Taxon: Aquilegia canadensis L. **Family:** Ranunculaceae

Common Name(s): Canada columbine
honeysuckle
meeting-houses
red-bell
wild columbine

Synonym(s): Aquilegia latiuscula Greene

Assessor: Chuck Chimera **Status:** Approved **End Date:** 6 May 2025

WRA Score: 6.5 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Perennial Herb, Shade-Intolerant, Self-Seeds, Hybridizes, Resprouter

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y = -3, n = 0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	0 = low, 1 = intermediate, 2 = high (see Appendix 2)	Low
202	Quality of climate match data	0 = low, 1 = intermediate, 2 = high (see Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y = 1, n = 0	y
204	Native or naturalized in regions with tropical or subtropical climates	y = 1, n = 0	n
205	Does the species have a history of repeated introductions outside its natural range?	y= -2, ? = -1, n = 0	?
301	Naturalized beyond native range		
302	Garden/amenity/disturbance weed	y = 1*multiplier (see Appendix 2), n = 0	n
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	n
305	Congeneric weed	y = 1*multiplier (see Appendix 2), n = 0	y
401	Produces spines, thorns or burrs	y = 1, n = 0	n
402	Allelopathic		
403	Parasitic	y = 1, n = 0	n
404	Unpalatable to grazing animals		
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
408	Creates a fire hazard in natural ecosystems	y = 1, n = 0	n

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y = 1, n = 0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y = 1, n = 0	y
411	Climbing or smothering growth habit	y = 1, n = 0	n
412	Forms dense thickets	y = 1, n = 0	n
501	Aquatic	y = 5, n = 0	n
502	Grass	y = 1, n = 0	n
503	Nitrogen fixing woody plant	y = 1, n = 0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y = 1, n = 0	n
601	Evidence of substantial reproductive failure in native habitat	y = 1, n = 0	n
602	Produces viable seed	y = 1, n = -1	y
603	Hybridizes naturally	y = 1, n = -1	y
604	Self-compatible or apomictic	y = 1, n = -1	y
605	Requires specialist pollinators	y = -1, n = 0	n
606	Reproduction by vegetative fragmentation	y = 1, n = -1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
702	Propagules dispersed intentionally by people	y = 1, n = -1	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal		
705	Propagules water dispersed	y = 1, n = -1	y
706	Propagules bird dispersed	y = 1, n = -1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y = 1, n = -1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Flora of North America Editorial Committee, eds. (1997). Flora of North America: Volume 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford, UK	[No evidence of domestication] "Flowering spring-summer (Mar-Jun). Shaded or open woods, often around cliffs, rock outcrops, and forest edges; 0-1600 m; Man., Ont., Que., Sask.; Ala., Ark., Conn., Del., Fla., Ga., Ill., Ind., Iowa, Kans., Ky., Maine, Md., Mass., Mich., Minn., Mo., Nebr., N.H., N.J., N.Y., N.C., N.Dak., Ohio, Okla., Pa., R.I., S.C., S.Dak., Tenn., Tex., Vt., Va., W.Va., Wis."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2025). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2025). Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**Low**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2025). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 6 May 2025]	"Native Northern America SUBARCTIC AMERICA: Canada [Yukon], United States [Alaska] EASTERN CANADA: Canada [Québec, Nova Scotia, Ontario, Newfoundland and Labrador] WESTERN CANADA: Canada [Manitoba, British Columbia] NORTHEASTERN U.S.A.: United States [Connecticut, Indiana, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia] NORTH-CENTRAL U.S.A.: United States [Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, Wisconsin] SOUTHEASTERN U.S.A.: United States [Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Maryland, North Carolina, South Carolina, Tennessee, Virginia] SOUTH-CENTRAL U.S.A.: United States [Texas]"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**

Qsn #	Question	Answer
	USDA, Agricultural Research Service, National Plant Germplasm System. (2025). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 6 May 2025]	"Native Northern America SUBARCTIC AMERICA: Canada [Yukon], United States [Alaska] EASTERN CANADA: Canada [Québec, Nova Scotia, Ontario, Newfoundland and Labrador] WESTERN CANADA: Canada [Manitoba, British Columbia] NORTHEASTERN U.S.A.: United States [Indiana, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, Connecticut] NORTH-CENTRAL U.S.A.: United States [Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, Wisconsin] SOUTHEASTERN U.S.A.: United States [Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Maryland, North Carolina, South Carolina, Virginia, Tennessee] SOUTH-CENTRAL U.S.A.: United States [Texas]"

