

Plant Propagation Protocol for *Iliamna rivularis*
ESRM 412 – Native Plant Production



Image Source: https://www.wildflower.org/gallery/result.php?id_image=53163

TAXONOMY	
Plant Family	
Scientific Name	Malvaceae
Common Name	Mallow Family
Species Scientific Name	
Scientific Name	<i>Iliamna rivularis</i> (Douglas x Hook.) Greene
Varieties	<i>Iliamna rivularis</i> var. <i>diversa</i> [2] <i>Iliamna rivularis</i> var. <i>rivularis</i> [2]
Sub-Species	None
Cultivar	None
Common Synonyms [2]	<i>Iliamna acerifolia</i> (Nutt. ex Torr. & A. Gray) Greene <i>Iliamna corei</i> Sherff <i>Iliamna remota</i> Greene <i>Phymosia remota</i> (Greene) Britton <i>Sphaeralcea rivularis</i> (Douglas ex Hook.) Torr.
Common Names	Streambank wild hollyhock [7] Mountain hollyhock [3] Streambank globemallow [3]

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Species Code	ILRI [2]
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GENERAL INFORMATION

Geographical Range

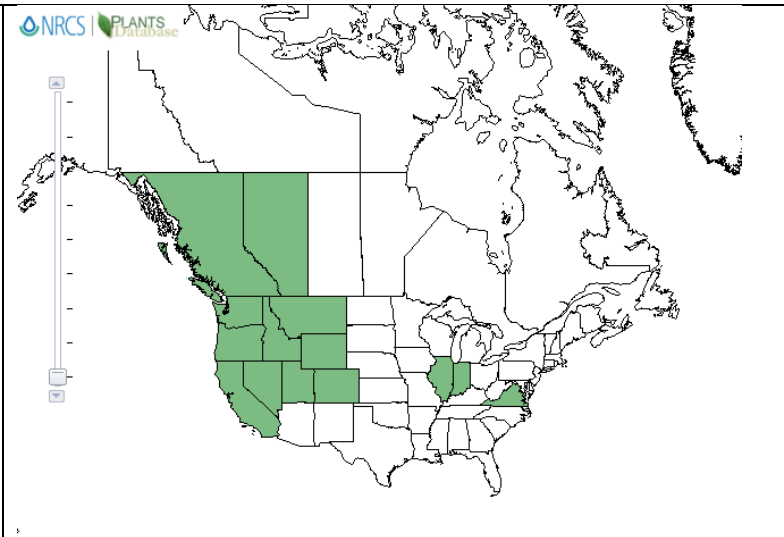


Figure 1: Distribution in North America [2]

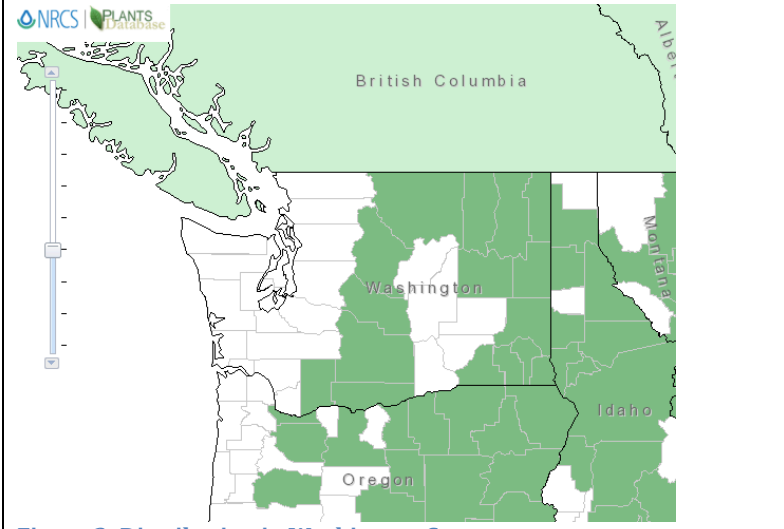


Figure 2: Distribution in Washington State [2]

