extinct in the wild. In 1980 it was declared extinct in the South African National Scientific Programmes Report no. 45, but in the spring of 1982, Johan Loubser revisited the original site and reported some 200 plants in flower. It would appear that certain visitors to the site may not have known precisely where the plants grew and not finding any in flower, considered it extinct (Geary-Cooke, 1983). It seems mysterious that since 1982, almost all remaining individuals have been lost, and in recent times, fewer than five plants were recorded in 1995 and 2002, and no specimens at all were located in the wild between 2005 and 2010. Consequently, the species was judged to have a conservation status of Critically Endangered, Possibly Extinct.
Nevertheless, it is not an infrequent occurrence for ‘extinct’ species in the Cape Flora to suddenly reappear, and hope still remained that it may make a comeback, and indeed, in early September 2011, amid great excitement, two plants were discovered by the botanist Rupert Koopman at the original site.

**Cultivation.** Like the critically endangered *Moraea aristata*, the position of *M. loubseri* is somewhat paradoxical in that despite its extreme rarity in the wild, it responds very well to cultivation, flowering reliably every year provided certain requirements are met. The plants perform admirably in deep pots with a diameter of 25 cm and can be grown in a variety of well drained acid or alkaline media. In the Kirstenbosch Bulb Nursery I grow it in a mixture of equal parts of course industrial (silica) sand and finely milled bark, with a 3 cm layer of well-rotted, acid compost placed at the base of the container over the drainage crots. Mature corms are planted 2 cm deep and in order to reduce the possibility of fungal infection, are placed within a layer of pure sand. An initial heavy drench is provided in mid-autumn, followed by twice-weekly applications once the leaves appear and throughout the winter growing period. It is especially important to maintain sufficient moisture during flower bud formation to prevent their abortion and the plants entering dormancy prematurely. Similarly, the plants require sufficient moisture during the flowering and fruiting periods to perform optimally.

Although the corms are fairly long-lived, lasting about 8–10 years under ideal conditions, in order to maintain this species in cultivation over the long term in collections, it is necessary to isolate and cross-pollinate flowers by hand in order to have a stock of developing young plants coming-on, in case of sudden loss of adult plants. Cross-pollinating *M. loubseri* flowers is easily accomplished. Pollen can be collected by dabbing a water paintbrush over the ripe anthers, which are located directly beneath the style branches. Pollen is ready for collection once it has turned bright orange and become somewhat sticky, then, moving to a flower of a different clone, gently brushed over the two stigma ‘flaps’ situated just above the top of each anther. Seed sets readily after successful fertilisation and an abundance can be obtained from a single capsule. *M. loubseri* is half-hardy and able to withstand temperatures down to 0°C for short periods, but in cold winter climates it needs to be grown in the cool greenhouse [Duncan,
2010). When maintaining a large bulb collection, it is important to harvest the ripe capsules in time, just after they have started to split, as the seeds are released in gusts of wind and readily colonise adjacent pots (Duncan, 1997). Once the leaves start turning yellow in early summer, watering must cease until the following autumn.

*Moraea loubseri* is not suited to general garden cultivation owing to its need for a very dry summer dormant phase, and due to its corms falling prey to mole rats and porcupines. However, in areas not plagued by porcupines, it can be grown in dedicated rock garden pockets that are kept dry in summer, and which have been securely lined with wire mesh to exclude mole rats.

Fresh seeds germinate readily within 3 weeks and in ideal conditions, this species can flower in its second season of growth (Duncan, 1981). More usually though, initial flowering occurs in the third spring season. Excellent viability of fresh seeds is maintained when stored at room temperature for 6 months following harvesting and sowing in the immediately ensuing autumn, but viability decreases markedly thereafter. However, long-term storage of seeds is excellent at 6–7°C, and this can easily be achieved by the home-grower using the vegetable compartment of a fridge. The leaves, stems, flower buds and developing capsules are very susceptible to attack by aphids, and the leaf undersides to red spider mite infestation as temperatures rise markedly in spring. The corms are also sometimes subject to attack by mealy bugs.


**Description.** Deciduous, winter-growing geophyte 150–260 mm high. Corm globose, 8–12 mm in diam., white, outer tunics fibrous, moderately firm, light brown, offset-forming. Leaf 1, linear, 300–600 × 3–5 mm, basal, canaliculate, bright green, upper surface glabrous, lower surface minutely pubescent, midrib prominent on lower surface, apex acute. Stem erect, minutely pubescent, bright green; stem nodes 2, prominent; sheathing stem bracts erect, 50–60 mm long, bright green, apices attenuate, light brown; outer and inner spathe bracts bright green, 3–5 mm long, apices light brown, attenuate, overlapping. Inflorescence a rhipidium, sometimes 1-branched, producing 1–3 flowers at staggered intervals. Flowers light to deep violet-mauve; three outer tepals more or less spatulate, 22–30 × 15–20 mm, spreading or slightly to strongly reflexed, apices apiculate, upper surface light to deep violet-mauve with deeper violet midrib, with a small
triangular, navy blue iridescent spot in middle near base, just above black beard, lower surface light violet-mauve, margins slightly undulate; tepal claws 5 × 5 mm, upper surface heavily bearded with black, lower surface light green; three inner tepals tricuspidate, 15–20 mm long, central lobe linear, light violet-mauve, deep purple at base, spreading; two lateral lobes light violet-mauve above, fused lower portion light blue and violet-spotted. Filaments 4–5 mm long, light blue, fused below; anthers three, linear, 5–6 mm long; pollen bright orange when ripe. Ovary oblong, 8–10 mm long, protruding above spathe bracts, light green; style branches spreading to suberect, 10 × 3 mm, midribs dull blue, margins hyaline; style crests 2 mm long, brownish mauve. Capsule cylindrical, 15–20 × 3–5 mm. Seeds angular, 1 × 1 mm, light brown. Chromosome number: 2n = 12 (Goldblatt, 1986).

**Distribution.** Confined to a single site near Langebaan on the Cape west coast.

**Habitat.** Amongst low scrubby growth in sandy, granite-derived soil of a granite outcrop, in full sun.

**Flowering period.** August to early September, with a peak from mid- to late August.

**REFERENCES**