203	Broad climate suitability (environmental versatility)	y
	Source(s)	**Notes**
	Missouri Botanical Garden. (2020). Aquilegia canadensis . http://www.missouribotanicalgarden.org. [Accessed 16 Sep 2020]	"Zone: 3 to 8" [Can grow in 6 hardiness zones]
	Flora of North America Editorial Committee, eds. (1997). Flora of North America: Volume 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford, UK	[Broad latitudinal and elevational range] "Flowering spring-summer (Mar-Jun). Shaded or open woods, often around cliffs, rock outcrops, and forest edges; 0-1600 m; Man., Ont., Que., Sask.; Ala., Ark., Conn., Del., Fla., Ga., Ill., Ind., Iowa, Kans., Ky., Maine, Md., Mass., Mich., Minn., Mo., Nebr., N.H., N.J., N.Y., N.C., N.Dak., Ohio, Okla., Pa., R.I., S.C., S.Dak., Tenn., Tex., Vt., Va., W.Va., Wis."

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	**Notes**
	Flora of North America Editorial Committee, eds. (1997). Flora of North America: Volume 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford, UK	"Flowering spring-summer (Mar-Jun). Shaded or open woods, often around cliffs, rock outcrops, and forest edges; 0-1600 m; Man., Ont., Que., Sask.; Ala., Ark., Conn., Del., Fla., Ga., Ill., Ind., Iowa, Kans., Ky., Maine, Md., Mass., Mich., Minn., Mo., Nebr., N.H., N.J., N.Y., N.C., N.Dak., Ohio, Okla., Pa., R.I., S.C., S.Dak., Tenn., Tex., Vt., Va., W.Va., Wis."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
205	**Does the species have a history of repeated introductions outside its natural range?**	**?**
	Source(s)	**Notes**
	Flora of North America Editorial Committee, eds. (1997). Flora of North America: Volume 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford, UK	[Cultivated within widespread native range] "Flowering spring-summer (Mar-Jun). Shaded or open woods, often around cliffs, rock outcrops, and forest edges; 0-1600 m; Man., Ont., Que., Sask.; Ala., Ark., Conn., Del., Fla., Ga., Ill., Ind., Iowa, Kans., Ky., Maine, Md., Mass., Mich., Minn., Mo., Nebr., N.H., N.J., N.Y., N.C., N.Dak., Ohio, Okla., Pa., R.I., S.C., S.Dak., Tenn., Tex., Vt., Va., W.Va., Wis."
	Dave's Garden. (2020). Aquilegia canadensis. https://davesgarden.com/guides/pf/go/464/. [Accessed 17 Sep 2020]	Cultivated within widespread native range
	WRA Specialist. (2025). Personal Communication	Widely cultivated, but unclear how often it has been introduced outside its native range

301	**Naturalized beyond native range**	
	Source(s)	**Notes**
	Missouri Botanical Garden. (2020). Aquilegia canadensis . http://www.missouribotanicalgarden.org. [Accessed 16 Sep 2020]	"Freely self-seeds and will naturalize to form large colonies in optimum growing conditions." [Suggests plants will "naturalize" when cultivated, but most locations where grown appear to be within broad, native range]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Possible cultivation escape or agricultural weed] "Dispersed by: Humans, Escapee References: Canada-A-642, Canada-C-756, Global-CD-1611, Canada-G-1855."

302	**Garden/amenity/disturbance weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[No evidence] "Dispersed by: Humans, Escapee References: Canada-A-642, Canada-C-756, Global-CD-1611, Canada-G-1855."

303	**Agricultural/forestry/horticultural weed**	
	Source(s)	**Notes**
	Darbyshire, S.J. (2003). Inventory of Canadian Agricultural Weeds. Agriculture and Agri-Food Canada, Research Branch, Ottawa, Canada	[Categorized as a native agricultural weed in Canada due to its toxicity to livestock. However, other references do not support the claims of toxicity] "Native. Perennial; pastures, hedgerows, old fields and forests; poisonous to humans and livestock; common (possibly extirpated in New Brunswick)."

304	**Environmental weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[No evidence] "Dispersed by: Humans, Escapee References: Canada-A-642, Canada-C-756, Global-CD-1611, Canada-G-1855."

