

	Common Name	Latin Name
MN NWAC Risk Assessment Worksheet (04-2011)	Hairy Vetch; also called Winter Vetch, Fodder Vetch, Wooly or Woolypod Vetch, Sand Vetch, Russian or Large Russian Vetch, Siberian Vetch, and others	<i>Vicia villosa</i> Roth. (synonyms: <i>Cracca dasycarpa</i> Alef., <i>Cracca varia</i> Godr. & Gren., <i>Cracca villosa</i> (Roth) Godr. & Gren., <i>Ervum villosum</i> (Roth) Trautv., <i>Vicia ambigua</i> Guss., <i>Vicia dasycarpa</i> Ten., <i>Vicia microphylla</i> d'Urv., <i>Vicia pseudocracca</i> Bertol., and many others)
Reviewer	Affiliation/Organization	Date (mm/dd/yyyy)
James Calkins	Minnehaha Creek Watershed District	07/24/2015

Although the published descriptions vary widely, hairy vetch (*Vicia villosa*) is generally described as a herbaceous, rambling, annual or biennial, and occasionally a short-lived perennial, vine, 4-6 feet long, and is a member of the pea family (Fabaceae). The stems, leaves, flower stalks, bases of the flowers (the calyx; sepals), and fruits are distinctly pubescent being covered with long hairs; hence the name hairy vetch. The pubescence results in the leaves having a blue-green appearance. The pinnately-compound leaves are arranged alternately along the stems, have 4-12 pairs of linear leaflets (up to one inch long; opposite or slightly offset), and terminate in a branched tendrils (modified leaflets). Hairy vetch is native to Europe, western Asia, and northern Africa and was introduced as a cultivated species; the species has since escaped cultivation and become naturalized in parts of North America including Minnesota. The individual flowers are small, stalked (peduncled), and pea-like with bilateral symmetry (zygomorphic) and are perfect, usually bicolored (dark and light shades of pink, rose, or violet-blue or one of these colors and white; occasionally all white), and borne on many-flowered, one-sided racemes attached in the axils of leaves 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 legume (botanically, but is commonly called a pod), up to two inches long, that matures from August to October in Minnesota. The immature fruits are green, becoming gray to gray-black as they mature and eventually opening (dehiscing) to release the relatively-large, reddish-brown to gray or black seeds. Plants prefer and perform best in full sun, but tolerate partial shade. Like other legumes, hairy vetch is capable of fixing nitrogen and is commonly planted as a green manure, cover, or companion crop and as a bee/butterfly plant. A number of named varieties have been developed for forage and cover/companion crop use. The fruits are eaten by birds and various small mammals. Plants are adaptable and will grow on most soils, including sandy or gravelly, low-fertility soils, but prefer moist, well-drained conditions and are intolerant of hot dry sites. Hairy vetch is, however considered more drought tolerant than other vetches. Hairy vetch is also considered the hardiest vetch, and is reported as being cold hardy to U.S.D.A. Cold Hardiness Zone 4 (-20 to -30°F; -29 to -34°C) and Zone 3 (-30 to -40 °F; -34 to -40°C) with snow cover.



Hairy vetch is propagated by seed. 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 hairy vetch include cow vetch (*Vicia cracca*; native to Europe, Asia, and perhaps southeastern Canada, but also naturalized in Minnesota; very similar in appearance, except the stems and leaves are smooth or only slightly hairy), *Vicia americana* (American 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 japonicas* (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), and *Coronilla varia* (crown vetch; introduced and widely planted for erosion control; pink or pink and white flowers in round, crown-like clusters; lacks tendrils). Hairy vetch is generally more distinctly hairy than these species.

Box	Question	Answer	Outcome (i.e., Go to Box ?)
1	Is the plant species or genotype non-native?	Yes; hairy vetch (<i>Vicia villosa</i>) is not native to Minnesota; the species is native to Europe and Asia; 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.	
	A. Does the plant have toxic qualities that pose a significant risk to livestock, wildlife, or people?	No; some references indicate hairy vetch may be 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.	
	B. Does the plant cause significant financial losses associated with decreased yields, reduced 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.	

