

	Common Name	Latin Name
MN NWAC Risk Assessment Worksheet (04-2011)	Cow Vetch; also called Bird Vetch, Tufted Vetch, Tufted Bird Vetch, Boreal Vetch, Blue Vetch, and Canada Pea	<i>Vicia cracca</i> L. (synonyms: <i>Ervum cracca</i> (L.) Trautv., <i>Vicia hiteropus</i> Freyn., <i>Vicia lilacina</i> Ledeb., <i>Vicia macrophylla</i> B. Fedtsch, and others)
Reviewer	Affiliation/Organization	Date (mm/dd/yyyy)
James Calkins	Minnehaha Creek Watershed District	07/27/2015

Although the published descriptions vary widely, cow vetch (*Vicia cracca*) is generally described as a weak, herbaceous, rambling, perennial vine, 2-3 (and perhaps up to 6) feet long. It is a member of the pea family (Fabaceae). The stems and leaves are glabrous or inconspicuously appressed-pubescent (finely downy) with pinnately-compound leaves arranged alternately along the stems. The leaves have 4-12 pairs of linear leaflets (up to one inch long) and terminate in a branched tendril (modified leaflets). Native to Europe and Asia, and perhaps northeastern North America (southeastern Canada and the northeastern United States; Morley, 1969), cow vetch was first reported in North America in Ontario in 1860 and has since become naturalized across southern Canada and in parts of the eastern and northwestern United States including northern Minnesota. Reports of its distribution in Minnesota are variable. The individual flowers are small, stalked (peduncled), and pea-like with bilateral symmetry (zygomorphic) and are perfect, blue-violet, sometimes pink and occasionally white, and borne on axillary, loose, one-sided racemes from June through August in Minnesota; the species is predominantly allogamous (outcrosses), but can be self-fertile (autogamous; seed set is generally reduced) and the flowers are insect pollinated and attractive to a variety of bees and butterflies. The fruit is a flattened legume (botanically, but is commonly called a pod), up to one inch long and smooth (glabrous), that matures from August to October in Minnesota. As they mature, the fruits change in color from bright green to mottled tan or light brown and eventually open (dehisce) ballistically (explosive dehiscence whereby the seeds are thrown from the parent plant; accomplished by the sudden separation of the two halves of the pod along both sutures, accompanied by twisting, leaving behind the two twisted valves) to release 2-8 reddish-brown seeds. Plants prefer and perform best in full sun, but tolerate partial shade. Like many other legumes, cow vetch is capable of fixing nitrogen and is sometimes planted as a green manure, cover, or companion crop and as a bee/butterfly plant. The seeds are eaten by birds and various small mammals. Typically found in disturbed areas along roadsides and fields, plants are adaptable and will grow on most soils, including poor, sandy or gravelly, low-fertility soils, but prefer moist, well-drained conditions and, like vetches in general, tend to be intolerant of hot, dry sites. Described as being cold hardy to U.S.D.A. Cold Hardiness Zone 4 (-20 to -30°F; -29 to -34°C), but the species has been reported in Zone 3 (-30 to -40°F; -34 to -40°C), perhaps in response to reliable snow cover. Cow vetch is propagated from seeds, but can reproduce vegetatively from rhizomes. A portion of the seed crop is hard-seeded and requires scarification in order for



germination to occur; this hard-seededness can result in the development of a seedbank. Native species and other introduced species present in Minnesota that might be confused with cow vetch include *Vicia villosa* (hairy vetch; native to Europe and Asia; naturalized in the northern United States, including Minnesota, and southern Canada), *Vicia americana* (American vetch, purple vetch; a North American and Minnesota native typically found in savanna and prairie habitats), *Vicia caroliniana* (Carolina vetch, pale vetch, wood vetch; a North American and Minnesota native; habit and foliage similar, but has white flowers), *Vicia sativa* (common vetch; native to Europe and Asia; foliage similar, but only one to a few flowers in the upper leaf axils), *Lathyrus venosus* (purple pea, veiny pea, vetchling; a Minnesota native in woodland and prairie communities), and *Lathyrus japonicus* (synonym – *V. maritimus*; beach pea, heath pea, seaside pea; a North American and Minnesota native that is commonly found on sandy beaches including the beaches of Lake Superior), and *Lathyrus palustris* (marsh pea, wild pea, vetchling; a North American and Minnesota native found in marshes and along shorelines), *Astragalus canadensis* (Canada milkvetch, little rattlepod; a North American and Minnesota native; habit and foliage similar, but has white to creamy yellow flowers in terminal, bottle-bush-like racemes), *Coronilla varia* (crown vetch; introduced and widely planted for erosion control; bicolored, pink and white flowers in round, crown-like clusters; lacks tendrils), and others.