305	**Congeneric weed**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Queensland Government. (2020). Weeds of Australia. Aquilegia vulgaris L. https://keyserver.lucidcentral.org. [Accessed 17 Sep 2020]	"This species is regarded as an environmental weed in Victoria, where it has spread from gardens into nearby natural habitats. It has only become naturalised relatively recently, first being recorded in 1988, and is of most concern in high-altitude heathland areas in the sub alpine and alpine regions of south-eastern Australia. Columbine (Aquilegia vulgaris) is listed as an environmental weed at Falls Creek in northern Victoria, and is also present in other alpine areas in this state (i.e. at Mount Buffalo, Mount Buller and Mount Stirling). It also appears on some local (e.g. Frankston City) and regional (i.e. in the Goulburn Broken Catchment) environmental weed lists in other parts of this state. Columbine (Aquilegia vulgaris) has also been recorded in treeless vegetation in surveys of the Australian Alps, and was very recently recorded as naturalised in wet sclerophyll forest at Katoomba, in the New South Wales central tablelands region."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Aquilegia vulgaris] "Weed of: Cereals" [Listed in a large number of publications as a weed]

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Flora of North America Editorial Committee, eds. (1997). Flora of North America: Volume 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford, UK	[No evidence] "Stems 15-90 cm. Basal leaves 2×-ternately compound, 7-30 cm, much shorter than stems; leaflets green adaxially, 17-52 mm, not viscid; primary petiolules 17-93 mm (leaflets not crowded), glabrous or pilose, sometimes somewhat viscid. Flowers pendent; sepals divergent from floral axis, red or apex green, lance-ovate to oblong-ovate, 8-18 × 3-8 mm, apex broadly acute to acuminate; petals: spurs red, straight, ± parallel to divergent, 13-25 mm, stout (at least proximally), abruptly narrowed near middle, blades pale yellow or yellow-green, oblong to rounded, 5-9 × 4-8 mm; stamens 15-23 mm. Follicles 15-31 mm; beak 10-18 mm."

402	Allelopathic	
	Source(s)	**Notes**
	Mardani, H., Kazantseva, E., Onipchenko, V., & Fujii, Y. (2016). Evaluation of allelopathic activity of 178 Caucasian plant species. International Journal of Basic and Applied Sciences, 5(1), 75-81	Unknown. Aquilegia olimpica evaluated for allelopathic properties.

403	Parasitic	n
	Source(s)	**Notes**
	Spira, T. P. (2011). Wildflowers and Plant Communities of the Southern Appalachian Mountains and Piedmont: A Naturalist's Guide to the Carolinas, Virginia, Tennessee, and Georgia. The University of North Carolina Press, Chapel Hill	"Herbaceous perennial with slender, leafy, much-branched stems 1-3 ft. tall. Stem and basal leaves divided into 3 leaflets, each mostly 3-lobed with rounded tips." [No evidence]

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"The palatability of wild columbine is rated as follows [5]: domestic sheep: fair cattle: poor horses: unpalatable"

Qsn #	Question	Answer
	Missouri Botanical Garden. (2020). Aquilegia canadensis . http://www.missouribotanicalgarden.org. [Accessed 16 Sep 2020]	"Tolerate: Rabbit, Deer, Drought, Dry Soil"
	WRA Specialist. (2025). Personal Communication	Palatability varies depending in ungulate species

405	Toxic to animals	
	Source(s)	**Notes**
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Medicinal uses listed, but no evidence of toxicity, in contrast to Darbyshire (2003)] "(Infusions from various parts of plants to treat heart trouble, kidney problems, headaches, bladder problems and fever, and as a wash for poison ivy. Ceremonial, magico-religious beliefs, ritual, powdered seeds used as love charms; and a compound used to detect bewitchment.)"
	Darbyshire, S.J. (2003). Inventory of Canadian Agricultural Weeds. Agriculture and Agri-Food Canada, Research Branch, Ottawa, Canada	[Other references do not support this claim of toxicity to humans and livestock] "Aquilegia canadensis L. Aquilegia flaviflora Torr. Aquilegia canadensis var. flaviflora Britton Aquilegia coccinea Small Aquilegia canadensis var. coccinea (Small) Muntz Canada columbine, rock-bells, wild columbine. ancolie du Canada, colombine, gants de Notre-Dame, glands. Distribution: (NF) (NS) NB QC ON MB SK Native. Perennial; pastures, hedgerows, old fields and forests; poisonous to humans and livestock; common (possibly extirpated in New Brunswick)."
	Burrows, G. E., & Tyrl, R. J. (2013). Toxic Plants of North America. Second Edition. Wiley-Blackwell, Hoboken, NJ	No evidence, in contrast to Darbyshire (2003)