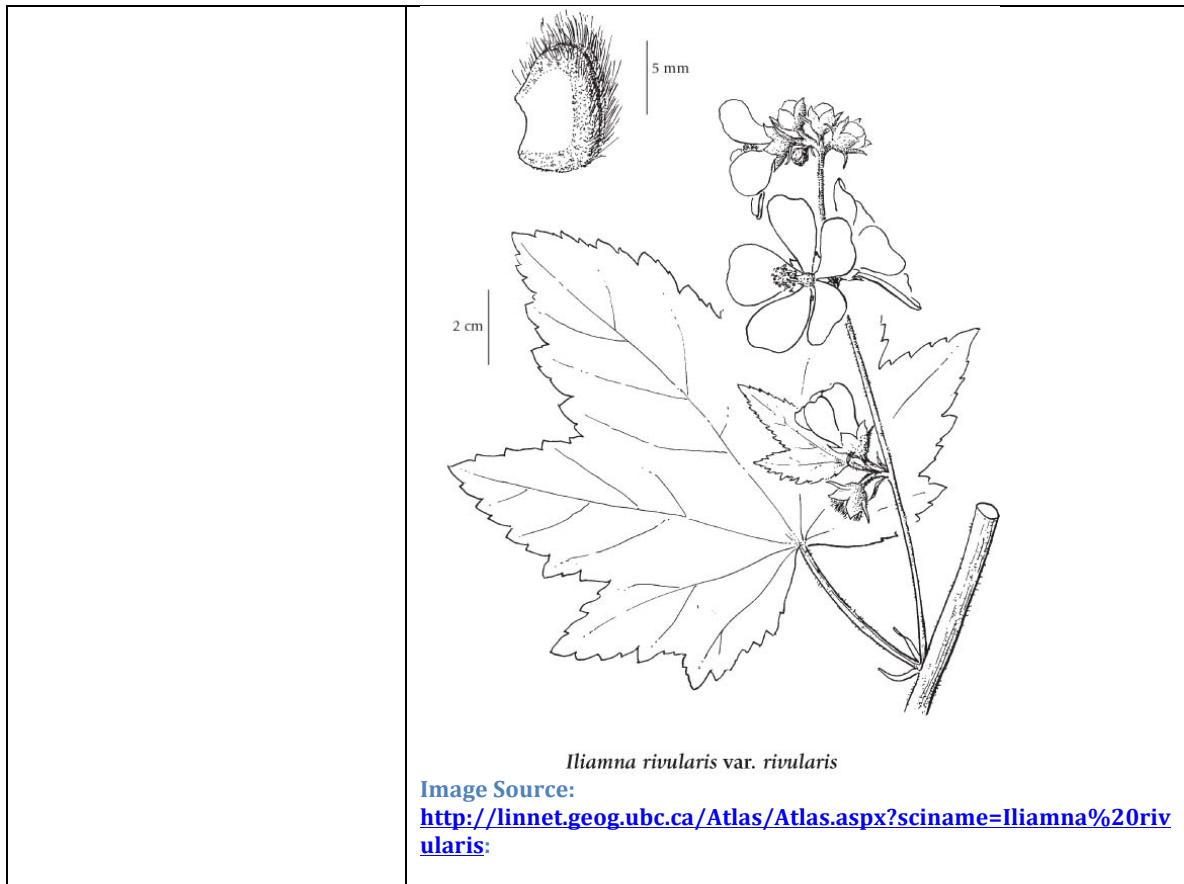
Wild hollyhock occurs mostly east of the Cascade Range from Alberta and British Columbia to Oregon, east to Montana, and south to Colorado [3]

Ecological Distribution

Wild hollyhock commonly grows on forested slopes, in meadows, along streambanks, and in disturbed areas It occurs on mesic sites in deep, moist, but well-drained soil. [3]

“Moist to mesic disturbed areas, streambanks and meadows in the steppe and lower montane zones; infrequent in S BC east of the Coast-Cascade Mountains;

	S to CO and OR.” [4]
Climate and Elevation Range	<p>It has been found to 11,500 feet (3,490 m) elevation in Colorado and 9,570 feet (2900 m) elevation in Utah. [3]</p> <p>“The climate type for this species, as reported in the: "British Columbia plant species codes and selected attributes. Version 6 Database" (Meidinger et al. 2008), is not evaluated, unknown or variable.” [4]</p>
Local Habitat and Abundance	<p>East side of cascades near foothills and forest openings around mid elevations [5].</p> <p><i>I. rivularis</i> is the most widespread of the 8 species of the <i>Iliamna</i> Greene genus, and is most common in Utah. [10].</p>
Plant Strategy Type/ Successional Stage	<p><i>I. rivularis</i> is an early seral species. It becomes abundant following disturbance such as clearcutting, broadcast burning, and wildfire. [3]</p> <p>“It survives even severe fire by germination of dormant, fire-activated seeds. It flowers during early postfire stages” [3]</p>
Plant Characteristic	<p><i>Iliamna rivularis</i> is a perennial herb. Its stem is erect and branched, and reaches .5 to 2 meters. The stem is covered in short, stiff hairs.</p> <p>Its alternate leaves are 5-15cm long. Leaves are triangular – ovate. The have 3-7 triangular lobes, and are also covered in short, stiff hairs. [9]</p> <p><i>I. rivulari</i> has abundant flowering. Inflorescence is single, auxiliary flowers on a short base. Flowers are pink to pink/salmon colored. [8]</p> <p>The fruit are carples, which are 7-8 mm long. Each carple is very hairy, and contains 2-4 seeds. [4]</p>