Box	Question	Answer	Outcome (i.e., Go to Box ?)
1	Is the plant species or genotype non-native?	Yes; cow vetch (<i>Vicia cracca</i>) is not native to Minnesota; native to Europe and temperate Asia, and perhaps northeastern North America (northeastern United States and southeastern Canada; Morley, 1969; hence the common name Canada Pea; the USDA Plants Database indicates the species is introduced in Canada and the United States); introduced and planted as a green manure, cover, companion, forage, hay, and silage crop.	Go to Box 3
2	Does the plant species pose significant human or livestock concerns or have the potential to significantly harm agricultural production?	No.	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	A. Does the plant have toxic qualities that pose a significant risk to livestock, wildlife, or people?	<i>No; some references indicate cow vetch may be slightly toxic, but the species is commonly planted as a forage and hay crop alone or with other species; toxicity may be related to excessive consumption.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>

Box	Question	Answer	Outcome (i.e., Go to Box ?)
	B. Does the plant cause significant financial losses associated with decreased yields, reduced quality, or increased production costs?	<i>No; while some competition is likely, the species is sometimes planted as a companion crop; apparently the benefits (nitrogen fixation and weed suppression) outweigh any competitive effects.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
3	Is the plant species, or a related species, documented as being a problem elsewhere?	Yes, but not commonly given the species' relatively wide distribution; based on a 2015 Minnesota Department of Natural Resources survey, generally referenced as a problem in restoration projects, but not established ecosystems; seems to be considered a more serious problem in Alaska where it is listed as restricted noxious-weed seed (maximum allowable tolerance = two seeds per pound); Alaska is the only state where the species is currently listed as noxious.	Go to Box 6
4	Are the plant's life history & growth requirements sufficiently understood?	In general, Yes, but unanswered questions remain; cow vetch is a herbaceous perennial vine that grows on a variety of soils, primarily in disturbed habitats, in sun or partial shade; reproduces by seed and can reproduce vegetatively by rhizomes.	
5	Gather and evaluate further information:	<i>Comments/Notes: Additional information about the potential significance of any potentially negative effects of cow vetch on native ecosystems would be helpful.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
6	Does the plant species have the capacity to establish and survive in Minnesota?	Yes; reported as hardy to USDA Cold Hardiness Zone 4 and present in Zone 3 on some distribution maps; reported as naturalized in the northern United States, including northern Minnesota, and southern Canada; according to EDDMapS, the species is present in the northern half of Minnesota (Kittison, Roseau, Lake of the Woods, St. Louis, Lake, Cook, Clay, Cass, and Pine Counties), the neighboring states of Wisconsin, Iowa, and far western South Dakota, and the adjacent Canadian provinces of Manitoba and Ontario.	

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	A. Is the plant, or a close relative, currently established in Minnesota?	Yes; cow vetch is present in Minnesota - Kittison, Roseau, Lake of the Woods, St. Louis, Lake, Cook, Clay, Cass, and Pine Counties (EDDMapS; July 2015).	Go to Box 7
	B. Has the plant become established in areas having a climate and growing conditions similar to those found in Minnesota?	Yes.	
7	Does the plant species have the potential to reproduce and spread in Minnesota?	Yes.	
	A. Does the plant reproduce by asexual/vegetative means?	Yes; according to some, but not all references, the species can reproduce vegetatively by rhizomes, but the documentation of this capacity is limited.	Go to Question B
	B. Are the asexual propagules effectively dispersed to new areas?	No; can be moved with infested soil	Go to Question C
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes (exact numbers not found); relative to many other weedy species individual plants produce a relatively small, but not insignificant, number of seeds; the seeds are cold hardy in Minnesota.	Go to Question F
	D. If the species produces low numbers of viable seeds, does it have a high level of seed/seedling vigor or do the seeds remain viable for an extended period?	Yes; again, no documentation on the number of seeds produced; seeds are reported to have a high germination rate (97% with scarification) and may remain viable in the soil for several years (5 years).	Go to Question F
	E. Is the species self-fertile?	Yes; the species tends to outcross, but can be self-fertile; pollinated by insects and attractive to bees and butterflies.	Go to Question F
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes; seeds dispersed locally by explosive dehiscence; appears to be spread greater distances by human-mediated activities like mowing and forage/hay production; one reference suggests seeds may survive digestion by birds, but not documented.	Go to Question I
	G. Can the species hybridize with native species (or other introduced species) and produce viable seed and fertile offspring in the absence of human intervention?	<i>No (probably); no reports of hybrids found and interspecific hybrids are uncommon for legumes in general.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>