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Porter, J. R., & Flores, H. (1991). Host range and implications of plant infection by Agrobacterium rhizogenes. Critical Reviews in Plant Sciences, 10(4), 387-421	"Agrobacterium rhizogenes is the bacterial agent of “hairy root”; disease of many higher plants. This bacterium has been used for insertion of selectable markers into host plants, the culture of immortal root lines for secondary metabolite production, and studies of root physiology and plant fungal and plant-nematode interactions." [Aquilegia canadensis listed among hosts. Importance unknown]
	The Royal Horticultural Society. (2020). Aquilegia canadensis - Canadian columbine. https://www.rhs.org.uk. [Accessed 17 Sep 2020]	"Pests: Can get aphids, leaf-mining flies and sawflies Diseases: May be infected by powdery mildews and aquilegia downy mildew "
	Missouri Botanical Garden. (2020). Aquilegia canadensis . http://www.missouribotanicalgarden.org. [Accessed 17 Sep 2020]	"This species has very good resistance to leaf miner which often causes severe damage to the foliage of many other columbine species and hybrids."

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	**Notes**
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Medicinal uses listed, but no evidence of toxicity, in contrast to Darbyshire (2003)] "(Infusions from various parts of plants to treat heart trouble, kidney problems, headaches, bladder problems and fever, and as a wash for poison ivy. Ceremonial, magico-religious beliefs, ritual, powdered seeds used as love charms; and a compound used to detect bewitchment.)"

Qsn #	Question	Answer
	Darbyshire, S.J. (2003). Inventory of Canadian Agricultural Weeds. Agriculture and Agri-Food Canada, Research Branch, Ottawa, Canada	[Other references do not support this claim of toxicity] "Native. Perennial; pastures, hedgerows, old fields and forests; poisonous to humans and livestock; common (possibly extirpated in New Brunswick)."
	Burrows, G. E., & Tyrl, R. J. (2013). Toxic Plants of North America. Second Edition. Wiley-Blackwell, Hoboken, NJ	No evidence of toxicity, in contrast to Darbyshire (2003)
	Wagstaff, D.J. (2008). International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence of toxicity, in contrast to Darbyshire (2003)

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	[No evidence of increased fire risk from this species, but does recover following fires] "FIRE ECOLOGY OR ADAPTATIONS: Red columbine sprouts from the caudex following fire [3]."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	**Notes**
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"Red columbine is moderately shade intolerant [1,2,3,5,8]."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Stritch, L. (2020). Plant of the Week - Red or Eastern Columbine (Aquilegia canadensis L.). US Forest Service. https://www.fs.fed.us/wildflowers/plant-of-the-week/aquilegia_canadensis.shtml. [Accessed 16 Sep 2020]	"Columbine is found throughout the Eastern half of the United States and grows in a variety of soil and light conditions that range from woodland edges to riverbanks, and gravelly shores and ridges."
	Spira, T. P. (2011). Wildflowers and Plant Communities of the Southern Appalachian Mountains and Piedmont: A Naturalist's Guide to the Carolinas, Virginia, Tennessee, and Georgia. The University of North Carolina Press, Chapel Hill	"Habitat/range: Occurs in variety of moist to dry habitats, including forests, woodlands, and rock outcrops, often on high-calcium soils associated with calcareous or mafic rocks."
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"It is found on thin soils over granitic bedrock, steep hillsides of thin loess over limestone or quartzite bedrock, and on gravelly glacial moraine [4]."
	Missouri Botanical Garden. (2020). Aquilegia canadensis . http://www.missouribotanicalgarden.org. [Accessed 16 Sep 2020]	"Wide range of soil tolerance as long as drainage is good. Prefers rich, moist soils in light to moderate shade. "

Qsn #	Question	Answer
411	**Climbing or smothering growth habit**	n
	Source(s)	**Notes**
	Spira, T. P. (2011). Wildflowers and Plant Communities of the Southern Appalachian Mountains and Piedmont: A Naturalist's Guide to the Carolinas, Virginia, Tennessee, and Georgia. The University of North Carolina Press, Chapel Hill	"Herbaceous perennial with slender, leafy, much-branched stems 1-3 ft. tall.

