



Viola serpentinicola (Violaceae), a new Tasmanian species endemic to serpentinitised ultramafic soils

Miguel F. de Salas

Tasmanian Herbarium, Tasmanian Museum and Art Gallery, PO Box 5058, UTAS LPO, Sandy Bay 7005, Tasmania, Australia; e-mail: Miguel.deSalas@tmag.tas.gov.au

Abstract

Recent field work in western Tasmania has led to the identification of the new species *Viola serpentinicola* de Salas sp. nov. This species is abundant in areas where serpentinitised ultramafic geologies are exposed to the surface, and does not extend beyond their geological boundary. Every ultramafic outcrop sampled in western Tasmania contained the new species, although it is absent on the Anderson Creek ultramafic complex in the central north, and the Adamsfield ultramafics in central southern Tasmania. The new species is characterised by its large, showy, discolourous flowers and deltoid, dark-green coriaceous leaves. A new key to *Viola* L. in Tasmania is provided.

Keywords: *Viola hederacea* complex, *Viola* section *Erpetion*, geology, ultramafics, Tasmania

Introduction

Prior to Adams's (1982) revision of *Viola* L. for the *Flora of Australia*, most of what are now considered to be distinct species in section *Erpetion* consisted of only two taxa: *V. hederacea* Labill. and *V. sieberiana* Spreng. Adams (1982) reduced *V. sieberiana* to a subspecies of *V. hederacea* and described a further five subspecies: *V. hederacea* subsp. *cleistogamoides* L.G. Adams, *V. hederacea* subsp. *curtisiae* L.G. Adams, *V. hederacea* subsp. *fuscoviolacea* L.G. Adams, *V. hederacea* subsp. *perreniformis* L.G. Adams and *V. hederacea* subsp. *seppeltiana* L.G. Adams. All of these, except for *V. hederacea* subsp. *seppeltiana*, have since been promoted to species rank (Jessop et al. 1986; James 1996; Little and Leaper 2013; Thiele et al. 2018), and an additional three species: *V. banksii* K.R.Thiele & Prober, *V. eminens* K.R.Thiele & Prober and *V. silicestriss* K.R.Thiele & Prober have been described (Thiele and Prober 2003, 2006). For notes on the taxonomic status of *V. hederacea* subsp. *seppeltiana* and a general discussion of current taxonomy within *Viola* section *Erpetion* (D.C. ex Sweet) Benth. & Hook. f. see Thiele et al. (2018).

Four species of section *Erpetion* are known to occur in Tasmania: *V. hederacea*, *V. cleistogamoides* (L.G. Adams) Seppelt, *V. curtisiae* K.R. Thiele and *V. fuscoviolacea* (L.G. Adams) T.L. James (de Salas and Baker 2017; Thiele et al. 2018; Duretto 2009). Recent field work on ultramafic serpentinitised substrates on the west coast of the island revealed a new, fifth distinctive taxon that appears to be endemic to areas of serpentinitised

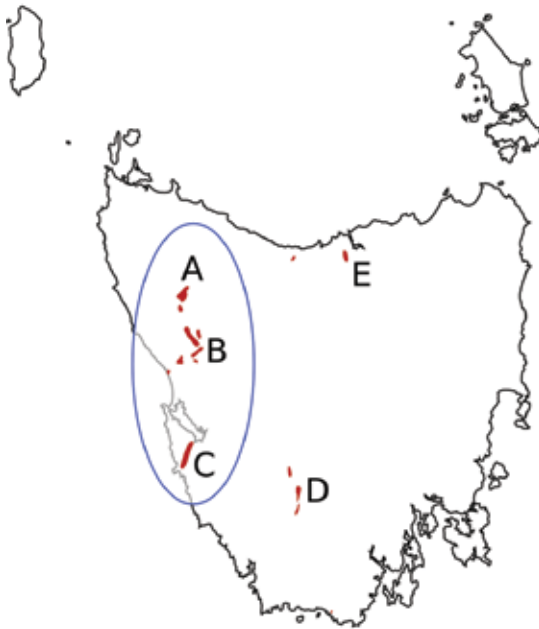


Figure 1. Distribution of ultramafic rocks in Tasmania.