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	H. If the species is woody (trees, shrubs, and woody vines) is the juvenile period less than or equal to 5 years for tree species or 3 years for shrubs and vines?	<i>No; cow vetch (Vicia cracca) is herbaceous.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	I. Do natural controls exist, species native to Minnesota, that are documented to effectively prevent the spread of the plant in question?	No.	Go to Box 8
8	Does the plant species pose significant human or livestock concerns or have the potential to significantly harm agricultural production, native ecosystems, or managed landscapes?	No.	
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	No; some references indicate cow vetch may be slightly toxic, but the species is commonly planted as a forage and hay crop alone or with other species; toxicity may be related to excessive consumption and otherwise probably isn't present in sufficient amounts to be a threat.	Go to Question B
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?	No; while some competition is likely, the species is sometimes planted as a companion crop; apparently the benefits (nitrogen fixation and weed suppression) outweigh any competitive effects.	Go to Question C
	C. Can the plant aggressively displace native species through competition (including allelopathic effects)?	No; can form mats that cover and shade out low vegetation, but not reported to be a problem in established plant communities in Minnesota; can be a weed in disturbed restoration situations, but so are many other weeds.	Go to Question D
	D. Can the plant hybridize with native species resulting in a modified gene pool and potentially negative impacts on native populations?	No (probably); no reports of hybrids found and interspecific hybrids are uncommon for legumes in general.	Go to Question E

Box	Question	Answer	Outcome (i.e., Go to Box ?)
	E. Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?	Perhaps, but probably No; depending on coverage, the species can fix atmospheric nitrogen and add nitrogen to the soil, but what the ultimate effects in an ecosystem might be and whether they would be beneficial or detrimental are unknown.	Go to Question F
	F. Does the plant have the potential to introduce or harbor another pest or serve as an alternate host?	No; no significant pest relationships found.	THE SPECIES IS NOT CURRENTLY BELIEVED TO BE A RISK – NO REGULATORY ACTION
9	Does the plant species have clearly defined benefits that outweigh associated negative impacts?		
	A. Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?	<i>Probably; recommended as a green manure, cover, or companion crop and as a bee/butterfly species.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	B. Is the plant an introduced species and can its spread be effectively and easily prevented or controlled, or its negative impacts minimized through carefully designed and executed management practices?	<i>Yes (an introduced species) and Yes; no effective mechanism of dispersal to new areas and new infestations can be managed.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	C. Is the plant native to Minnesota?	<i>No; cow vetch (<i>Vicia cracca</i>) is native to Europe and Asia (see Box 1).</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>

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	D. Is a non-invasive, alternative plant material commercially available that could serve the same purpose as the plant of concern?	<i>Perhaps, but probably not so No; compared to cow vetch, the native species are probably not aggressive enough to provide adequate cover.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	E. Does the plant benefit Minnesota to a greater extent than the negative impacts identified at Box #8?	<i>Perhaps; often recommended for use in organic cropping systems as a nitrogen fixing green manure, cover, or companion crop and as habitat for beneficial insects.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
10	Should the plant species be enforced as a noxious weed to prevent introduction &/or dispersal; designate as prohibited or restricted?		
	A. Is the plant currently established in Minnesota?	<i>Yes (see Box 6, Question A).</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	B. Does the plant pose a serious human health threat?	<i>No.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	C. Can the plant be reliably eradicated (entire plant) or controlled (top growth only to prevent pollen dispersal and seed production as appropriate) on a statewide basis using existing practices and available resources?	<i>Yes; where feasible, mowing to prevent seed set; pulling, herbicides (clopyralid, triclopyr, 2,4-D, or glyphosate).</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>