412	**Forms dense thickets**	n
	Source(s)	**Notes**
	Flora of North America Editorial Committee, eds. (1997). Flora of North America: Volume 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford, UK	"Flowering spring-summer (Mar-Jun). Shaded or open woods, often around cliffs, rock outcrops, and forest edges; 0-1600 m" [No evidence]
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"Usually scattered and found on rocky bluffs, wild columbine has little importance as a forage species."

501	**Aquatic**	n
	Source(s)	**Notes**
	Flora of North America Editorial Committee, eds. (1997). Flora of North America: Volume 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford, UK	[Terrestrial] "Shaded or open woods, often around cliffs, rock outcrops, and forest edges; 0-1600 m"

502	**Grass**	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2025). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 6 May 2025]	"Family: Ranunculaceae Subfamily: Isopyroideae Tribe: Isopyreae Subtribe: Isopyrinae"

503	**Nitrogen fixing woody plant**	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2025). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 6 May 2025]	"Family: Ranunculaceae Subfamily: Isopyroideae Tribe: Isopyreae Subtribe: Isopyrinae"

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"Red columbine is a perennial herb 12 to 30 inches (30-80 cm) tall, growing from a stout caudex. The stamens are long and exserted, the fruit is erect with five parallel ascending follicles with ultimately outcurving summits. Red columbine has a short, erect underground stem and fibrous, short-lived roots [1,2,7,15]."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Spira, T. P. (2011). Wildflowers and Plant Communities of the Southern Appalachian Mountains and Piedmont: A Naturalist's Guide to the Carolinas, Virginia, Tennessee, and Georgia. The University of North Carolina Press, Chapel Hill	"Common. Widespread in eastern North America."
	Flora of North America Editorial Committee, eds. (1997). Flora of North America: Volume 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford, UK	"Flowering spring-summer (Mar-Jun). Shaded or open woods, often around cliffs, rock outcrops, and forest edges; 0-1600 m; Man., Ont., Que., Sask.; Ala., Ark., Conn., Del., Fla., Ga., Ill., Ind., Iowa, Kans., Ky., Maine, Md., Mass., Mich., Minn., Mo., Nebr., N.H., N.J., N.Y., N.C., N.Dak., Ohio, Okla., Pa., R.I., S.C., S.Dak., Tenn., Tex., Vt., Va., W.Va., Wis."

602	Produces viable seed	y
	Source(s)	**Notes**
	Spira, T. P. (2011). Wildflowers and Plant Communities of the Southern Appalachian Mountains and Piedmont: A Naturalist's Guide to the Carolinas, Virginia, Tennessee, and Georgia. The University of North Carolina Press, Chapel Hill	"Although the flowers are well adapted for cross-pollination by hummingbirds, they are fully self compatible, so abundant seeds can be produced in the absence of pollinators. Self-fertilized seeds, however, give rise to much less vigorous plants than seeds derived from cross pollination, suggesting that the energy expenditure associated with producing showy, nectar rich flowers that attract pollinators is a good investment." … "Easily grown from seed, eastern columbine makes a wonderful addition to wildflower gardens."
	Missouri Botanical Garden. (2020). Aquilegia canadensis . http://www.missouribotanicalgarden.org. [Accessed 16 Sep 2020]	"Freely self-seeds and will naturalize to form large colonies in optimum growing conditions."
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"Red columbine sprouts from a stout caudex and reproduces from seed [7]."

603	Hybridizes naturally	y
	Source(s)	**Notes**
	Stritch, L. (2020). Plant of the Week - Red or Eastern Columbine (Aquilegia canadensis L.). US Forest Service. https://www.fs.fed.us/wildflowers/plant-of-the-week/aquilegia_canadensis.shtml. [Accessed 16 Sep 2020]	"Hybridization occurs easily with non-native Aquilegia species. To establish and maintain locally native genotype, all other Aquilegia must be removed."

