

## *Clarkia purpurea* ssp. *quadrivulnera*

**English name** small-flowered godetia

**Scientific name** *Clarkia purpurea* ssp. *quadrivulnera*

**Family** Onagraceae

**Other scientific names** *Clarkia quadrivulnera*

**Risk status**

BC: critically imperilled (S1); red-listed

Canada: not yet assessed

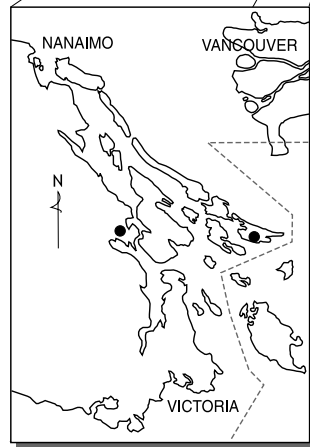
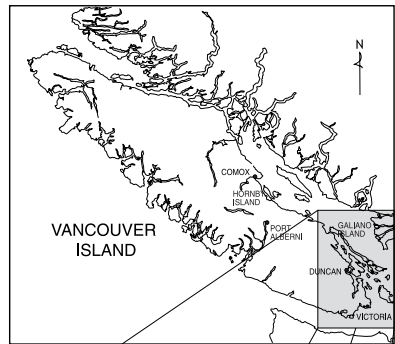
Global: secure (G5T5)

Elsewhere: California, Oregon, Washington, Arizona – reported (SR);

Pennsylvania – exotic (SE)

**Range/Known distribution**

Small-flowered godetia was first collected in British Columbia in 1997. It occurs from Baja California north to British Columbia through Arizona, California, Oregon and Washington. Ssp. *quadrivulnera* (the only subspecies that occurs in Canada) is reportedly more abundant in the south of its range, particularly in valleys and foothills towards Baja California. In British Columbia, small-flowered godetia is known only from three localities: one at the Mt. Tzuhalem Ecological Reserve near Cowichan Bay on southeast Vancouver Island, and two on Saturna Island in the southern Gulf Islands. These occurrences in southwest British Columbia represent the northern limits for the species in North America. Based on field work in 2002, there are currently three known occurrences and no unconfirmed historic localities in British Columbia.



Distribution of *Clarkia purpurea* ssp. *quadrivulnera*

● recently confirmed sites

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### Field description

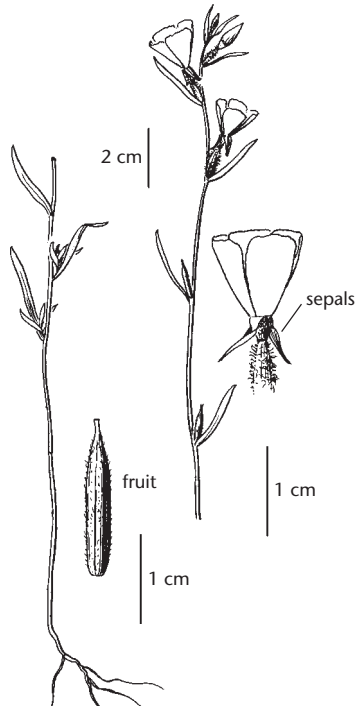
An annual herb from a slender taproot, with erect stems reaching 10-70 cm in height. Stems are glabrous (smooth and hairless) to hairy, and are generally simple or branched from the base. The toothless, linear- to lance-shaped leaves, 1.5-5 cm long, are usually unstalked. The inflorescence is an open, 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. 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**. Flowers possess 8 fertile stamens with their anthers not exceeded in height by the reddish-purple stigma (1.5 mm long). Anthers are bent away from the stigma in the open flowers, probably to minimise 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. Mature seeds are brown or grey in colour.

### IDENTIFICATION TIPS

Small-flowered godetia is distinguished from farewell-to-spring (*C. amoena*), with which it is often associated, by the fact that its sepals are fused in pairs or free, rather than joined and turned to one side of the ovary.



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### **Life history**

Seeds probably germinate in autumn as the summer drought breaks. Seed germination is hindered by hot weather but this may not be an issue in British Columbia. Flowering occurs from May to July. Small-flowered godetia sheds pollen over two to three days. For *Clarkia* species in general, fertilisation usually occurs about 40 hours after pollination. Bees and syrphid flies are the primary pollinators but most species of *Clarkia* are capable of self-fertilisation. Flowering of all *Clarkia* species is stimulated by long days and elevated temperatures. Seeds are shed gradually over weeks or months.

The genus *Clarkia* is comprised of annuals found only in the temperate regions of western North America, and all of these species occur in colonies of several hundred to several thousand plants. For *C. springvillensis*, a rare *Clarkia* from the west coast of California, populations fluctuate annually from thousands to no adult plants in a given year. These fluctuations are seemingly correlated with levels of winter and spring rainfall. As an annual, small-flowered godetia 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, *Clarkia purpurea* ssp. *quadrivulnera* 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*). Several introduced grasses also occur at the two sites, including dominant species sweet vernalgrass\* (*Anthoxanthum odoratum*), barren brome\* (*Bromus sterilis*), and hedgehog dogtail\* (*Cynosurus echinatus*), and associated species such as silver hairgrass\* (*Aira caryophylla*), soft brome\* (*B. hordeaceus*), and barren fescue\* (*Vulpia bromoides*). Elevations: 120-320 m.

Other species at risk occurring at the Mt. Tzuhalem site include white-top aster (*Aster curtus* syn. *Sericocarpus rigidus*), deltoid balsamroot (*Balsamorhiza deltoidea*), purple sanicle (*Sanicula bipinnatifida*) and yellow montane violet (*Viola praemorsa* ssp. *praemorsa*). All of these species are federally listed as Threatened or Endangered.

Whether fire historically maintained the habitat of this species is unknown, although 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 *Clarkia unguiculata* found that pollen tubes grew faster on individuals from sites that had been subject to fire.

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### **Why the species is at risk**

As similar habitat historically existed over much of what is now Greater Victoria, small-flowered godetia may have been more widely distributed in the past. There are currently just three occurrences of this species in Canada, and only one of these is on protected land. It is not known whether the species is at risk due to competition from introduced grasses or other invasive plants. Feral goats are present at the Saturna Island site.

### **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 experimentation prior to implementation. **Before taking any action, expert advice should be obtained, and no action taken without it. Please refer to the introductory section of this manual.**

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 both 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](http://www.goert.ca).

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\*Refers to non-native species.