

Clarkia purpurea ssp. *quadrivulnera* – Wine-cup Clarkia

English name: Wine-cup Clarkia

Other English names: Small-flowered Godetia, Four-spot Clarkia

Scientific name: *Clarkia purpurea* subsp. *quadrivulnera* (Douglas ex Lindl.) F.H. Lewis & M.E. Lewis

Other scientific names: *Clarkia quadrivulnera* (Douglas ex Lindl.) A. Nelson & J.F. Macbr.

Family: *Onagraceae*

Risk status

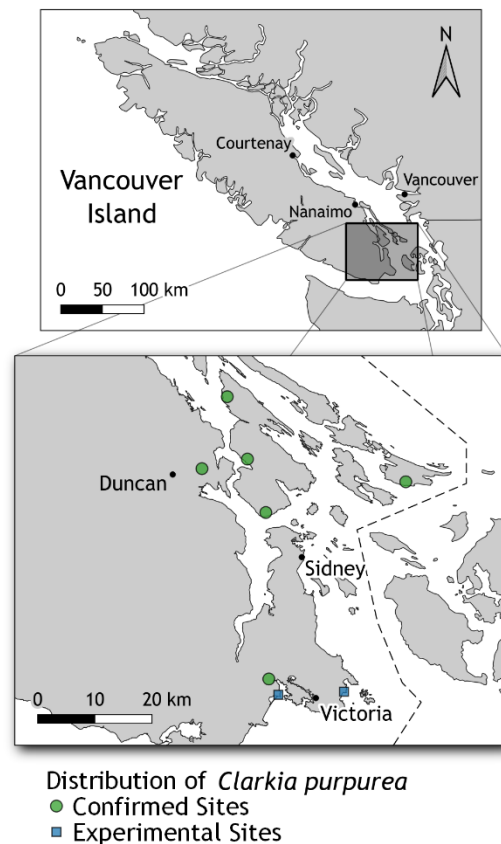
BC: imperiled (S2); red-listed

Canada: not yet assessed

Global: secure (G5T5)

Elsewhere: California, Oregon, Washington, Arizona – reported (SNR); Pennsylvania – exotic (SNA)

Range/Known distribution: Wine-cup Clarkia occurs from Baja California north to British Columbia through Arizona, California, Oregon, and Washington. There are three subspecies of *Clarkia purpurea* but ssp. *quadrivulnera* is the only one that occurs in Canada. It appears to be uncommon in all but the southernmost parts of Washington State but is abundant in the south of its range, particularly in valleys and foothills towards Baja California. In British Columbia, Wine-cup Clarkia is known only from seven localities, including Mount Tzouhalem, Saltspring Island, Saturna Island, and Mill Hill and Uplands Park in the Victoria area. The population at Uplands Park may be a recent introduction.



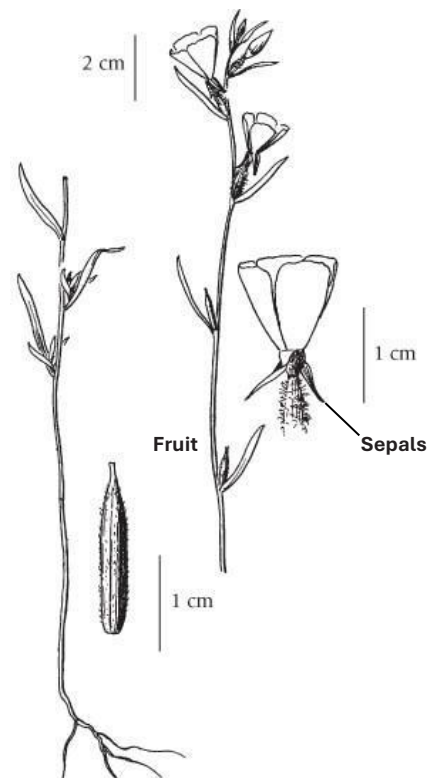
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Field description: Wine-cup Clarkia is an annual herb arising from a slender taproot, with erect stems reaching 10-70 cm in height. Its stems are glabrous (smooth and hairless) or hairy and are generally simple or branched from the base. Its toothless, linear- to lance- shaped leaves are 1.5-5 cm long and are usually unstalked. The inflorescence is an open, loosely-flowered spike with erect buds. The flowers themselves are lavender to purple in colour, often with a darker spot above, and tend to close at night. The flower petals are elliptic to fan-shaped (5-15 mm in length) while the sepals are usually bent back and are fused in pairs or coming free. The flowers possess 8 fertile stamens and their anthers do not extend beyond the reddish-purple stigma (1.5 mm long). The anthers are bent away from the stigma in the open flowers, probably to minimize any chance of self-pollination. The fruits are hairy, short-beaked, ribbed capsules, 1-3 cm in length, and are rounded or angled in cross-section. When mature, the seeds are brown or gray in colour.

