

Aquilegia formosa

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Hort 5051



Photo: www.stauder.net/a.htm

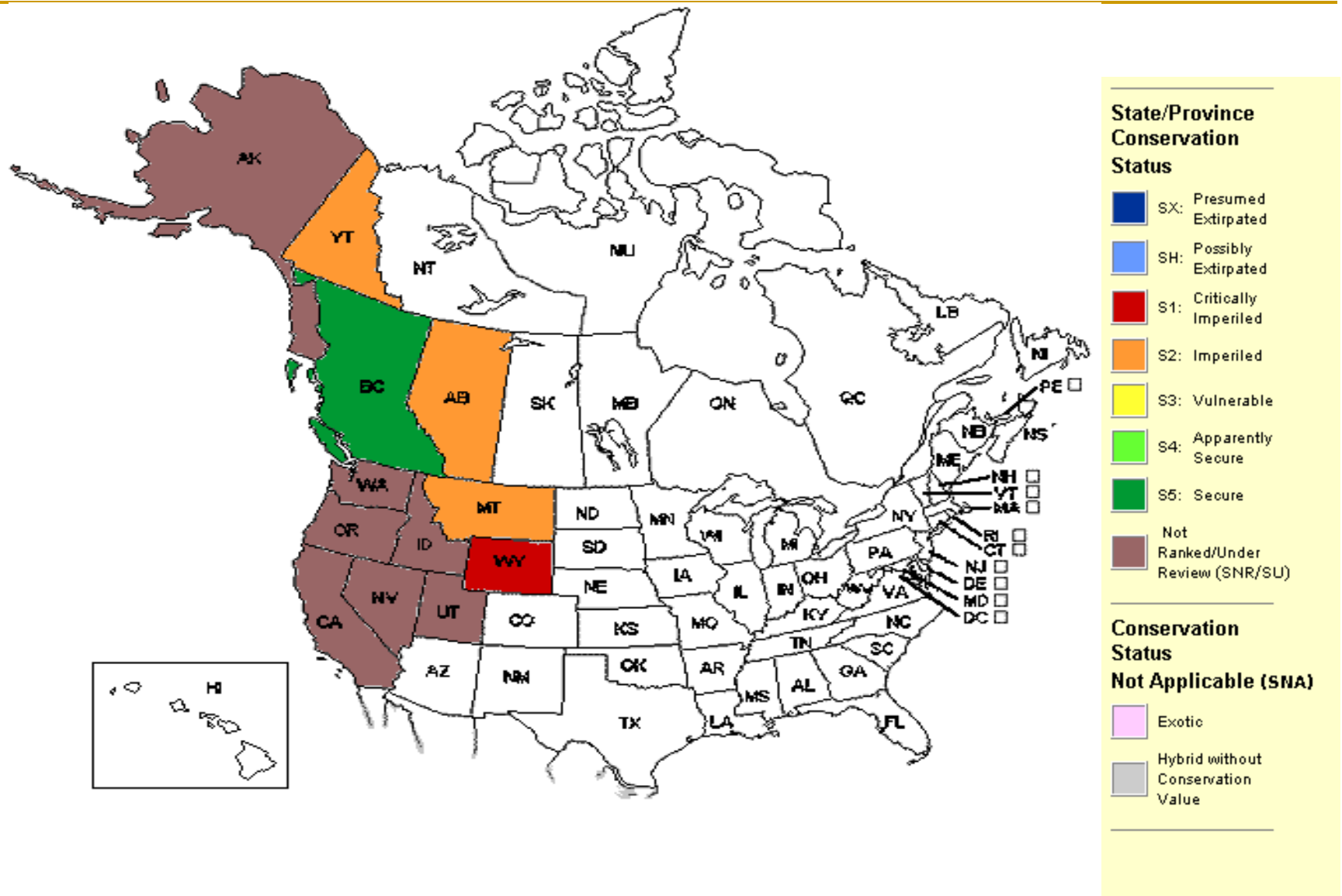
Taxonomy

- **Common Names: Western Columbine, Crimson Columbine**
 - **Scientific Name: *Aquilegia formosa***
 - **Family: Ranunculaceae**
 - **Genus: *Aquilegia***
 - **Species: *formosa***
 - **Lower taxa:**
 - *A. formosa* var. *Formosa*
 - *formosa* var. *hypolasia* (Greene) Munz
 - *A. formosa* var. *truncate* (Fisher & Meyer) Baker
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Geographic Distribution

Native to where?