Box	Question	Answer	Outcome (i.e., Go to Box ?)
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; Florida appears to be the only state where the species is currently listed as invasive.	Go to Box 6
4	Are the plant's life history & growth requirements sufficiently understood?	In general, Yes, but unanswered questions remain; hairy vetch is a herbaceous annual, biennial, and occasionally perennial vine that grows on a variety of soils, especially sandy soils and primarily in disturbed habitats, in sun or partial shade; reproduces by seed.	
5	Gather and evaluate further information:	<i>Comments/Notes: Additional information about the potential significance of any potentially negative effects of hairy 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 Zone 3 with snowcover; reported as naturalized in all 50 states, including Minnesota, and parts of southern Canada including Manitoba and Ontario; according to EDDMapS, the species is present in more than half of the counties in Minnesota (primarily in the northeast, northcentral, and east central parts of the state, but also in other areas).	
	A. Is the plant, or a close relative, currently established in Minnesota?	Yes; hairy vetch is present in more than half of the counties in Minnesota.	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?		
	A. Does the plant reproduce by asexual/vegetative means?	No.	Go to Question C
	B. Are the asexual propagules effectively dispersed to new areas?		

Box	Question	Answer	Outcome (i.e., Go to Box ?)
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes (1000 seeds/square meter); 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?	<i>Yes; seeds are reported to have a high germination rate (>90% with scarification) and may remain viable in the soil for several years (5 years).</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	E. Is the species self-fertile?	<i>Yes; the species tends to outcross, but can be self-fertile; pollinated by insects and attractive to bees and butterflies.</i>	<i>Note: This information is supplemental and is not part of the decision tree path for this risk assessment.</i>
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes; 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>
	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>Hairy vetch 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

Box	Question	Answer	Outcome (i.e., Go to Box ?)
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; hairy vetch is reported to be toxic to livestock, but is commonly planted as a forage crop.	
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	Yes, but likely not a significant risk so No; although the species has been commonly planted as a forage and hay crop alone and with other species, some references indicate hairy vetch is toxic to livestock (more toxic than cow vetch, <i>Vicia cracca</i> ; seeds suggested as being the most 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 (likely more so than cow vetch, <i>Vicia cracca</i>), 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
	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

Box	Question	Answer	Outcome (i.e., Go to Box ?)
	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; organic vetch seed is sold nationwide by Johnny's Selected Seeds (Winslow, Maine).</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; hairy vetch (<i>Vicia villosa</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>
	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 hairy 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; the most widely planted species of vetch (<i>Vicia</i>) planted for these purposes.</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 ?)
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, but shouldn't be eaten.</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>
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	Voted 11 in favor and 0 opposed	NO REGULATORY ACTION – DO NOT LIST
	MDA Commissioner		

Box	Question	Answer	Outcome (i.e., Go to Box ?)
	File #: MDARA00045HVT		

References:

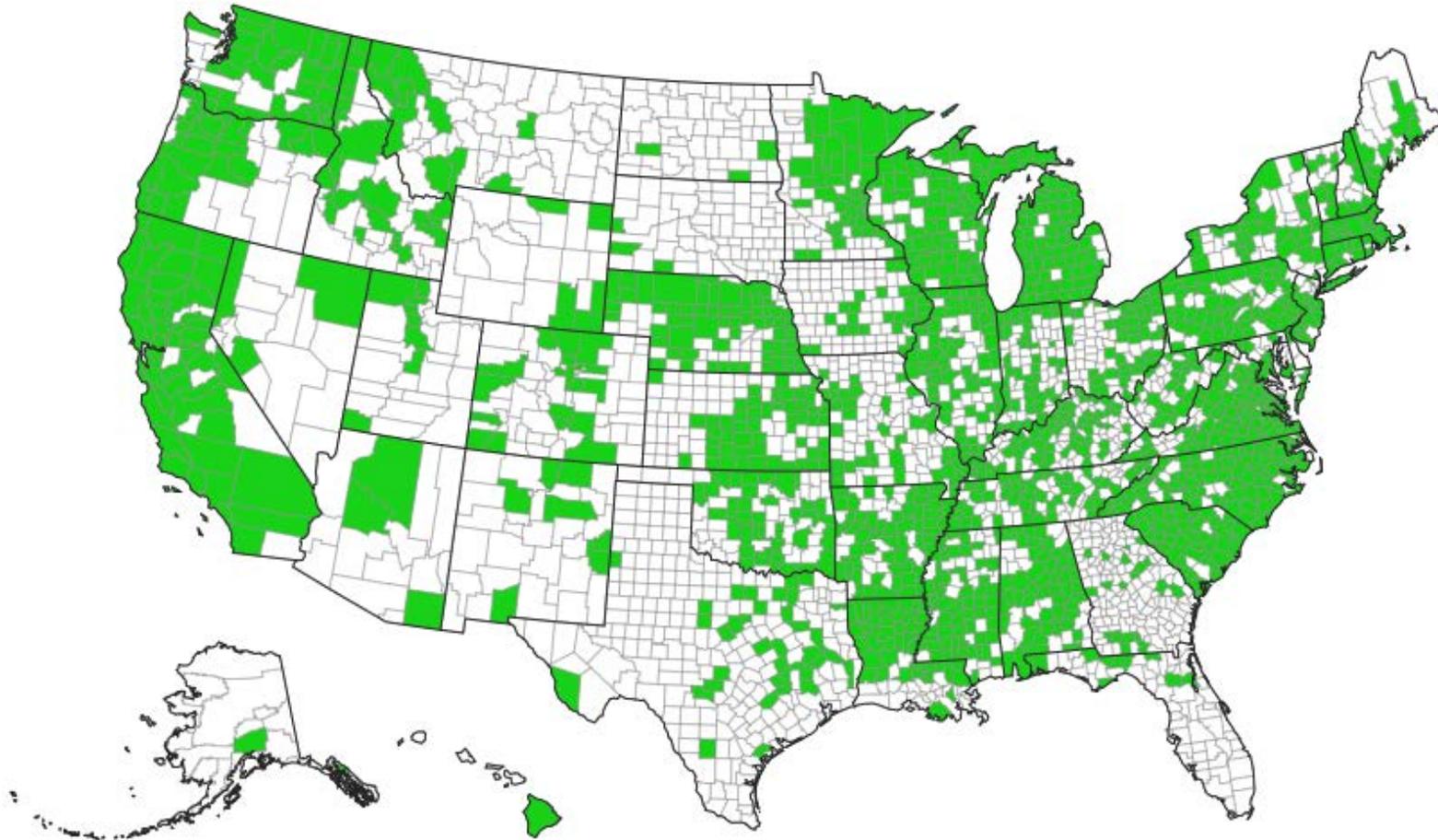
(List any literature, websites, and other publications)

1. Minnesota Department of Natural Resources. Cow Vetch and Hairy Vetch (*Vicia cracca*, *Vicia villosa*). <http://www.dnr.state.mn.us/invasives/terrestrialplants/herbaceous/cowvetch.html> - not a threat to healthy native prairies at this time, but can be a problem in prairie reconstructions and on disturbed sites.
2. USDA Forest Service. 2005. Hairy Vetch. http://na.fs.fed.us/fhp/invasive_plants/weeds/hairy-vetch.pdf
3. Early Detection & Distribution Map System (EDDMapS). 2014. The University of Georgia - Center for Invasive Species and Ecosystem Health. <http://www.eddmaps.org/>; <http://www.eddmaps.org/distribution/uscounty.cfm?sub=6614>
4. Undersander, D.J., N.J. Ehlke, A.R. Kaminski, J.D. Doll, and K.A. Kelling. Hairy Vetch. Alternative Field Crops Manual; University of Wisconsin Extension, University of Minnesota Center for Alternative Plant & Animal Products and Extension. <https://www.hort.purdue.edu/newcrop/afcm/vetch.html>
5. eXtension (www.extension.org). 2013. Hairy Vetch for Cover Cropping in Organic Farming. Adapted from: Clark, A. (ed.). 2007. Managing Cover Crops Profitably. 3rd Edition. National SARE Outreach Handbook Series Book 9. National Agricultural Laboratory, Beltsville, MD; available online at <http://www.sare.org/publications/covercrops.htm>. <http://www.extension.org/pages/18570/hairy-vetch-for-cover-cropping-in-organic-farming#.VbFNBVoo7IW> (Accessed July 14, 2015)
6. Aarssen, L.W., I.V. Hall, and K.I.N. Jensen. 1986. The Biology of Canadian Weeds. 76. *Vicia angustifolia* L., *V. cracca* L., *V. sativa* L., *V. tetrasperma* (L.) Schreb., and *V. villosa* Roth. Canadian Journal of Plant Science 66:711-737. <http://pubs.aic.ca/doi/pdf/10.4141/cjps86-092>
7. Smith, C. (editing by R.J. Burnham). 2013. *Vicia villosa*. CLIMBERS: Censusing Lianas in Mesic Biomes of Eastern Regions. University of Michigan. <http://climbers.lsa.umich.edu/?p=329>
8. Early Detection & Distribution Mapping System (EDDMaps). Hairy Vetch: *Vicia villosa* Roth. <http://www.eddmaps.org/distribution/uscounty.cfm?sub=6614>
9. Baldwin, K.R. and N.G. Creamer. 2005. Cover Crops for Organic Production Systems. Center for Environmental Farming Systems. Organic Production Training Series: 1-21. <http://content.ces.ncsu.edu/cover-crops-for-organic-farms.pdf>