Box	Question	Answer	Outcome (i.e., Go to Box ?)
11	Should the plant species be allowed in Minnesota via a species-specific management plan; designate as specially regulated?		
Final Results of Risk Assessment			
	Review Entity	Comments	Outcome
	NWAC Listing Subcommittee	Reviewed on 9/17/15.	NO REGULATORY ACTION – DO NOT LIST
	NWAC Full-group	Vote 10 in favor and 0 opposed.	NO REGULATORY ACTION – DO NOT LIST
	MDA Commissioner		
	File #: MDARA00046HCOWVT		

References:

(List any literature, websites, and other publications)

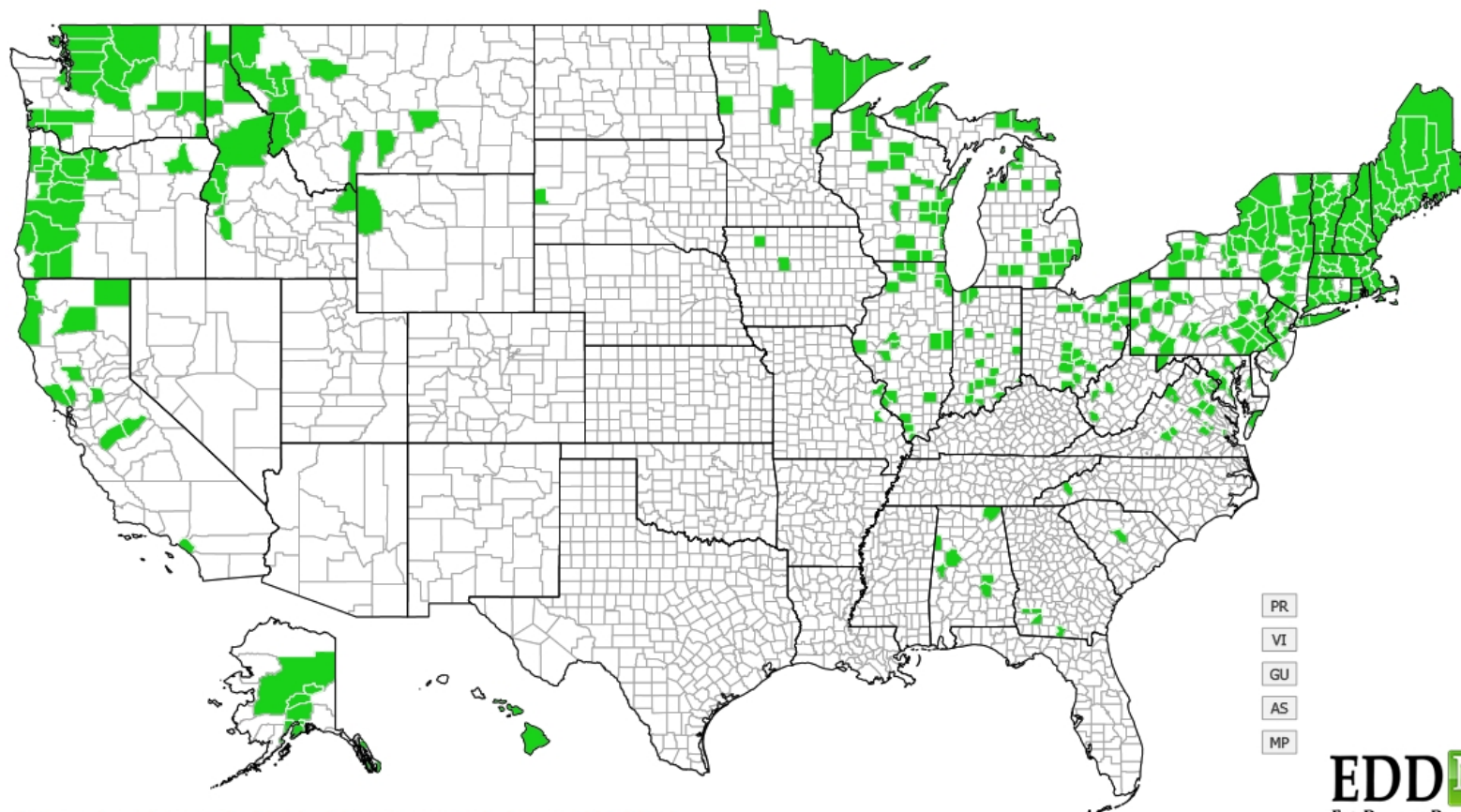
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12. Minnesota Wildflowers: A Field Guide to the Flora of Minnesota. *Vicia villosa* (Hairy Vetch). <https://www.minnesotawildflowers.info/flower/hairy-vetch>
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<https://www.eddmaps.org/distribution/uscounty.cfm?sub=13109>