A. Savage River area. **B.** Harman River / Wilson River / Serpentine Ridge (and minor outcrops) area. **C.** Modder River area. **D.** Adamsfield area. **E.** Anderson Creek area.

Viola serpentinicola only occurs on outcrops near the west coast (circled).

ultramafic geology. Outcrops of serpentinised ultramafics, predominantly of Cambrian age, occur at multiple sites in central-northern and western Tasmania (Gibson et al. 1992). The main concentration occurs approximately along a line from the Savage River ultramafic outcrop between the Heazlewood and Savage rivers, southwards to the Modder River and Hibbs Lagoon, south of Macquarie Harbour (Fig. 1). The unusual soil chemistry that develops in ultramafic soils has given rise to a relatively high degree of endemism (Proctor and Woodell 1971; van der Ent 2015). In Tasmania, recently-discovered species that are endemic to soils derived from serpentinised ultramafics include *Micranthemum serpentinum* Orchard (Orchard et al. 1991), *Epacris glabella* Jarman (Jarman et al. 1991), *Eucalyptus nebulosa* A.M.Gray (Gray 2008) and *Euphrasia amplidens* W.R.Barker (Barker et al. 2013).

The new discovery occurred during a Bush Blitz survey at the headwaters of the Harman River in north-western Tasmania. Careful examination of the *Viola* collections at the Tasmanian Herbarium disclosed the

existence of three further specimens filed among other section *Erpetion* species. I am now confident that this is a distinct, endemic species, which I describe here as *Viola serpentinicola* de Salas sp. nov.

Taxonomy

Viola serpentinicola de Salas sp. nov.

Type: TASMANIA. Roaring Mag Creek, approximately 100m upstream of Heazlewood River, 18 Nov 2017, *M.F. de Salas* 1894 (holotype HO589960; isotypes: AD, MEL, NSW).

Perennial stoloniferous herb. Leafy stems vertically contracted so that the leaves form a rosette. Leaves with petiole (5–)15–30(–60) mm long, glabrous, often tinged red; lamina (5–)7–15(–20) mm long, (5–)9–20(–25) mm wide, deltoid to rhomboidal, reniform only in etiolated specimens, coriaceous and brittle, discolorous with adaxial surface glossy dark green, abaxial surface paler, base truncate to almost cuneate, often decurrent, margin distinctly crenate with glandular teeth, apex acute to obtuse, rarely rounded, sometimes apiculate; stipules triangular to narrowly triangular, 4–6(–7) mm long. Scapes (10–)30–80(–120) mm tall, glabrous or hirsute; bracteoles near or above the middle of the scape, 4–5 mm long, 0.6–0.8 mm wide, narrowly triangular, sometimes glandular. Sepals lanceolate, 3.5–4.5 mm long, 1.0–1.3 mm wide. Petals discolorous, violet proximally, grading to pale violet at the apices; anterior petal 7–9 mm long, 3–4 mm wide, approximately rectangular to obovate, 3-veined with markedly darker anastomosing veins, the outer veins pinnately divided on the outside only, petal apex truncate to emarginate; lateral petals 6–8 mm long, 2.5–4 mm wide, approximately rectangular, reflexed to moderately twisted, bearded proximally, quantity of beard variable, apex truncate; dorsal petals 5–6.5 mm long, 3–4 mm wide, obovate. Anthers 5, sessile, c. 1.5 mm long, yellow; anther appendages pale brown, c. 1.25 mm long. Pollen creamy-yellow. Ovary pale green with purple mottling, almost solid purple at the apex; style geniculate, c. 1.75 mm long. Fruit green, mottled purple, 6–7 mm long. Seed pearlescent black, c. 2 mm long, 1.1 mm wide, lachrymiform (Figs. 2, 3).

