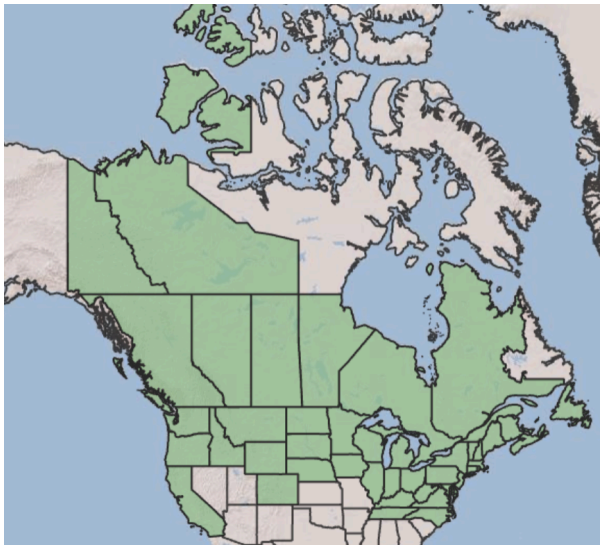
Plant Propagation Protocol for *Antennaria howellii*

ESRM 412 – Native Plant Production

URL: https://courses.washington.edu/esrm412/protocols/2026/ANHO.pdf

North America Distribution:

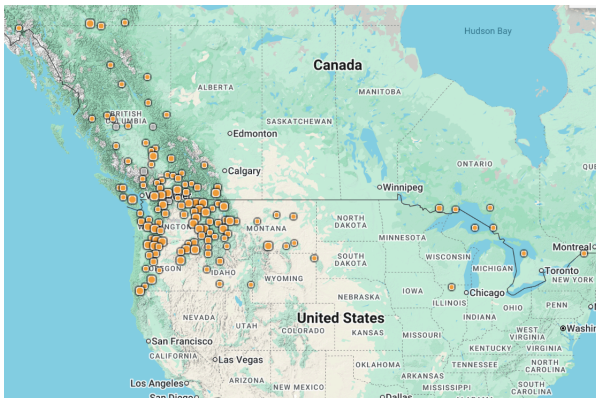


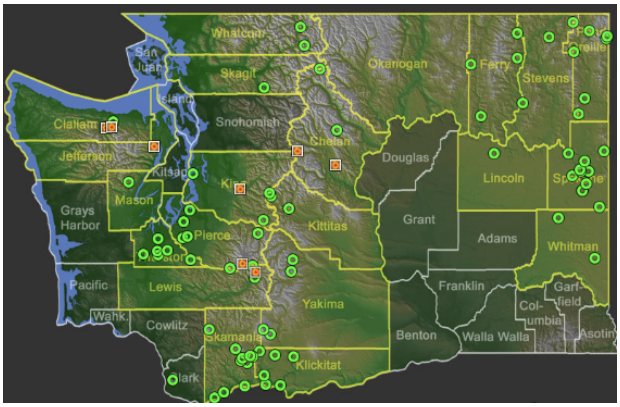
PNW Distribution:

Source: USDA PLANTS Database[13]

North American Observation map[9] (Circles represent areas where one or more specimen have been found [shown left]

Washington Observations[1] (Squares identify locations where photos were taken, circles represent specimen sightings) [shown right]





Source: Pacific Northwest Herbaria,[9] Burke Herbarium Image Collection[1]

TAXONOMY	
Plant Family	
Scientific Name	Asteraceae / Compositae[13]
Common Name	Aster/Sunflower/Daisy/Composite family[2]
Species Scientific Name	
Scientific Name	*Antennaria howellii* Greene[13]
Varieties	