- **Continents:** North America
 - **Countries:** Canada, Mexico, United States
 - **States/Provinces/Regions:** Sub arctic America:
Canada; Yukon Territory, USA; Alaska
 - Western Canada: Alberta, British Columbia
 - Northwest USA: Idaho, Montana, Oregon, Washington and Wyoming
 - Southwest USA: California, Nevada, Utah
 - Northern Mexico: Baja Norte
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<http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Aquila+formosa>

General Habitat Info

- **Latitudinal Ranges:** 20-65 degrees
 - **Altitude:** Sea level to 10,000
 - **General Climatic Conditions:** Prefers cool, moist temperatures below timberline, sub alpine environments.
 - **Tendency to naturalize or become invasive:** Will naturalize, but not considered invasive, slow spreading
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Native Habitat

- **Habitat:** Moist woods and damp places from sea level to 10000 feet. Prefers a moist well drained soil and will not tolerate a wet soil. Sun exposure should be partial shade or a sheltered sunny position. Often found by creeks or on Northern rocky slopes.
 - **Plant community:** Stream banks, seeps, moist places, oak woodland, coniferous forests, chaparral
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Yosemite National Park California

http://www.oeb.harvard.edu/faculty/kramer/Anji_Ballerini/Anji_photos.htm



Eastern Sierra, Ca

Taxonomic Description

- **Overall Plant Habit/Description:** Short lived perennial growing to 20-80cm (7-30 in.) with an erect, leafy and branched stem that terminates in a loose leafy raceme of showy nodding red and yellow flowers.
 - **Root System:** slender, woody rhizomes that form a tap root
 - **Leaves:** Basal rosettes with 2-3 leaflets of divided deeply 3-lobed, blue-green leaves on long stems, glaucous underneath with petioles 5-30 cm and segments 7-45mm.
 - **Flower:** Hermaphrodite erect flower with red sepals and yellow spurs. Sepals 12-20mm, red; petal blade 1-8mm, yellow, spur 10-23 mm, stamens 10-18 mm.
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Season of Bloom: Spring, early summer and mid-summer



Medicinal Uses by indigenous people

- North American Indians used early spring greens and roots, which were cooked and eaten. *A. formosa* considered a famine food. It was eaten cautiously because the family contains a number of mildly toxic species, but there are no records of toxicity for *A. formosa*.
 - Native Americans used *Aquilegia formosa* for wide variety of purposes:
 - ladies used it as a charm to gain the affections of men or to retain wealth and possessions.
 - For medicinal purposes seeds were chewed to alleviate stomach aches, and leaves were chewed or used in infusions to treat coughs, colds, and sore throats. A salve of mashed roots was also applied to rheumatic joints or bee stings.
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Other Uses

- The seed was ground up and used to treat lice.
 - The whole plant could also be boiled up and used as a hair wash.
 - Seeds are aromatic and can be crushed and rubbed on the body as a perfume.
 - The flowers have nectar deposits that can be eaten and are very sweet and are quite a treat.
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Market Niche

- Cut or potted natives
 - Organic market good niche due to natives lower nutrient requirements and disease and pest resistance.
 - Target Dates: Spring into Summer (May 1st-July 4th)
 - Could be force year round with proper scheduling.
 - Competitive market: Many spring cut flowers available, Delphinium, Coreopsis, Dutch Iris. Quite a few Columbine hybrids available.
 - *A. formosa* used as a gene source for current ornamental hybrids. Seeds stored in National Germplasm Resources Laboratory in Beltsville, Maryland.
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Next big thing?

- Probably not the next big “wave” in the horticultural world. Will never be a major crop.
 - The plants native history and ability to attract wildlife such as hummingbirds, bees and butterflies a selling point.
 - Good niche market and already identifiable to growers and some consumer
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Propagation Methods

- Seed rather than Veg.
- Many seeds per flower
- Dormancy
 - Must be cold stratified
 - 6-8 weeks at 4 C/40 F
 - Emerge in 25-30 days



<http://www.ubcbotanicalgarden.org/forums/showthread.php?t=3422>

Anticipated Cultural Requirements

- **Winter Hardiness:** USDA zones 3a to 8b
 - **Heat/Drought Tolerance:** Fairly drought tolerant
 - **Temperature (Day/Night):** Day 16-20 C (60-68 F), Night 13-18 C (55-64 F)
 - **Light quality, duration, photoperiod response:** Day neutral, but obligate vernalization. Most Columbine are day neutral after vernalization but benefits from long days (14 hours) at around 4000 f.c. to reduce stem elongation. They must develop 15-20 leaves to reach a maturity where they respond to conditions for floral initiation.
 - **Nutrition:** Low to moderate, 150 ppm every other irrigation
 - **Soil:** Well drained
 - **Plant Growth Regulators:** Tank mix B-Nine at 2500 ppm and A-rest 15-25 ppm. Some growers drop night temperature to 14-16 C (58-60 F) at visible bud to promote shorter plants with a longer shelf life.
 - **Container size:** 392 plug tray, to a 50 or 804 for bulking and finish in a 1801's, 4", 6", or 1 qt., or 1 gal.
 - **Disease Resistance/Susceptibility:** Leaf miners, crown rot and root rot, powdery mildew
 - **Fungicides, Insecticides, Cultural Control:** Leaf miners can be controlled by cutting back all foliage. Crown and root rot can be avoided by not over watering.
 - **Other:** *Aquilegia spp.* critical production factor is irrigation. Containers should dry down between watering and only fertilize every other irrigation. The critical post harvest factor is that they are very sensitive to ethylene gas. Remove dead flowers and foliage. *A. Formosa* is also rather deer resistant.
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Production Schedule