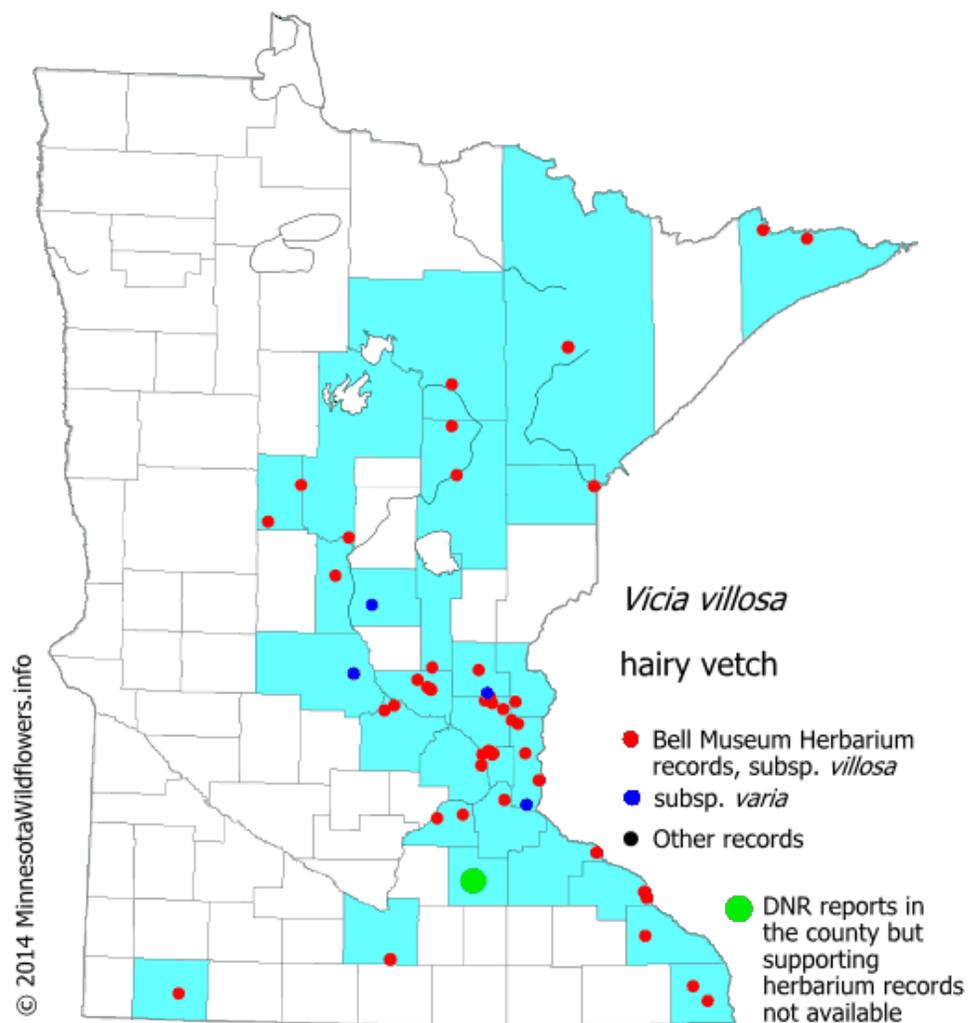
10. Owsley, M. 2011. Plant Fact Sheet for Hairy Vetch (*Vicia villosa*). USDA-Natural Resources Conservation Service, USDA NRCS. http://plants.usda.gov/factsheet/pdf/fs_vivi.pdf
11. University of California, Division of Agriculture and Natural Resources. ANR Cover Crop Database – Hairy Vetch. http://ucanr.org/sites/asi/db/covercrops.cfm?crop_id=21
12. Smart, J. 1979. Interspecific Hybridization in the Grain Legumes – A Review. *Economic Botany*, 33(3):329-337. http://www.agri.ankara.edu.tr/fcrops/1289_BAKLAGILLERDEMELEZLEME.pdf
13. Friends of the Wild Flower Garden, Inc. 2013. Plants of the Eloise Butler Wildflower Garden – Veiny Pea. <http://www.friendsofthewildflowergarden.org/pages/plants/veinypea.html>
14. Minnesota Wildflowers: A Field Guide to the Flora of Minnesota. *Vicia sativa* (Common Vetch). <https://www.minnesotawildflowers.info/flower/common-vetch>
15. Minnesota Wildflowers: A Field Guide to the Flora of Minnesota. *Vicia villosa* (Hairy Vetch). <https://www.minnesotawildflowers.info/flower/hairy-vetch>
16. Minnesota Wildflowers: A Field Guide to the Flora of Minnesota. *Vicia cracca* (Tufted Vetch). <https://www.minnesotawildflowers.info/flower/tufted-vetch>
17. Uva, R.H., J.C. Neal, and J.M. DiTomaso. 1997. *Weeds of the Northeast*. Cornell University Press, Ithaca, NY.
18. Heuzé V., G. Tran, F. Lebas, N. Edouard, and M. Lessire. 2015. Hairy Vetch (*Vicia villosa*). Feedipedia, a programme by INRA, CIRAD, AFZ and FAO. <http://www.feedipedia.org/node/238>
19. Invasive.org. Hairy Vetch - *Vicia villosa* Roth. Center for Invasive Species and Ecosystem health. <http://www.invasive.org/browse/subinfo.cfm?sub=6614#maps> (Accessed July 25, 2015)