Selected specimens examined: TASMANIA. Fern Creek, on track between Timbertops and Modder River, *A.M. Buchanan*

1924 (HO412158); Brassey Hill, near old nickel mine, *A.M.Buchanan 11633* (HO121152); Tunnel Hill (Serpentine Hill), *M.Wapstra 1295* (HO565182); Harman River. Meredith Range Regional Reserve, approximately 4 km north of Parsons Hood, *M.F.de Salas 1279* (HO583942); Waratah Road, W of Heazlewood River, *S.J.Jarman s.n.* (HO583941); Jones Creek. South side of valley, approximately 1.5 km upstream of Heazlewood River, *M.F.de Salas 1888* (HO589962); Track to Bullock's Head, approximately 3 km west of bridge over Heazlewood River, 300m N of Waratah Rd, *M.F.de Salas 1895* (HO).

Diagnostic features: *Viola serpentinicola* can be distinguished from other species in *Viola* section *Erpetion* by the following combination of characters: Plants highly floriferous (Fig. 3A) with often many flowers per clump; leaf lamina thick and coriaceous, normally distinctly deltoid to rhomboidal, often with base somewhat decurrent and apex angular, upper surface glossy, dark green; flowers large and showy, borne well above the leaves, with only slight to moderate bearding on the lateral petals (Fig. 3B, C); seed glossy, black (Fig. 3D).

Phenology: Flowers in spring and early summer.

Distribution and habitat: Known from several disconnected outcrops of serpentinitised ultramafic rocks in western Tasmania, from the Savage River area (Fig. 1A), through the Wilson River / Harman River / Serpentine Ridge outcrop (Fig. 1B) to the Modder River, south of Macquarie Harbour (Fig. 1C), a distance of over 100 km. It occurs in heathland and heathy *Eucalyptus nebulosa* A.M.Gray / *E. nitida* Hook.f. woodland. It grows in soils derived from ultramafic geologies in high rainfall areas of western Tasmania, where it is abundant and usually the only *Viola* species present. It is absent on adjacent soils not derived from serpentinitised ultramafics, where it is replaced by *Viola hederacea*.

It is absent from other sizable ultramafic outcrops away from the west coast, such as the Anderson Creek ultramafic complex near Beaconsfield in central-northern Tasmania (Fig. 1E), where only *V. hederacea* and *V. cleistogamoides* occur. A survey of the Adamsfield ultramafic complex (Fig. 1D) failed to locate any *Viola* plants. However, a fruiting, depauperate specimen (HO590847) recently collected from serpentinite at nearby Florentine River is mostly vegetatively consistent with *V. serpentinicola*.

Conservation status: Despite its limited geographic range, *V. serpentinicola* is locally abundant and well represented within three reserves: the Savage River

Regional Reserve, the Meredith Range Regional Reserve and the Southwest Conservation Area.

Etymology: Named in reference to the substrate on which it occurs, which consists exclusively of serpentinitised ultramafic rocks, with the Latin suffix *-cola* (dweller, inhabitant).

Discussion

Viola serpentinicola is morphologically close to other species in section *Erpetion*, particularly to *V. hederacea sensu stricto* and *V. sieberiana* (including *V. hederacea* subsp. *seppeltiana*, VicFlora 2018). It differs from *V. hederacea* primarily in the shape, colour and texture of the leaves, which are soft, pale to mid-green and reniform in *V. hederacea*, compared to coriaceous, glossy dark green and deltoid to rhomboidal with a commonly decurrent base in *V. serpentinicola*. In addition, the lateral petals of *V. serpentinicola* only have light to moderate bearding (Fig. 3C), while the bearding of the lateral petals of *V. hederacea* is generally much denser. The seeds of *V. serpentinicola* are black and somewhat glossy (Fig. 3D), compared to brown for *V. hederacea*. *Viola sieberiana* has similarly shaped and textured leaves to *V. serpentinicola*, though generally rhomboidal instead of predominantly deltoid, and its flowers are smaller, concolorous and pale blue to mauve instead of showy and discolorous with a dark violet center and paler margins. The base of the lamina in *V. sieberiana* is cuneate and strongly decurrent, whereas that of *V. serpentinicola* is predominantly truncate, though sometimes also decurrent. *Viola cleistogamoides* and *V. fuscoviolacea* both differ from *V. serpentinicola* in their comparatively tiny, inconspicuous flowers, and *V. curtisiae* differs in its concolorous cream to pale violet, almost campanulate flowers that are distinctive in the emarginate apex of all the petals.