PROPOGATION DETAILS	
Ecotype	Forest opening, Walton Ranger Station, Glacier National Park, MT. [6]
Propagation Method	Seed
Product Type	Container (Plug)
Stock Type	164 ml conetainers
Time to Grow	5 Months
Target Specifications	6 to 10 true leaves Height: 30 cm Root System: Firm plug in container
Propagule Collection	“Seeds are hand collected in late August when capsules turn brown and begin to dehisce. Mature seed color is brown. Seed capsules are collected in paper bags and kept in drying shed prior to cleaning.” [6]
Propagule Processing	“Seeds are cleaned with a thresher and screened. Seed longevity is at least 10 years under dry cool storage conditions at 3 to 5 C and low relative humidity.” [6] Seeds have physical-physiological dormancy.
Pre-Planting Treatments	Scarification: Seeds should be scarified in a 5 to 10 second bath of hot water. They should then be transferred

	<p>to cold water to imbibe overnight.</p> <p>“Seeds are placed in fine mesh bags in moist peat moss in ventilated containers at 3 C for a 30 to 60 day cold, moist stratification.” [6]</p>
Growing Area/ Preparation	<p>Sowing Method: Direct Seedling. Seedlings should be covered with medium.</p> <p>Growing media: 6:1:1- milled sphagnum peat, perlite, and vermiculite with Osmocote controlled release fertilizer and Micromax fertilizer at the rate of 1 gram of Osmocote and 0.20 gram of Micromax per 172 ml container. [6]</p> <p>Greenhouse Temperature: 21 to 25 degrees C during day, and 16 to 18 degrees C at night. [6]</p> <p>Irrigation: Hand water seedlings in greenhouse until about mid-May. Seedlings are then moved outdoors for the remainder of their growing season, where they are watered with Rainbird automatic irrigation. [6]</p>
Establishment Phase	<p>Seedlings should begin to emerge 7 to 10 days following sowing. Following establishment, seeds should be thinned after two weeks. Seedlings will produce rapid shoot development within the two weeks. Due to large surface area of the leaves, seedlings will need to be spaced apart to receive proper irrigation. [6]</p> <p>“These seeds germinate rapidly depending on species and origin. If germination does not occur after 3–4 weeks a cooling period of 2–4 weeks is recommended.” [8]</p>
Length of Establishment	4 Weeks
Active Growth Phase	<p>Plants should be fertilized weekly.</p> <p>Fertilizer is a 13:13:13 liquid NPK at 100 ppm. during this stage, and should be kept inside a greenhouse.</p> <p>During late spring, plants are moved outside to continue growth during this phase.</p> <p>Once moved outside, seeds should be potted in 1-gallon containers. [6]</p>
Length of Active Growth Phase	12 weeks
Hardening Phase	<p>Plants are outside during this phase.</p> <p>In August and September, seeds should be fertilized with 10-20-20 liquid NPK at 200 ppm.</p> <p>During September and October, irrigation should be gradually reduced. The last irrigation should occur in October prior to winterization. [6]</p>

Length of Hardening Phase	8 weeks
Harvesting, Storage, and Shipping	“Total Time To Harvest:7 months Harvest Date: July Storage Conditions: Overwinter in outdoor nursery under insulating foam and snow cover.” [6]
Length of Storage	5 Months
Guidance for Outplanting	Plants begin flowering 8 weeks after snowmelt.[6] <i>I. rivularis</i> has deeply spreading roots, and should be outplanted in moist, well drained soils. It does well in areas that often burn, as wildfires are often needed for seed scarification for reproduction. [3] Frequent fertilization is necessary, because <i>I. rivularis</i> depletes nutrients from the soil fairly quickly. [6]
Other Comments	Sandpaper scarification is not an effective method. Hot water baths are the most effective scarification method for the seeds. Hot water baths more closely resemble wildfire scarification than sandpaper does. Hot water baths are also the most effective way to yield uniform scarification on the seed. [6]