<http://www.eddmaps.org/distribution/uscounty.cfm?sub=6614>

Vicia villosa (Minnesota county distributions mostly based on 1 to a few reports, but several based on between 10 and 41 reports and 106 reports for St Louis County; the two subspecies – *V. villosa* ssp. *varia* and *V. villosa* ssp. *villosa* – have only been reported in CA)



Vicia villosa - <https://www.minnesotawildflowers.info/udata/r9ndp23q/maps/vicvil.png>



Vicia villosa, known as the hairy vetch, fodder vetch or winter vetch, is a plant native to some of Europe and western Asia. It is a legume, grown as a forage crop, fodder crop, cover crop, and green manure. Although non-native, it occurs in all US states and is considered invasive by some states, such as Alaska, Florida, Georgia, Michigan, Minnesota, Oregon, and Washington state – as well as in Japan and some parts of Europe where it is not native. It is also found in most Canadian provinces. Few legumes match hairy vetch for spring residue production or nitrogen contribution. Widely adapted and winter hardy through Hardiness Zone 4 and into Zone 3 (with snow cover), hairy vetch is a top N provider in temperate and subtropical regions. The cover grows slowly in fall, but root development continues over winter. Growth quickens in spring, when hairy vetch becomes a sprawling vine up to 12 feet long. Field height rarely exceeds 3 feet unless the vetch is supported by another crop. Its abundant, viney biomass can be a benefit and a challenge. Common Name Common names are hairy vetch, sand vetch, winter vetch, and woolypod vetch (Duke, 1981). The species has also been termed wooly vetch (Hermann, 1960), Russian vetch, or Siberian vetch (Goar, 1934). Scientific Name *Vicia villosa* Roth (Duke, 1981); *Vicia villosa* and *Vicia dasycarpa* are now merged into *Vicia villosa* (Duke, 1981). Cultivar According to Duke (1981), *Vicia villosa* includes 'Madison Vetch,' 'Winter' vetch, and 'Hairy' vetch, and the "Dasycarpa" forms 'Auburn,' 'Oregon,' and 'Lana.' Hairy vetch is said to be unlike other vetches in its extreme winter hardiness (Madson, 1951); it is seldom, if ever, winter-killed in California (Goar, 1934) and is more cold-tolerant than crimson clover. (Hargrove, 1986).