Sub-species	*Antennaria howellii* Greene ssp. *canadensis* (Greene) Bayer[13] *Antennaria howellii* Greene ssp. *howellii*[13] *Antennaria howellii* Greene ssp. *neodioica* (Greene) Bayer[13] *Antennaria howellii* Greene ssp. *petaloidea* (Fernald) Bayer[13]
Cultivar	
Common Synonym(s)	
Common Name(s)	Howell's pussytoes[13]
Species Code (as per USDA Plants database)	ANHO[13]
GENERAL INFORMATION	
Geographical range	Native to both sides of the Cascades in Washington, Yukon Territory to California, east towards the Rocky Mountains, the northern Great Plains, the Great Lakes region, and northeastern North America.[1] Areas in North America include: ● USA: CA , CO , CT , DC , DE , IA , ID , IL , IN , KY , MA , MD , ME , MI , MN , MT , NC , ND , NE , NH , NJ , NY , OH , OR , PA , RI , SD , TN , VA , VT , WA , WI , WV , WY ● Canada: AB , BC , MB , NB , NL , NS , NT , ON , PE , QC , SK , YT [3] Distribution maps for North America and PNW above.
Ecological distribution	Grows in rocky or sandy slopes, dry to moist grasslands, and forest openings.[1] *Antennaria howellii* Greene ssp. *petaloidea* (Fernald) Bayer grows in open woodlands, fine shale talus slopes, dry and exposed roadsides, and fields above thin soils.[8] Human disturbed habitats, cliffs, ledges, meadows, and fields, and woodlands . Tolerates poor quality soils.[6]
Climate and elevation range	Areas with low moisture, high sun exposure, and dry soils.[3] Drought tolerant once established, tolerates partial shade.[11]

	Found across Eco Zones 3-9.[7] Plant Hardiness Zones 2a - 5b.[12] Low-mid elevations (0 - ~2000m).[1] Distribution and observation maps for Washington and North America shown above.
Local habitat and abundance	Perennial herb that propagates rapidly so likely to be found in abundance where found.[1]
Plant strategy type / successional stage	Early successional pioneer species that rapidly colonizes open & disturbed areas and persist in stable exposed environments.[1, 8]
Plant characteristics	A vascular perennial for/herb (herbaceous dicot)[13] Its basal leaves are spatulate, oblanceolate/oblovate, undersides are white and have soft hairs, the surface of leaves green and smooth, and grow up to 2cm. The few cauline leaves are linear and lack a petiole. The leaf arrangement of the leaves is alternate.[1] Howell's pussytoe flowers have narrow and pointed bracts, with 3 to 15 flower heads in a cluster per inflorescence. Male and female flowers occur separately on distinct individuals. Flower heads are approximately three-eighths of an inch long and resemble shaving brushes, with each head surrounded by phyllaries. Each of these series of bracts has a green to reddish and firm base with white and petal-like tips. Individual flowers are 3.5 to 7 mm and involucre is 6 to 11 mm. Male plants are uncommon in the Pacific Northwest since the species primarily produces asexually via apomixis during which no male plants are producex. [1, 4]


Images of flowers and leaves above.[1]

The fruit of this species is a brown seed, 0.8 to 2mm in length with a pappus attached to carry it off in the wind. Fruits are produced even in the absence of male plants and seeds are fertile, genetically identical clones of the mother plant. The pappus of these flowers is longer than the stigmas. [1, 4]

Stolons allow for horizontal growth and are cord-like, have few leaves, and end in rosettes with defined petioles. [6]

Flowering occurs in May through July.[1]

Host plant of American Painted Lady Butterfly caterpillars[12]