Qsn #	Question	Answer
	Taylor, R. J. (1967). Interspecific hybridization and its evolutionary significance in the genus Aquilegia. Brittonia, 19(4), 374-390	"Various hybrid combinations of 18 species and varieties of Aquilegia were produced, and several cross-pollinations were made which failed to produce hybrids. Pollen fertility of hybrids was generally high, with a total mean of approximately 50%, but highly variable among hybrid combinations and consistently lower than that of parental species. With the exception of frequent occurrence of giant pollen grains and rare synaptic failure of one or two homologous pairs, meiotic behavior in hybrid pollen mother cells appeared to be completely regular." [Hybrids include atrata X canadensis, ecalcarata X canadensis, flabellata X canadensis, flabellata var. alba X canadensis, oxysepala var. yabeana X canadensis, canadensis X sibirica, canadensis X viridiflora, viridiflora X canadensis]

604	Self-compatible or apomictic	y
	Source(s)	**Notes**
	Spira, T. P. (2011). Wildflowers and Plant Communities of the Southern Appalachian Mountains and Piedmont: A Naturalist's Guide to the Carolinas, Virginia, Tennessee, and Georgia. The University of North Carolina Press, Chapel Hill	"Although the flowers are well adapted for cross-pollination by hummingbirds, they are fully self-compatible, so abundant seeds can be produced in the absence of pollinators. Self-fertilized seeds, however, give rise to much less vigorous plants than seeds derived from cross-pollination, suggesting that the energy expenditure associated with producing showy, nectar-rich flowers that attract pollinators is a good investment."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Spira, T. P. (2011). Wildflowers and Plant Communities of the Southern Appalachian Mountains and Piedmont: A Naturalist's Guide to the Carolinas, Virginia, Tennessee, and Georgia. The University of North Carolina Press, Chapel Hill	[Adapted for specialized pollination, but not required to set seed] "Ruby-throated hummingbirds use their long beaks and tongues to lap up nectar within the red nectar spurs. Several species of long-tongued bumblebees also visit the flowers for nectar (or pollen) and function as pollinators. The tubular nectar spurs narrow just below their tips, where the nectar is secreted, which probably prevents most insects from reaching the nectar. However, some bees and wasps get around this by cutting a hole in the base of the spur to get at the nectar. Although the flowers are well adapted for cross-pollination by hummingbirds, they are fully self compatible, so abundant seeds can be produced in the absence of pollinators. Self-fertilized seeds, however, give rise to much less vigorous plants than seeds derived from cross-pollination, suggesting that the energy expenditure associated with producing showy, nectar-rich flowers that attract pollinators is a good investment."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"Red columbine sprouts from a stout caudex and reproduces from seed [7]." [Resprouts, but does not spread vegetatively]

607	Minimum generative time (years)	2
	Source(s)	**Notes**

Qsn #	Question	Answer
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"Red columbine begins growth early in spring. Flowering occurs from March to July, fruiting from June to August, seed release in early to mid autumn [12]. Aboveground portions of the plant become senescent in mid to late autumn, dying back to the caudex [1,7]."
	Bender, M., Baskin, J., & Baskin, C. (2000). Age of Maturity and Life Span in Herbaceous, Polycarpic Perennials. Botanical Review, 66(3), 311-349	"Table IX Herbaceous, polycarpic perennials with earliest maturity under cultivation being the second year or later" [Aquilegia canadensis - Year of maturity = 2]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	**Notes**
	Bartkowska, M. P., Wong, A. C., Sagar, S. P., Zeng, L., & Eckert, C. G. (2018). Lack of spatial structure for phenotypic and genetic variation despite high self-fertilization in Aquilegia canadensis (Ranunculaceae). Heredity, 121(6), 605-615	"this species typically occurs in small, isolated aggregations on patchily distributed rock outcrops and lacks any obvious traits for seed dispersal."
	Ladyman, J.A.R. (2006). Aquilegia brevistyla Hooker (smallflower columbine): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. http://www.fs.fed.us. [Accessed 17 Sep 2020]	[Aquilegia canadensis with morphologically similar seeds] "Aquilegia brevistyla seed dispersal mechanisms are not known. Agents of seed dispersal may include water, wind, and animals. The small, black, smooth seeds of A. brevistyla have no obvious adaptations for specialized dispersal, such as barbs that would stick to animal fur or “wings” to facilitate wind-dispersal. The majority of seed may simply fall to the soil just below the parent plant. Water may contribute to A. brevistyla seed dispersal from plants growing at seeps or along streams and drainages."
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	[Occurrence along roadsides suggest seeds may be moved by vehicles or people] "Red columbine is moderately shade intolerant [1,2,3,5,8]. It is sometimes abundant on roadsides, sandbanks, or recent excavations [17]."