Vicia cracca (Minnesota county distributions are based on 1 or 2 reports except Cook County/5 reports)

Vicia cracca

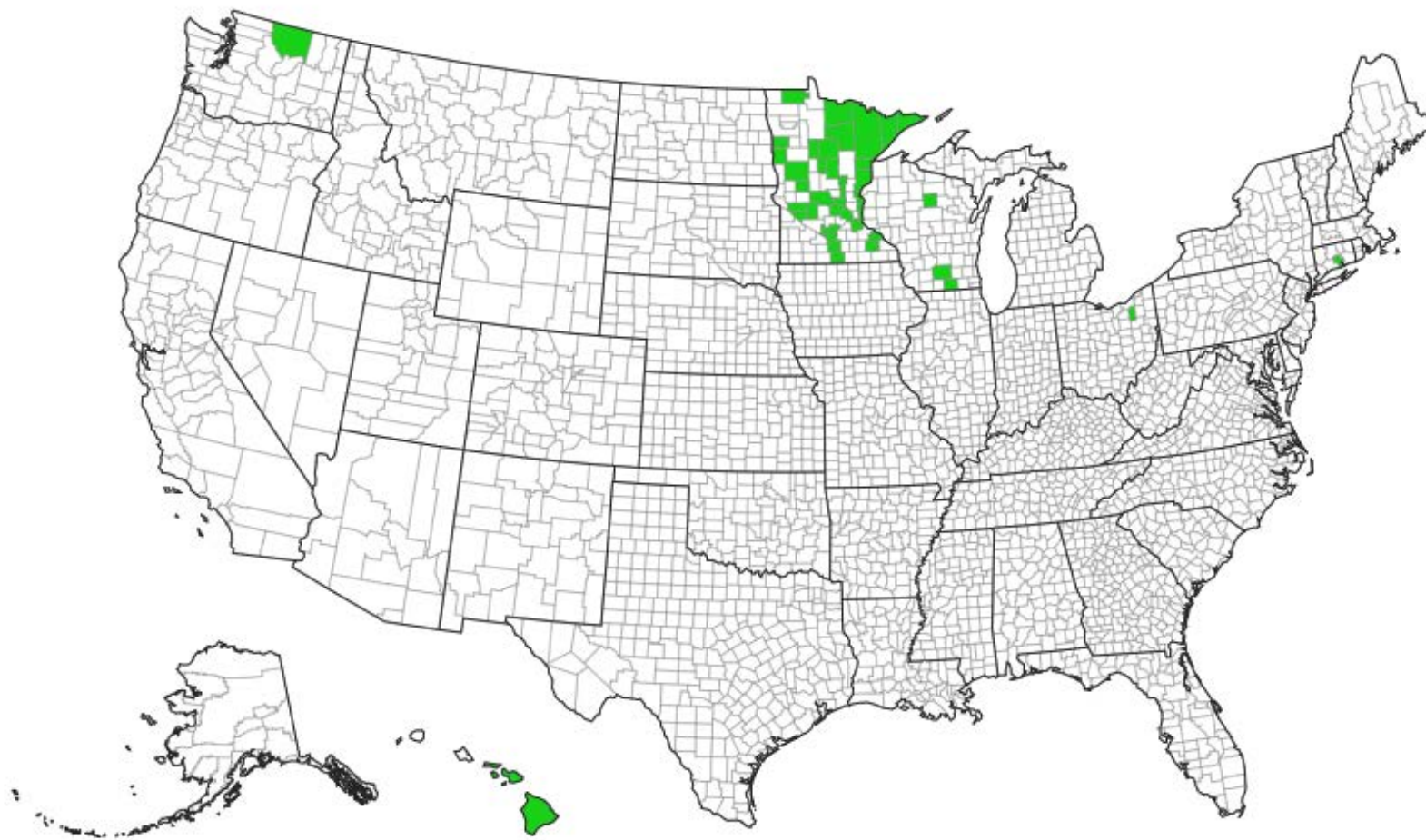


Last observation: August 8, 2014 - Map generated: August 27, 2014

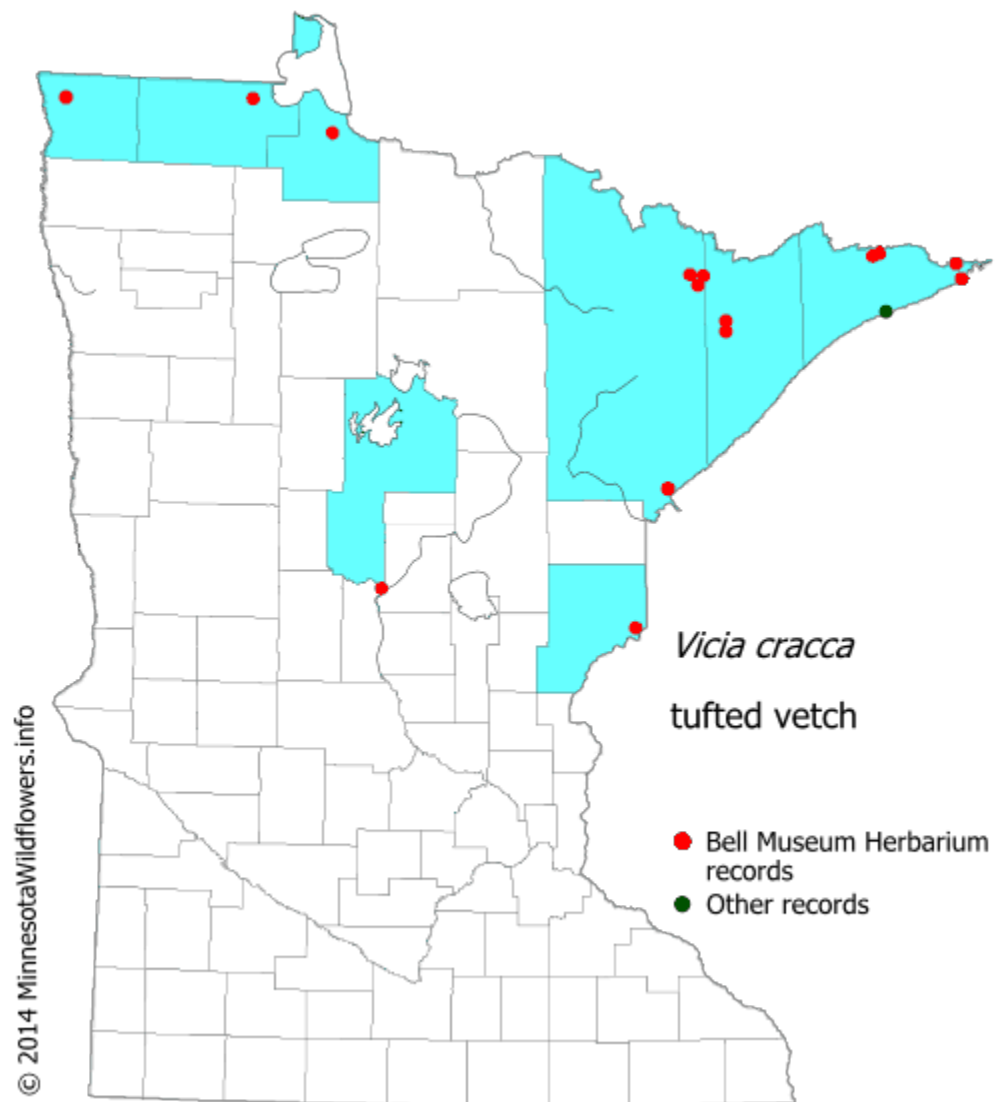
EDDMapS
Early Detection & Distribution Mapping System

<https://www.eddmaps.org/distribution/uscounty.cfm?sub=29754>

Vicia cracca ssp. *tenuifolia* (Minnesota county distributions mostly based on one to a few reports except St. Louis County/155 reports; the subspecies *cracca* has only been reported in Alaska)



Vicia cracca - <https://www.minnesotawildflowers.info/flower/tufted-vetch>



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