PROPAGATION DETAILS: FROM SEED	
Comment	This propagation information is taken from the specific subspecies *Antenneria howellii* ssp. *Petaloidea*, which also lives in areas with high sun exposure, dry soils, and low moisture. [5]
Ecotype	Lodgepole pine forest, Camas region, 1000m elevation in Glacier National Park.[5]
Propagation Goal	Plants[5]
Propagation Method	Seed[5]
Product Type	Container (plug)[5]
Stock Type	172ml container[5]
Time to Grow	4 months[5]
Target Specifications	3 cm tall, 10 - 15 true leaves. Established root system in a 10 cubic inch container.[5]
Propagule Collection Instructions	Seeds collected when achenes are easily separated from the receptacle. Seeds are dark grey at full maturity. Collect seeds in paper bags and keep in a well ventilated drying shed prior to cleaning.[5]
Propagule Processing/Propagule Characteristics	Seeds can be cleaned using a hammermill and run over with an office clipper. Seed longevity is up to 5 years when stored in sealed containers at 1 degrees celsius. Dormancy is classified as non dormant, and seeds have: a density of 14,520,000 seeds per kg, 100% purity, and 80-90% germination.[5]
Pre-Planting Propagule Treatments	None[5]
Growing Area Preparation / Annual Practices for Perennial Crops	Greenhouse or outdoor growing facility. Sow seeds directly into the surface of soil, seedlings require light to germinate. “Use 6:1:1 milled sphagnum peat, perlite, and vermiculite with Osmocote controlled release fertilizer (13N:13P2O5:13K2O; 8 to 9 month release rate at 21C) and Micromax fertilizer (12%S, 0.1%B, 0.5%Cu, 12%Fe, 2.5%Mn, 0.05%Mo, 1%Zn) at the rate of 1 gram of Osmocote and 0.20 gram of Micromax per 172 ml container” as a growing medium. Containers should be filled and sown in late fall for outdoor nurseries and just before sowing in a greenhouse. Irrigate thoroughly following sowing. [5]
Establishment Phase Details	Seedlings appear to germinate more slowly than many other forb species. Wide fluctuations in temperature may increase germination percentages by directly

	growing in outdoor nurseries. Thin following the appearance of true leaves.[5]
Length of Establishment Phase	4 weeks[5]
Active Growth Phase	Once established, plants develop a spike in shoot and root growth 2 to 4 weeks after germination. Plants should be fertilized with 20-20-20 liquid NPK fertilizer at 100pp bi-weekly during the growing season. Plants form mats and quickly fill containers, and can be produced 8 weeks after germination.[5]
Length of Active Growth Phase	8 weeks[5]
Hardening Phase	Fertilize plants with 10-20-20 liquid NPK fertilizer in early fall, leach pots with water, and gradually lower irrigation from September through October, frequency and amount not specified.[5]
Length of Hardening Phase	4 weeks[5]
Harvesting, Storage and Shipping	It takes 4 months to harvest. Harvesting should occur in July, and plants should be overwintered in an outdoor nursery under insulating foam cover and snow.[5]
Length of Storage	5 months[5]
Guidelines for Outplanting / Performance on Typical Sites	Transplant plants at similar depth as harvested plants, with at least 12 inches to account for spread, directly in ground or in pot.[10] Transplanted seedlings are likely to flower in the first growing season following being transplanted in between April and July.[12]
Other Comments	Seeds require light for germination. If direct seeding onto restoration sites, seeds must be rolled or pressed into prepared seed beds. Raking or burying seeds will result in poor establishment.[5]
PROPAGATION DETAILS: VEGETATIVE	
Ecotype	N/A
Propagation Goal	Plant
Propagation Method	Vegetative (division)
Product Type	Bareroot Container (plug)
Stock Type	N/A
Time to Grow	N/A
Target Specifications	Well established root system with at least one growing point per plant.

Propagule Collection Instructions	Vegetative propagules are best collected from division during Spring or Autumn when the plant is actively growing. Dig around the mother plant to loosen soil and carefully remove the plant. Separate plant root system into smaller sections, with at least one shoot per section (rhizome and root mass unspecified).[10]
Propagule Processing/Propagule Characteristics	Plant divisions in fresh soil at the same depth as prior to division.[10]
Pre-Planting Propagule Treatments	Propagule taken from live plants and directly transplanted into soil.[10]
Growing Area Preparation / Annual Practices for Perennial Crops	Prepare well drained, rocky/sandy soils for transplanting.[1,6]
Establishment Phase Details	N/A
Length of Establishment Phase	N/A
Active Growth Phase	Once established, plants develop a spike in shoot and root growth 2 to 4 weeks after germination. Plants should be fertilized with 20-20-20 liquid NPK fertilizer at 100pp bi-weekly during the growing season. Plants form mats and quickly fill containers, and can be produced 8 weeks after germination.[5]
Length of Active Growth Phase	8 weeks[5]
Hardening Phase	For plants transplanted in greenhouse, acclimation must take place. Fertilize plants with 10-20-20 liquid NPK fertilizer in early fall, leach pots with water, and gradually lower irrigation from September through October.[5]
Length of Hardening Phase	4 weeks[5]
Harvesting, Storage and Shipping	It takes 4 weeks to harden transplanted plants. Harvesting should occur in July, and plants should be overwintered in an outdoor nursery under insulating foam cover and snow.[5]
Length of Storage	5 months[5]
Guidelines for Outplanting / Performance on Typical Sites	Transplant plants at similar depth as harvested plants, with at least 12 inches to account for spread, directly in ground.[10] Transplanted plants are likely to flower in the first growing season following being transplanted, in between April and July.[12]
Other Comments	N/A
INFORMATION SOURCES	