No other species of *Viola* has been collected from the serpentinitised ultramafic areas to which *V. serpentinicola* is confined. However, *V. hederacea* has been collected by the author only metres away from *V. serpentinicola*, growing in Cambrian basalt on the other side of the geological divide. The fact that the two taxa remain distinct when growing in such proximity supports the description of *V. serpentinicola* as a new species.



Figure 2. Holotype of *V. serpenticola* (HO589960)

Acknowledgements

The author would like to especially thank Jean Jarman for providing specimens of *Viola serpentinicola*, as well as photographs (Fig. 3A) in habitat. I would also like to thank Kevin Thiele (W.A. Herbarium) and John Little for constructive commentary and help in formulating concepts for *Viola* taxa in Tasmania, as well as Gintaras Kantvilas, Matthew Baker and Lyn Cave for helpful discussions in the lead-up to this paper. This species was discovered during a Bush Blitz survey to the Tarkine, in north-western Tasmania, co-funded by the Australian Government and BHP Billiton.

References

- Adams, L.G. (1982). 'Violaceae', in A.S. George (ed.) *Flora of Australia* **8**, 91–110. Australian Biological Resources Study: Canberra.
- Barker, W.R., Wapstra, M. and French, B. (2013). *Euphrasia amplidens* W.R.Barker (Orobanchaceae), a new and very localised species from western Tasmania. *Journal of the Adelaide Botanic Gardens* **26**, 23–29.
- de Salas, M.F. and Baker, M.L. (2017). *A Census of the Vascular Plants of Tasmania, including Macquarie Island*. http://www.tmag.tas.gov.au/collections_and_research/tasmanian_herbarium/tasmanian_herbarium_publications (Accessed 16 Jan 2018).
- Duretto M.F. (2009). '79Violaceae', version 2009:1. In M.F. Duretto (ed.), *Flora of Tasmania Online*. 7 pp. (Tasmanian Herbarium, Tasmanian Museum & Art Gallery: Hobart).

