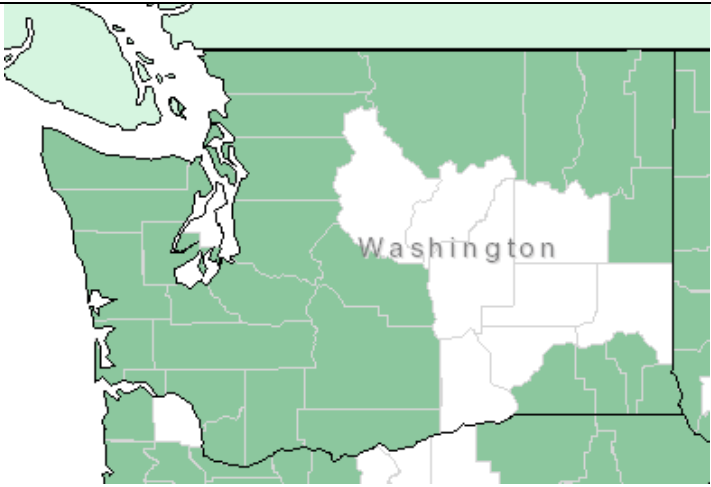
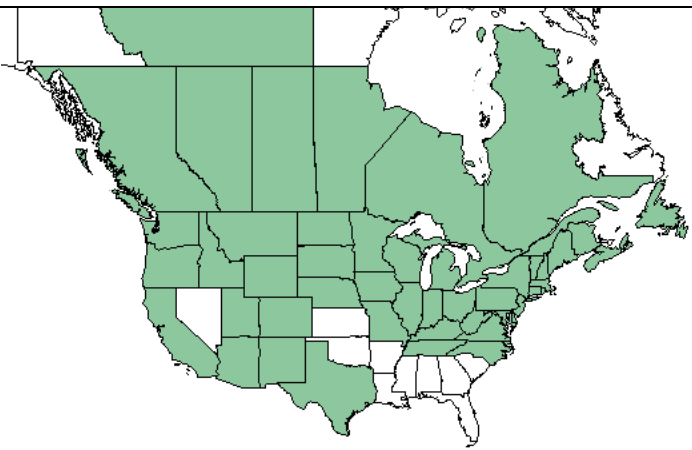


Plant Propagation Protocol for *Fragaria vesca*

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/FRVE.pdf>

TAXONOMY	
Plant Family	
Scientific Name	Rosaceae
Common Name	Rose family
Species Scientific Name	
Scientific Name	<i>Fragaria vesca</i> L.
Varieties	<i>Fragaria vesca</i> L. var. <i>americana</i> Porter <i>Fragaria vesca</i> L. var. <i>bracteata</i> (A. Heller) R.J. Davis <i>Fragaria vesca</i> L. var. <i>crinita</i> (Rydb.) C.L. Hitchc. <i>Fragaria vesca</i> L. var. <i>alba</i> (Ehrh.) Rydb.
Sub-species	<i>Fragaria vesca</i> L. ssp. <i>americana</i> (Porter) Staudt <i>Fragaria vesca</i> L. ssp. <i>bracteata</i> (A. Heller) Staudt <i>Fragaria vesca</i> L. ssp. <i>californica</i> (Cham. & Schltld.) Staudt <i>Fragaria vesca</i> L. ssp. <i>vesca</i>
Cultivar	None
Common Synonym(s)	None
Common Name(s)	Woodland strawberry, Woods strawberry, California strawberry
Species Code (as per USDA Plants database)	FRVE
GENERAL INFORMATION	
Geographical range	

	 <p>Distribution maps from the USDA Plants Database. ^[1]</p>
Ecological distribution	<ul style="list-style-type: none"> – Forests, woods – Chaparral – Stream banks – Meadows ^[2,3,4,5,6]
Climate and elevation range	Moist areas below 7000 m. across North America and Europe ^[2,3,4,5,6]
Local habitat and abundance	Widely abundant in moist woods and stream banks of low/mid elevation. ^[2]
Plant strategy type / successional stage	<ul style="list-style-type: none"> – Self-propagates via rhizomes and stolons – Invasive ground-covering behavior ^[6]
Plant characteristics	<ul style="list-style-type: none"> – Herbaceous, ground-covering perennial – Reproduces via seed and self-cloning – Leaves are serrate, basal, and pubescent. Leaflets appear in triplets. Petioles grow to 3-12 cm. – Flowers are perfect with 5 white petals, many pistils, and 20-15 stamens. – Fruit is a red, fleshy receptacle covered in achenes. ^[2,6,7]
PROPAGATION DETAILS	
Vegetative Propagation Method – Plugs ^[4,5,6]	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Container (plug)
Stock Type	2-4 inch pot
Time to Grow	3 months or less
Target Specifications	Plugs with well established roots.
Propagule Collection Instructions	Identify plants that have put out healthy runners and plantlets. Take 4-16 inch cuttings in spring, summer, or fall.
Propagule Processing/Propagule	Keep cuttings in a cool, moist place.