References	[1]Burke Museum, University of Washington. (n.d.). Antennaria howellii — Burke Herbarium Image Collection. https://burkeherbarium.org/imagecollection [2]GBIF Backbone Taxonomy. (n.d.). *Antennaria howellii* Greene. GBIF. https://www.gbif.org/species/113579929 [3]Lady Bird Johnson Wildflower Center. (n.d.). *Antennaria howellii* Greene. Native Plant Information Network. https://www.wildflower.org/plants Luna, Tara; Evans, Jeff; Wick, Dale; Hosokawa, Joy. 2008. Propagation protocol for production of Container (plug) *Antennaria howellii* (Fern.) Bayer. plants 172 ml container; USDI NPS - Glacier National Park West Glacier, Montana. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2026/06/08). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=asteraceae-antennaria-14 [4]Minnesota Wildflowers. (n.d.). Howells Pussytoes (*Antennaria howellii*). Minnesota Wildflowers. https://www.minnesotawildflowers.info/flower/howells-pussytoes [5]Native Plant Network. (n.d.). Propagation protocol: *Antennaria howellii*. Native Plant Network. https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=asteraceae-antennaria-14 [6]Native Plant Trust. (n.d.). *Antennaria howellii*. GoBotany. https://gobotany.nativeplanttrust.org/species/antennaria/howellii/

	[7]Natural Edge / Watersheds Canada. (n.d.). Howells Pussytoes (*Antennaria howellii*). Natural Edge. https://naturaledge.watersheds.ca/plants/howells-pussytoes/ [8]New York Flora Atlas (University of South Florida). (n.d.). *Antennaria howellii*. New York Flora Atlas. https://dev.newyork.plantatlas.usf.edu/plant/species/7181 [9]Pacific Northwest Herbaria. (n.d.). *Antennaria howellii* specimen search results. Pacific Northwest Herbaria. https://www.pnwherbaria.org/data/results.php?DisplayAs=WebPage&ExcludeCultivated=Y&GroupBy=ungrouped&SortBy=Year&SortOrder=DESC&SearchAllHerbaria=Y&QueryCount=1&Genus1=antennaria&IncludeSynonyms1=Y&Species1=howellii&Zoom=4&Lat=55&Lng=-135&PolygonCount=0 [10]Propagate.One. (n.d.). How to propagate *Antennaria howellii*. Propagate.One. https://propagate.one/how-to-propagate-antennaria-howellii/ [11]South Dakota State University. (n.d.). *Antennaria howellii*. Open PRAIRIE Native Plant Profiles. https://openprairie.sdstate.edu/nativeplant/263/ [12]Toadshade Wildflower Farm. (n.d.). *Antennaria howellii*. Toadshade Wildflower Farm. https://www.toadshade.com/Antennaria-howellii.html [13]USDA, NRCS. (n.d.Antennaria howellii, Howell's Pussytoes at Toadshade Wildflower Farm). *Antennaria howellii* Greene. USDA PLANTS Database. https://plants.sc.egov.usda.gov/plant-profile/ANHO

Other Sources Consulted	Flora of North America Editorial Committee. (n.d.). *Antennaria howellii* Greene. Flora of North America. Retrieved from http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=101977
Protocol Author	William Fitzgerald
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