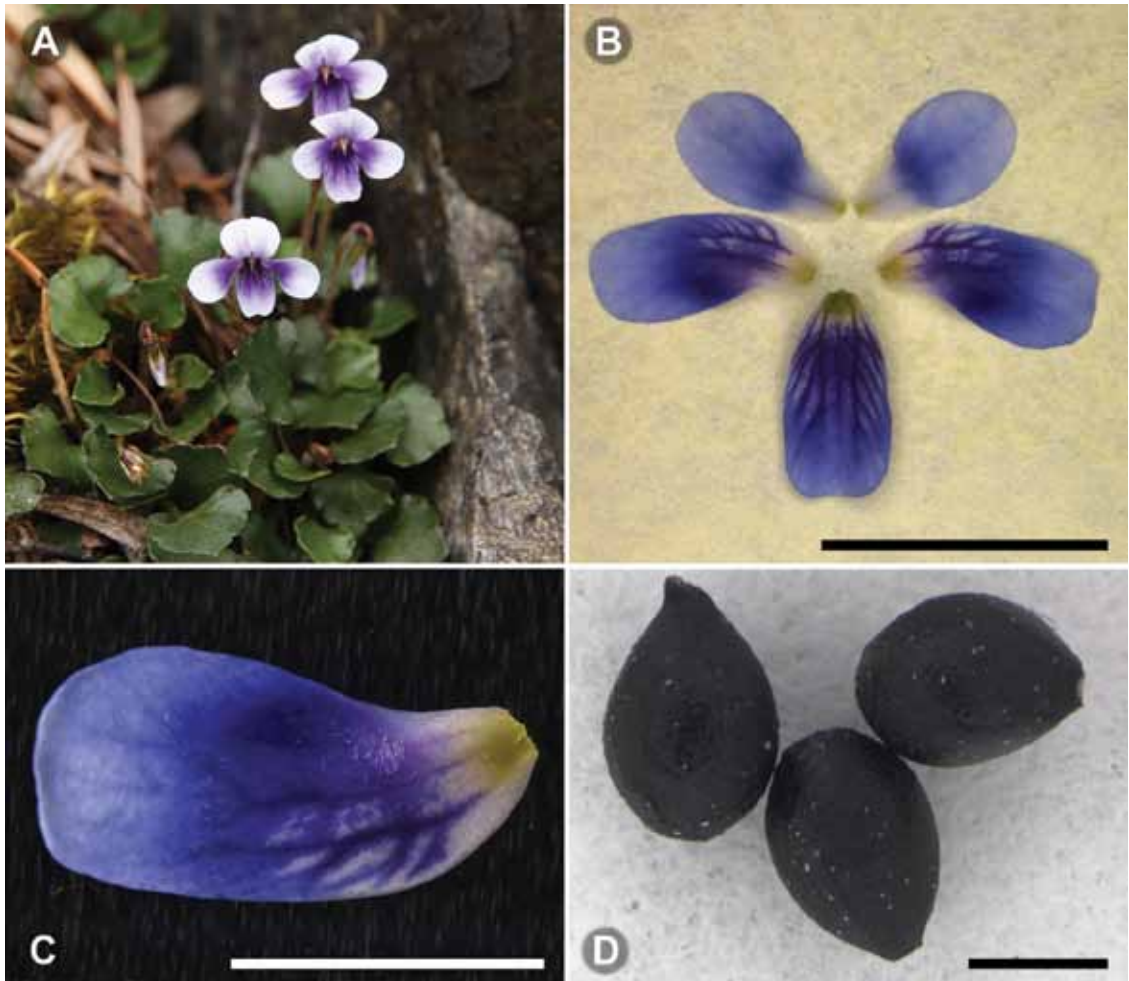


Figure 3. *Viola serpentinicola* flower and seed. **A.** Flowering specimen (*S.J.Jarman s.n.* HO583941) growing in situ. Note prolific flowers on tall scapes well above the basal rosettes. **B.** Petal shapes. **C.** Rectangular lateral petal. Note sparse beard. **D.** Black, glossy, lachrymiform seed.