Characteristics	
Pre-Planting Propagule Treatments	Strike cuttings 1.5 inches deep in sheets of 1:1 perlite to vermiculite mixture.
Growing Area Preparation / Annual Practices for Perennial Crops	Grow cuttings in a greenhouse with a misting system. Keep plants well-watered.
Establishment Phase Details	After 90 days or less, transplant cuttings into individual 2-4 inch containers. Use standard potting mix. Cover roots and stems.
Length of Establishment Phase	90 days or less.
Active Growth Phase	None.
Length of Active Growth Phase	12 weeks.
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	Plugs may be stored in a shadehouse.
Length of Storage	Up to 4 months.
Guidelines for Outplanting / Performance on Typical Sites	Prepare an area with full sunlight and loose soil. When fall/winter rains begin, plant plugs 10 inches apart. Average transplant survival is around 85%. Plants may be fertilized lightly. <i>Fragaria vesca</i> can exhibit invasive ground-covering behavior; prune back runners regularly. Plant vigor will decline after 3-4 years.
Other Comments	
Vegetative Propagation Method – Bareroot ^[4]	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Bareroot plants; field-grown
Stock Type	Bareroot plants
Time to Grow	1 year
Target Specifications	Plants with well-established roots; 5 cm in height.
Propagule Collection Instructions	Plant healthy, mature individuals on a raised bed.
Propagule Processing/Propagule Characteristics	N/A
Pre-Planting Propagule Treatments	N/A
Growing Area Preparation / Annual Practices for Perennial Crops	The raised bed can contain equal parts of rotted manure, sand, and soil.
Establishment Phase Details	None.
Length of Establishment Phase	2 weeks.
Active Growth Phase	Water regularly. Keep soil moist.
Length of Active Growth Phase	12 weeks.
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	Harvest runners and plantlets after one year, in Spring or Fall. Cuttings can be immediately outplanted in a

	new raised bed or potted in containers for plugs (store in a shadehouse).
Length of Storage	4 months if potted for plugs.
Guidelines for Outplanting / Performance on Typical Sites	New plants must be outplanted on a new raised bed with snowcover.
Other Comments	
Propagation From Seed Method (Least Recommended) ^[3]	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	Container/tray
Time to Grow	3 months.
Target Specifications	Seedlings with well-established roots
Propagule Collection Instructions	Collect red fruits during mid-summer. Soak fruits in Dybvig seed cleaner and wash well. Strain seeds out with a screen.
Propagule Processing/Propagule Characteristics	Seeds can be stored for up to 3 years.
Pre-Planting Propagule Treatments	Seeds must be cold-moist stratified in media for a minimum of 85 days. A temperature of 21C is required for germination. Seeds will germinate in 2-3 weeks.
Growing Area Preparation / Annual Practices for Perennial Crops	None.
Establishment Phase Details	Keep seedlings indoors with moist soil.
Length of Establishment Phase	3-4 weeks.
Active Growth Phase	Keep seedlings indoors with moist soil.
Length of Active Growth Phase	12 weeks.
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	3-4 weeks after germination, seedlings may be up-planted into pots. Store plugs in a shadehouse or indoors if it is not consistently warm outside.
Length of Storage	4 months if up-planted into pots.
Guidelines for Outplanting / Performance on Typical Sites	Outplant only after winter has passed and outside soil is consistently warm. Plant 10 inches apart.
Other Comments	<i>Fragaria vesca</i> can be difficult to grow from seed. It is therefore recommended that vegetative propagation methods be used instead.
INFORMATION SOURCES	
References	<p>The original 2006 protocol for <i>Fragaria vesca</i> is attached below.</p> <ol style="list-style-type: none"> 1. USDA Plants Database. "Plants Profile for <i>Fragaria Vesca</i> (woodland Strawberry)." Web. 23 Apr. 2016.