Identification tips: Wine-cup Clarkia is distinguished from Farewell-to-spring (*C. amoena*), with which it is often associated, by the fact that its sepals are bent backwards and fused in pairs or free, rather than joined and turned to one side of the ovary.



Clarkia purpurea



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Life history: The seeds begin to germinate in late summer or autumn as the rains return. Seed germination is hindered by hot weather, but this may not be an issue in British Columbia. Flowering occurs from May to July. Individual flowers of Wine-cup Clarkia shed pollen over two to three days. For *Clarkia* species in general, fertilization usually occurs about 40 hours after pollination. Bees and syrphid flies are the primary pollinators but most species of *Clarkia* are capable of self-fertilization. Flowering of all *Clarkia* species is stimulated by long days and elevated temperatures. The seeds are shed quickly once a capsule splits open, but plants continue to produce capsules gradually over a few weeks.

The genus *Clarkia* consists of many annual species, which are only found in the temperate regions of western North America. The species often occur in colonies of several hundred to several thousand plants. The size of a population may vary considerably among years and these fluctuations are seemingly correlated with levels of winter and spring rainfall. As an annual, Wine-cup Clarkia may buffer the effects of a small population (e.g., genetic drift) by maintaining a genetically diverse seed bank that is able to respond to varied environmental conditions.

Habitat: In British Columbia, Wine-cup Clarkia occurs on shallow, well-drained soils in sunny, open areas associated with Garry Oak (*Quercus garryana*) woodlands. The species has been found on dry ridges and on moderate to steep grassy slopes, generally with a southwesterly aspect. It is frequently found in association with Lemmon's Needlegrass (*Achnatherum lemmonii* var. *lemmonii*) and Farewell-to-spring (*Clarkia amoena*). It occurs at elevations of up to 250 m.

Fire may have historically maintained the habitat of this species. For instance lower-altitude sites near Mt. Tzuhalem were likely burned by indigenous peoples for the cultivation of camas (*Camassia* spp.) meadows. These fires may have occasionally escaped up-slope to Mt. Tzuhalem itself, but this area was more likely kept shrub-free by grazing Roosevelt Elk (*Cervus elaphus roosevelti*). A study of the effects of fire on a related species of *Clarkia* found that pollen tubes grow faster on individuals from sites that had been subject to fire.

Why the species is at risk: In the past, the greatest threat to Wine-cup Clarkia was probably habitat loss to residential and recreational development. Over 95% of Garry Oak ecosystems have been lost since European settlement began in the 19th century.

The remaining populations of Wine-cup Clarkia are threatened by suppression by non-native shrubs such as Scotch Broom* (*Cytisus scoparius*) and competition from introduced grasses such as Sweet Vernal Grass* (*Anthoxanthum odoratum*), Barren Brome* (*Bromus sterilis*), and Hedgehog Dogtail* (*Cynosurus echinatus*) which dominate in some areas, and associated species such as Silver Hairgrass* (*Aira caryophylla*), Soft Brome* (*B. hordeaceus*), and Barren Fescue* (*Vulpia bromoides*).

What you can do to help this species: Management practices should be tailored to the needs of the site. Potential management tools will depend on the specific circumstances and may require

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experimentation prior to implementation. Before taking any action, expert advice should be obtained, and no action taken without it.

Management needs include protection of populations from trampling through the use of fences and the control of non-native, non-migratory Canada Geese. Little can be done to control the invasive species which occur in the same open meadows where Wine-cup Clarkia occurs, but invasive woody species such as Scotch Broom* (*Cytisus scoparius*) should be removed from these habitats to prevent it from being shaded out. Experiments should be conducted to determine how replacement populations can be established to compensate for those lost, particularly to climate change.

The Saturna Island occurrences of this species should be protected wherever possible. Parks Canada manages a right-of-way that may overlap with the Saturna Island population, and any park trails should avoid known occurrences. Population trends should be monitored at all localities.

References

- Costanzo, B. 2002. Stewardship Account: *Clarkia purpurea* ssp. *quadrivulnera* (Small-flowered Godetia). Garry Oak Ecosystems Recovery Team, Victoria, British Columbia.
- Douglas, G.W., D. Meidinger and J.L. Penny. 2002. *Rare native vascular plants of British Columbia*. 2nd ed. Province of British Columbia, Victoria, British Columbia.

For further information, contact the Garry Oak Ecosystems Recovery Team, or see the web site at: www.goert.ca

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*Refers to non-native species.