- Gibson, N., Brown, M.J., Williams, K. and Brown, V. (1992) Flora and vegetation of ultramafic areas in Tasmania. *Australian Journal of Ecology* **17**, 297–303.
- Gray, A.M. (2008). A new species of *Eucalyptus*, series *Radiatae*, subgenus *Monocalyptus*, (Myrtaceae) from north-western Tasmania. *Kanunnah* **3**, 41–48.
- James, T.A. (1990). Violaceae. *Flora of New South Wales* **1**, 438. NSW University Press: Sydney.
- James, T.A. (1996). New combinations in *Viola* (Violaceae). *Muelleria* **9**, 35–36.
- Jarman, S.J. and Mihaich, C.M. (1991). Additions to the Epacridaceae in Tasmania. In M.R. Banks, S.J. Smith, A.E. Orchard and G. Kantvilas (Eds.). *Aspects of Tasmanian Botany - a tribute to Winifred Curtis* 99–103.
- Jessop, J.P. and Toelken, H.R. (1986). Violaceae. In J.P. Jessop and H.R. Toelken (eds.), *Flora of South Australia* Edn. 4, 870. South Australian Government Printing Division: Adelaide.
- Little, R.J. and Leiper, G. (2013). *Viola perreniformis* (L.G. Adams) R.J. Little & G. Leiper, *stat. nov.*, with notes on Australian species in *Viola* section *Erpetion* (Violaceae). *Austrobaileya* **9**(1), 80–101.
- Orchard, A.E. (1991). A new species of *Micranthemum* (Euphorbiaceae) from Tasmania. In M.R. Banks, S.J. Smith, A.E. Orchard and G. Kantvilas (Eds.). *Aspects of Tasmanian Botany - a tribute to Winifred Curtis* 59–64.
- Proctor J. and Woodell R. J. (1975). The ecology of ultramafic soils. *Adv. Ecol. Res.* **9**, 255–366.
- Thiele, K.R., de Salas, M.F., Walsh, N.G., Messina, A. and Prober, S.M. (2018). *Viola curtisiae*, a new rank for a poorly understood species from Victoria and Tasmania, with notes on *V. hederacea* subsp. *seppeltiana*. *Muelleria* **36**, 107–111.
- Thiele, K.R. and Prober, S.M. (2003). New species and a new hybrid in the *Viola hederacea* species complex, with notes on *Viola hederacea* Labill. *Muelleria* **18**, 7–25.
- Thiele, K.R. and Prober, S.M. (2006). *Viola silicestrus*, a new species in *Viola* section *Erpetion* from Australia. *Telopea* **11**, 99–104.
- Van der Ent, A., Jaffre, T., L'Huillier, L., Gibson, N and Reeves, R.D. (2015) The flora of ultramafic soils in the Australia-Pacific Region: state of knowledge and research priorities. *Australian Journal of Botany* **63**, 173–190.
- VicFlora (2018). *Viola sieberiana* Spreng. *Flora of Victoria*, Royal Botanic Gardens Victoria, <<https://vicflora.rbg.vic.gov.au>>, last accessed 7 Feb 2018.

Key to Tasmanian *Viola* (adapted from Duretto 2009)

- 1 Stipules to 4 cm long, green, deeply lobed; plants annual ***V. arvensis***
- 1: Stipules small, brownish, entire or toothed but not deeply lobed; plants perennial **2**
- 2 Plants lacking stolons; anterior petal with a short basal spur..... **3**
- 2: Plants stoloniferous; anterior petal ± saccate at the base but lacking a spur **5**
- 3 Leaf lamina deeply cordate at the base; flowering stems ascending, to 30 cm long ***V. caleyana***
- 3: Leaf lamina with base truncate or shortly cuneate; flowering stems to 18 cm long **4**
- 4 Leaf lamina broadly ovate to broadly triangular; corolla 5–8 mm long, white with purple veins ***V. cunninghamii***
- 4: Leaf lamina oblong or lanceolate; corolla 10–17 mm long, purple, violet or almost white ***V. betonicifolia***
- 5 Corolla cream or very pale mauve, mostly concolorous..... **6**
- 5: Corolla blackish-purple to pale violet or discolorous..... **7**
- 6 Corolla cream, minute, downfacing, hidden among the leaves, scarcely longer than calyx; leaf bases decurrent, the lamina rhomboid..... ***V. cleistogamoides***
- 6: Corolla cream or pale mauve, forward-facing, extending well beyond the calyx; leaf base cordate, the lamina reniform or semicircular..... ***V. curtisiae***
- 7 Scapes usually shorter than the leaves; corolla blackish-purple at least in bud, often paler at maturity..... ***V. fuscoviolacea***
- 7: Scapes longer than leaves; corolla purple with paler apices **8**
- 8 Leaves coriaceous, brittle, glossy dark green; lamina deltoid or rhomboidal with acute apex and base decurrent or truncate; occurring only in areas of ultramafic geology on the west coast ***V. serpentinicola***
- 8: Leaves soft-textured, pale to mid-green; lamina reniform with base cordate (small specimens can have a decurrent base); widespread..... ***V. hederacea***