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Missouri Botanical Garden. (2020). Aquilegia canadensis . http://www.missouribotanicalgarden.org. [Accessed 16 Sep 2020]	"Borders, cottage gardens, open shade gardens, woodland gardens or naturalized areas. Also a good selection for a hummingbird garden. Continue to water plants after bloom to enjoy the ground cover effect of the attractive foliage."
	Select Seeds. (2020). Columbine - Wild. Aquilegia canadensis. www.selectseeds.com	Seeds sold on this and other websites

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	**Notes**
	Bartkowska, M. P., Wong, A. C., Sagar, S. P., Zeng, L., & Eckert, C. G. (2018). Lack of spatial structure for phenotypic and genetic variation despite high self-fertilization in Aquilegia canadensis (Ranunculaceae). Heredity, 121(6), 605-615	"this species typically occurs in small, isolated aggregations on patchily distributed rock outcrops and lacks any obvious traits for seed dispersal."
	WRA Specialist. (2025). Personal Communication	Unknown. Possible if grown with other plants, but no direct evidence found.

704	Propagules adapted to wind dispersal	

Qsn #	Question	Answer
	Source(s)	Notes
	Bartkowska, M. P., Wong, A. C., Sagar, S. P., Zeng, L., & Eckert, C. G. (2018). Lack of spatial structure for phenotypic and genetic variation despite high self-fertilization in Aquilegia canadensis (Ranunculaceae). Heredity, 121(6), 605-615	"this species typically occurs in small, isolated aggregations on patchily distributed rock outcrops and lacks any obvious traits for seed dispersal."
	Ladyman, J.A.R. (2006). Aquilegia brevistyla Hooker (smallflower columbine): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. http://www.fs.fed.us. [Accessed 17 Sep 2020]	[Aquilegia canadensis seeds are morphologically similar. Wind may facilitate short distance dispersal] "Aquilegia brevistyla seed dispersal mechanisms are not known. Agents of seed dispersal may include water, wind, and animals. The small, black, smooth seeds of A. brevistyla have no obvious adaptations for specialized dispersal, such as barbs that would stick to animal fur or “wings” to facilitate wind dispersal. The majority of seed may simply fall to the soil just below the parent plant. Water may contribute to A. brevistyla seed dispersal from plants growing at seeps or along streams and drainages. The contribution of water-induced soil erosion to seed dispersal at occurrences on steep slopes has not been documented. Wind is unlikely to be a significant seed-dispersal mechanism where occurrences are protected in deep canyons."

705	Propagules water dispersed	y
	Source(s)	Notes
	Ladyman, J.A.R. (2006). Aquilegia brevistyla Hooker (smallflower columbine): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. http://www.fs.fed.us. [Accessed 17 Sep 2020]	[Aquilegia canadensis seeds are morphologically similar. Water likely facilitates movement of seeds in riparian habitats] "Aquilegia brevistyla seed dispersal mechanisms are not known. Agents of seed dispersal may include water, wind, and animals."
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	[Water likely disperses seeds in riparian habitats] "Red columbine generally occupies open sites that are steep and rocky but somewhat moist, such as wooded bluffs of streams, wooded slopes, streambanks, banks and slopes of deep ravines, limestone bluffs and ledges, borders and clearings in deciduous or mixed woods or thickets [6,16,17]."

706	Propagules bird dispersed	n
	Source(s)	Notes
	Bartkowska, M. P., Wong, A. C., Sagar, S. P., Zeng, L., & Eckert, C. G. (2018). Lack of spatial structure for phenotypic and genetic variation despite high self-fertilization in Aquilegia canadensis (Ranunculaceae). Heredity, 121(6), 605-615	"this species typically occurs in small, isolated aggregations on patchily distributed rock outcrops and lacks any obvious traits for seed dispersal."
	Ladyman, J.A.R. (2006). Aquilegia brevistyla Hooker (smallflower columbine): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. http://www.fs.fed.us. [Accessed 17 Sep 2020]	[Aquilegia canadensis seeds are morphologically similar. Not fleshy-fruited] "Aquilegia brevistyla seed dispersal mechanisms are not known. Agents of seed dispersal may include water, wind, and animals. The small, black, smooth seeds of A. brevistyla have no obvious adaptations for specialized dispersal, such as barbs that would stick to animal fur or “wings” to facilitate wind dispersal. The majority of seed may simply fall to the soil just below the parent plant."