INFORMATION SOURCES

References	<ol style="list-style-type: none"> 1. Iliamna rivularis. (n.d.). Retrieved from https://www.wildflower.org/gallery/result.php?id_image=53163 2. Plants Profile for Iliamna rivularis (streambank holly). (n.d.). Retrieved from https://plants.usda.gov/core/profile?symbol=ILRI 3. SPECIES: Iliamna rivularis. (n.d.). Retrieved from https://www.fs.fed.us/database/feis/plants/forb/iliriv/all.html 4. Flora BC: Electronic Atlas of the Flora of British Columbia. (n.d.). Retrieved from http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Iliamna rivularis 5. WTU Herbarium, Burke Museum, & University of Washington. (n.d.). Iliamna rivularis streambank globemallow. Retrieved from http://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Iliamna rivularis 6. Luna, Tara; Evans, Jeff; Wick, Dale. 2008.
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	<p>Propagation protocol for production of Container (plug) <i>Iliamna rivularis</i> var. <i>rivularis</i> (Dougl.) Greene plants 164 ml conetainers; USDI NPS - Glacier National Park West Glacier, Montana. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2019/05/29). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources.</p> <p>7. <i>Iliamna rivularis</i> STREAMBANK WILD HOLLYHOCK. (2019). Retrieved from http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=28939</p> <p>8. ILIAMNA rivularis. (n.d.). Retrieved from https://www.jelitto.com/Seed/Perennials/ILIAMNA rivularis Portion s.html</p> <p>9. <i>Iliamna rivularis</i> Flora of North America. (n.d.). Retrieved from http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250101064</p> <p>10. Southwest, T. A. (n.d.). <i>Iliamna Rivularis</i>, Streambank Globemallow. Retrieved from https://www.americansouthwest.net/plants/wildflowers/iliamna-rivularis.html</p>
Other Sources	<p>11. WTU Herbarium, Burke Museum, & University of Washington. (n.d.). <i>Iliamna globemallow</i>. Retrieved from http://biology.burke.washington.edu/herbarium/imagecollection/browse.php?Genus=Iliamna</p> <p>12. <i>Iliamna rivularis</i> var. <i>diversa</i>. (2019). Retrieved from https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=195651#null</p>
Protocol Author	Dylana Guth
Date Protocol Updated	May 29, 2019



Species (common name, Latin name)

Streambank Hollyhock, Mountain Hollyhock, Streambank Globemallow;
Iliamna rivularis

Range

Wild hollyhock occurs mostly east of the Cascade Range from Alberta and British Columbia to Oregon, east to Montana, and south to Colorado (1)

Climate, elevation

Wild hollyhock commonly grows on forested slopes, in meadows, along streambanks, and in disturbed areas. It occurs on mesic sites in deep, moist, but well-drained soil. It has been found to 11,500 feet (3,490 m)

elevation in Colorado and 9,570 feet (2900 m) elevation in Utah. (1)

Local occurrence

East side of cascades near foothills and forest openings around mid elevations (2)

Habitat preferences

I. rivularis occurs on moist but well drained soils, it is common in burns and disturbed sites and is considered to be shade intolerant and flowers profusely in the sun. (3)

Plant strategy type/successional stage

rivularis is an early seral species. It becomes abundant following disturbance such as clearcutting, broadcast burning, and wildfire. (1)

Associated species

Other plants in the Hollyhock family.

May be collected as: (seed, layered, divisions, etc.)

Seed

Collection restrictions or guidelines

Seeds are hand collected in late August when capsules turn brown and begin to dehisce. Mature seed color is brown. Seed capsules are collected in paper bags and kept in drying shed prior to cleaning. (3)

Seed germination

Seeds are scarified in a brief, 5 to 10 second hot water bath and immediately transferred to cold water and imbibe overnight. Seeds are placed in fine mesh bags in moist peat moss in ventilated containers at 3C for a 30 day cold moist stratification. (3)

Seed life

Seed longevity is at least 10 years under dry cool storage conditions at 3 to 5 C and low relative humidity.(3) Wild hollyhock seeds remain viable for at least a few hundred years (1)

Recommended seed storage conditions

Dry cool storage conditions.

Propagation recommendations

Seed seems to be the easiest way to propagate Hollyhocks.

Soil or medium requirements (inoculum necessary?)

It occurs on mesic sites in deep, moist, but well-drained soil. In greenhouse conditions growing media used is 70% 6:1:1 milled sphagnum peat, perlite, and vermiculite and 30% sand.

Installation form (form, potential for successful outcomes, cost)

Seeds do seem to be considered difficult to germinate.

Care requirements after installed

Seedlings are uprooted into 1 gallon containers in late spring. Irrigate in morning until the pots are leached and irrigation is gradually reduced in September and October. Plants were given one final irrigation prior to winterization (3)

Normal rate of growth or spread; lifespan

Total Time To Harvest: 7 months (3)

Sources cited

1. Matthews, Robin F. 1993. *Iliamna rivularis*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/>
2. University of Washington Herbarium, 6/3/05 (<http://www.washington.edu/burkemuseum/collections/herbarium/index.php>)

3. Wick, Dale; Evans, Jeff; Luna, Tara. 2004. Propagation protocol for production of container *Iliamna rivularis* var. *rivularis* (Dougl.) Greene plants (116 ml conetainers); Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 6 June 2005). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

Data compiled by (student name and date)

Pat Kendzierski 6/3/05