	<ol style="list-style-type: none"> 2. Burke Museum. "Fragaria Vesca." <i>WTU Herbarium Collection</i>. Web. 23 Apr. 2016. 3. Luna, Tara. "Fragaria (vesca)." <i>Native Plant Network</i>. Web. 23 Apr. 2016. Seed propagation 4. Luna, Tara. "Fragaria (vesca)." <i>Native Plant Network</i>. Web. 23 Apr. 2016. Vegetative propagation (bareroot) 5. Young, Betty. "Fragaria (vesca)." <i>Native Plant Network</i>. Web. 23 Apr. 2016. Vegetative propagation (plugs) 6. USDA NRCS National Plant Data Center. "Wood Strawberry." Web. 23 Apr. 2016. 7. Hitchcock, C. Leo, and Arthur Cronquist. <i>Flora of the Pacific Northwest; an Illustrated Manual</i>. Seattle: U of Washington, 1973. Print. 8. Dumroese, R. Kasten., Tara Luna, and Thomas D. Landis. <i>Nursery Manual for Native Plants: A Guide for Tribal Nurseries</i>. Vol. 1. Washington, D.C.: U.S. Dept. of Agriculture, Forest Service, 2009. Print.
Other Sources Consulted	<ol style="list-style-type: none"> 1) Shulaev, Vladimir, et al. "The Genome of Woodland Strawberry (<i>Fragaria Vesca</i>).<i>" Nature Genetics</i> 43 (2010): 109-16. 26 Dec. 2010. Web. 23 Apr. 2016. 2) US Forest Service. "Fragaria Vesca." Web. 25 Apr. 2016.
Protocol Author	Kelly Ann Lee
Date Protocol Created or Updated	April 26, 2016

Plant Data Sheet



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http://www.wnps.org/plants/fragaria_vesca.html

<http://runeberg.org/nordflor/pics/301.jpg>

Species: *Fragaria vesca*, woodland strawberry

Range: North America and Europe (1)

Climate, elevation: low to subalpine areas, south of 55°N (4)

Local occurrence: Iron Goat trail, near Stevens Pass (1)

Habitat preferences: Clearings or open forests (4)

Plant strategy type/successional stage: low-growing perennial with long stolons (5)

Associated species: Cedar/Hemlock forest margin(2)

May be collected as: Seeds , stolons with plantlets, or divided plants (2)

Collection restrictions or guidelines: Divide plants in spring or fall. Seed is collected when

the fruits turn red in mid summer. Seed can be processed by maceration of the fruit using a Dyb-vig cleaner, followed by washing and screening.(2)

Seed germination: Seeds must be stratified for 85 days to break physiological dormancy. (2) Sow indoors 2 months before last frost date. Press into the soil firmly. Cover with paper to exclude light. Keep moist. Germination will occur in 2-3 weeks at an optimum soil temperature of 65-75°F. Up-pot at 3-4 weeks and transplant outside after the danger of frost has passed or direct seed outside as soon as the soil warms. (6)

Seed life: 2 years (6)

Recommended seed storage conditions: Unknown.

Propagation recommendations: Seeds or cuttings

Soil or medium requirements: Prefers a fertile, well-drained, moisture retentive soil(3) or moist sterile seeding mix (6)

Installation form: Bare root or in 2 or 4" pots (2)

Recommended planting density: 8-12" apart (6).

Care requirements after installed: Water weekly at least in first year after installation (7).

Normal rate of growth or spread; lifespan: Establishes quickly, but individual plants can lose vigor after three years (3).

Sources cited:

1. Washington Native Plant Society:

http://www.wnps.org/plants/fragaria_vesca.html

http://www.wnps.org/plant_lists/counties/king/documents/IronGoatTrail.doc

2. Native Plant Network: http://www.nativeplantnetwork.org/network/view.asp?protocol_id=212

3. Plants for a Future database: <http://www.pfaf.org/database/plants.php?Fragaria+vesca+'Semperflorens'>

4. *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia &*

Alaska. Jim Pojar and Andy Mackinnon. (Vancouver, BC: Lone Pine Publishing, 1994)

5. borealforest.org: <http://www.borealforest.org/herbs/herb14.htm>

6. Territorial Seed Company: [http://www.territorial-seed.com/stores/1/Strawberry_Seed_Culture_Infor_W73C28.cfm?UserID=16105573&jsessionid=8c305d0d5e14\\$2B\\$23Lt](http://www.territorial-seed.com/stores/1/Strawberry_Seed_Culture_Infor_W73C28.cfm?UserID=16105573&jsessionid=8c305d0d5e14$2B$23Lt)

7. BackyardGardener.com: http://www.backyardgardener.com/plantname/pda_2e00.html

Data compiled by Deborah Brown, May 7, 2006