Qsn #	Question	Answer
707	**Propagules dispersed by other animals (externally)**	
	Source(s)	**Notes**
	Mardani, H., Kazantseva, E., Onipchenko, V., & Fujii, Y. (2016). Evaluation of allelopathic activity of 178 Caucasian plant species. International Journal of Basic and Applied Sciences, 5(1), 75-81	[Aquilegia canadensis seeds are morphologically similar] "Aquilegia brevistyla seed dispersal mechanisms are not known. Agents of seed dispersal may include water, wind, and animals. The small, black, smooth seeds of A. brevistyla have no obvious adaptations for specialized dispersal, such as barbs that would stick to animal fur or “wings” to facilitate wind-dispersal. The majority of seed may simply fall to the soil just below the parent plant."

708	**Propagules survive passage through the gut**	
	Source(s)	**Notes**
	Ladyman, J.A.R. (2006). Aquilegia brevistyla Hooker (smallflower columbine): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. http://www.fs.fed.us. [Accessed 17 Sep 2020]	[Aquilegia canadensis seeds are morphologically similar. Certain animals may ingest seeds while browsing on plants] "Animals can disperse seeds after ingesting and subsequently excreting them."

801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	Missouri Botanical Garden. (2020). Aquilegia canadensis . http://www.missouribotanicalgarden.org. [Accessed 17 Sep 2020]	"Freely self-seeds and will naturalize to form large colonies in optimum growing conditions." [Unknown. Possibly if growing in higher densities]

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. (2020) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/. [Accessed 17 Sep 2020]	"Storage Behaviour: Orthodox Storage Conditions: Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 6 years"
	Stritch, L. (2020). Plant of the Week - Red or Eastern Columbine (Aquilegia canadensis L.). US Forest Service. https://www.fs.fed.us/wildflowers/plant-of-the-week/aquilegia_canadensis.shtml. [Accessed 16 Sep 2020]	[Stores for 3 years] "Tiny black seeds ripen at various times within the flower. They can be collected by hand over several days from August to October by gently tapping the follicle (old flower) into a container. Seeds should be dried for about 2 weeks in open paper bags or containers. When dry they should be stored in sealed, plastic bags and kept in a cool dry place, such as a refrigerator or cold porch, until sowing time. Seeds will stay viable up to 3 years."
	WRA Specialist. (2025). Personal Communication	Longevity in soil unknown, but able to be stored for several years

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. (2025). Personal Communication	Unknown

Qsn #	Question	Answer
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Sullivan, J. (1992). Aquilegia canadensis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://research.fs.usda.gov/feis/species-reviews/aqucan. [Accessed 6 May 2025]	"Red columbine sprouts from the caudex following fire [3]."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2025). Personal Communication	Unknown

Summary of Risk Traits:

"Aquilegia canadensis (Canada columbine, wild columbine) is an herbaceous perennial native to woodland and rocky slopes of eastern North America. Native Americans crushed the plants seeds and used them medicinally as a headache remedy, and it had many other uses in traditional medicine. It is reported to be naturalized throughout the United States but is not documented to be naturalized on any Hawaiian Islands to date. This plant is poisonous to humans and livestock, reaches maturity fairly quickly (2 years), and may form a persistent seed bank. This creates some cause for concern in terms of its ability to become invasive. "

High Risk / Undesirable Traits
• Broad climate suitability
• Possible cultivation escape or agricultural weed
• Other species are invasive
• Unpalatable to some browsing animals
• Tolerates many soil types
• Reproduces by seeds
• Hybridizes with other species
• Self-compatible
• Reaches maturity in 2 years
• Seeds lack obvious means of dispersal, but may be moved by wind, water, animals, and people
• Seeds able to be stored for several years, may form a persistent seed bank
• Resprouts from caudex after fire and cutting

Low Risk Traits
• A temperate species; may be a threat at cooler and higher elevations of tropical islands
• No confirmed reports of negative impacts where cultivated, but cultivation primarily occurs within broad native range
• Unarmed (no spines, thorns, or burrs)
• Although self-compatible, outcrossing by hummingbirds and long-tongued bumblebees produces more vigorous offspring. Absence of these pollinators may limit competitive ability of seedlings]
• Not reported to spread vegetatively