- **Stage 1:** Sow seeds into a 288-tray. Place in a dark cold room (4 C/40 F) for 6-8 weeks. Remove tray after stratification period and place on a mist bench at 20-22 C (68-72 F). Radicles will emerge in 25 to 30 days.
 - **Stage 2:** During stem and cotyledon emergence increase light levels to around 500-1000 f.c. Once the cotyledons have expanded begin fertilizing every other watering with a 50-75 ppm from 14-0-14. Stage 2 will take 15-25 days.
 - **Stage 3:** True leaves develop. Increase light to 1000-1500 f.c. and fertilizer to 100-150 ppm. Alternate fertilization between a 14-0-14 and a 20-10-20 every third watering. Growth regulators can be applied. Stage 3 will take 44-49 days.
 - **Stage 4:** Transplant to a 50 tray of final container.
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Production Schedule

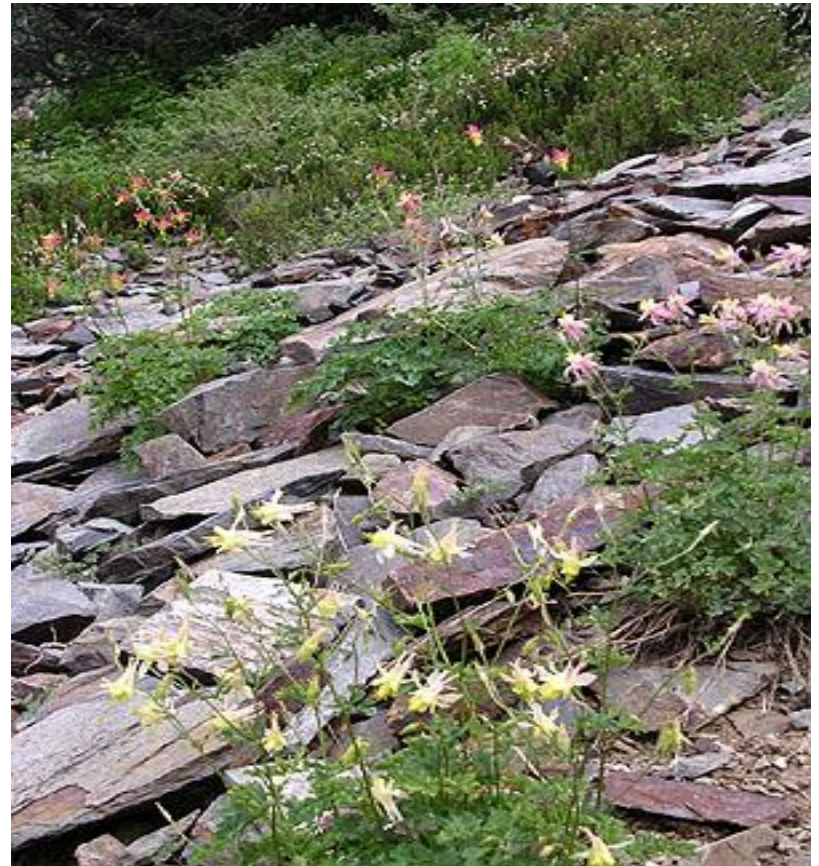
- **Bulking:**
 - Plants need to be bulked before cool treatments, the roots must become established. Grow at 19-21 C (65-70 F) days and 13-16 C (55-60 F) nights, fertilizing every other irrigation with a 15-0-15 at 150-200 ppm. Plants must develop 15-20 leaf nodes before cold treatment for flower initiation. Vegetative build up will take 8 to 10 weeks.
 - **Cold Treatment:**
 - The cold treatment can be done in a cooler or outside as the temperature is around 5 C (41 F). Do not fertilize during this time. The plants must be cooled for 10-12 weeks.
 - **Growing On:**
 - Bring plants out of the cold and place in a warm greenhouse at 20 C (68 F) days and 16-18 C (60-65 F) nights. Light should be around 3000-4000 f.c., with supplemental light recommended in Northern areas. Allow plants to dry out completely between irrigations and feed them 150-200 ppm from 15-0-15, or 20-10-20 at every other irrigation. Plants will flower in around four weeks.
 - **Notes:** Can also be direct sown in the fall and left outside for the winter.
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Production Time Break Down

- **Stratify seeds:** 6-8 weeks
 - **Germination:** 3-4 weeks
 - **Plug stage:** 8-10 weeks
 - **Bulking:** 8-10 weeks
 - **Vernalization:** 10-12 weeks
 - **Finish** 4 weeks
 - **Total production time: 39-48 weeks**
 - **16-20 spent stratifying/vernalizing**
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Production limitations and Room for Genetic Improvement

- Limited seed source available
 - Main areas of genetic improvement could be the reduction of juvenile periods/stratification time to reduce production time.
 - May also want to increase the flower power.
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Wild *A. formosa* X *A. pubescens*
hybrid plant

A. formosa X *A. pubescens* hybrid zone

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