

**Plant Propagation Protocol for *Peraphyllum ramosissimum***

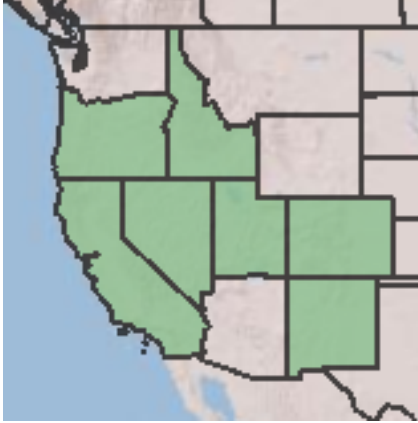

ESRM 412 – Native Plant Production

URL: <https://courses.washington.edu/esrm412/protocols/2021/PERA4.pdf>



Photographed by: Christopher L. Christie, 2008  
(2).

TAXONOMY	
Plant Family	
Scientific Name	Rosaceae (7).
Common Name	Rose Family (7).
Species Scientific Name	
Scientific Name	<i>Peraphyllum ramosissimum</i> Nutt. (7).
Varieties	No varieties are of <i>Peraphyllum ramosissimum</i> Nutt. are officially recognized in the USDA Plants database.
Sub-species	No subspecies of <i>Peraphyllum ramosissimum</i> Nutt. are officially recognized in the USDA Plants database.
Cultivar	
Common Synonym(s)	No common synonyms are recognized by the USDA Plants database.
Common Name(s)	Wild Crab Apple (9). Squaw Apple (9). Indian Apple (8).

Species Code (as per USDA Plants database)	PERA4
<b>GENERAL INFORMATION</b>	
Geographical range	<p>Within the United States, the <i>Peraphyllum ramosissimum</i> Nutt. is found in California, Colorado, Idaho, New Mexico, Nevada, Oregon, and Utah (4).</p>  <p>(7) This map shows in which states the <i>Peraphyllum ramosissimum</i> Nutt. can be found in the U.S.</p>  <p>(7) This map gives a closer look at the dispersal of <i>Peraphyllum ramosissimum</i> Nutt. throughout the Pacific Northwest specifically.</p>
Ecological distribution	<i>Peraphyllum ramosissimum</i> Nutt. occurs on dry hill sides (6),
Climate and elevation range	<i>Peraphyllum ramosissimum</i> Nutt. is usually found in areas with annual precipitation range of 6.0" to 25.5" with low precipitation in the Summer months, of about 0.53" to 3.30" (9).

	As it is known for being a hillside or mountainside species, <i>Peraphyllum ramosissimum</i> Nutt. have been found in elevations ranging from about 3,000-9,000' (8).
Local habitat and abundance	<p>Commonly associated with growing zones that are on the periphery of Ponderosa Pine forests, these zones are held in common with multiple other kinds of brush and grasses, such as: mountain brush (8).</p> <p><i>Peraphyllum ramosissimum</i> Nutt. is noted as a plant species that provides for <i>Malacosoma californica</i>, or the Western Tent Caterpillar (9). Not just insects however, it also acts as a habitat and source of food for deer, birds, and rodents (8)</p>
Plant strategy type / successional stage	<p><i>Peraphyllum ramosissimum</i> Nutt. is a hermaphroditic plant (6).</p> <p>Is able to be very successful in dry times and even times of drought (6).</p>
Plant characteristics	<p><i>Peraphyllum ramosissimum</i> Nutt. is classified as a shrub (9). It is a perennial plant (7).</p> <p>They are able to grow up to 2 meters in height (1).</p> <p>Key recognizable characteristics of <i>Peraphyllum ramosissimum</i> Nutt. are the pink “perfect” flowers and the bitter fruits, known as wild Crab, Squaw, or Indian apples (1) (8).</p>
<b>PROPAGATION DETAILS</b>	
Ecotype	Two very similar variations of the same seeding method were found, one through the United States restoration manuals (8), and another pertaining to another species of crabapple tree known as <i>Malus sylvestris</i> (3). While <i>Malus sylvestris</i> is different than <i>Peraphyllum ramosissimum</i> Nutt., its directive for propagation of crabapple trees by seed bares much similarity to the one published on the U.S. Federal Forest Service’s Rosaceous Shrubs document (8).
Propagation Goal	The propagation goal is to take seeds from the fruit of an existing wild crab apple shrub and to grow a new shrub plant seedling.
Propagation Method	Seed method
Product Type	Container plant stock (8).
Stock Type	

Time to Grow	<p>Very slow growing, often 1 to 2 years of growth is necessary in nursery conditions before outplanting (1).</p> <p>This depends on preference, however it is recommended at least 1 year as less will result in a weak plant that is less likely to survive (1) (8).</p>
Target Specifications	A plant developed enough to survive outplanting (8).
Propagule Collection Instructions	<p>Ensure to make a note of ecotype and soil type of your intended outplanting site, this will guide your decision during the process of seed collection (8).</p> <p>The fruits (crab apple fruits) are what are being collected in this propagation technique.</p> <p>They must be collected when the fruits are ripe, in the end of June to the beginning of August (1).</p>
Propagule Processing/Propagule Characteristics	<p><i>Peraphyllum ramosissimum</i> Nutt. seeds are small, with about 23,000 seeds per 1 pound (8).</p> <p>If stored properly, in cool and dry conditions seeds can keep for up to 5 years in properly-ventilated storage (8).</p>
Pre-Planting Propagule Treatments	<p>After collection but before planting, the fruits are to be mashed and blended with water. Some of the pulp is separated by flotation, and the rest via fanning away the dried pulp (8).</p> <p>Once the seed is extracted from the pulp, it must be kept wet, in a 38 degree pre-storage for germination, for 45 days, expecting 60-80% success (8).</p> <p>Extensive cold stratification is necessary as germination success rates are significantly less than 100% (1).</p>
Growing Area Preparation / Annual Practices for Perennial Crops	1 liter well-drained containers with medium-texture soil must be prepared (3) (8).
Establishment Phase Details	Extensive cold stratification is necessary as germination success rates are significantly less than 100% (1).
Length of Establishment Phase	The time from seeding to germination is about 45 days in the wet, chilled (38 degree) environment (8).
Active Growth Phase	The germinated <i>Peraphyllum ramosissimum</i> Nutt. seeds are then sown into a 1 liter pot, with a 2 seeds to a pot rule, the weaker of which will be removed (3).

	<p>The soil should be of a medium-texture gradient and have proper drainage, as the seedlings will be out planted in regions with dry soils (8). Some nurseries will cover the top layer with a thin sand layer (1).</p> <p>The seeds can be sown manually or they can be placed into their soil with a seed-drill, this is up to the size of the operation (8).</p>
Length of Active Growth Phase	<p>Seeds are sown and often, in nursery scenarios are not outplanted until they are 1 to 2 years old (1).</p> <p>They begin to sprout, however 6-12 days after they have been sown 5mm beneath the surface (1)</p>
Hardening Phase	<p>The <i>Peraphyllum ramosissimum</i> Nutt. plants must not be overwatered or transported during growing season as this will highly damage their chance of success in outplanting (1).</p> <p>It is important that <i>Peraphyllum ramosissimum</i> Nutt. remain in cold conditions during the winter to mirror those of the outplanting site (1).</p>
Length of Hardening Phase	<p>In winter months, weather must be mimicked in order to ensure hardening and that the plants will be able to handle desert cold (1).</p>
Harvesting, Storage and Shipping	<p>Cannot be shipped during the growing season, and must be done, unless absolutely necessary, off-season (1).</p>
Length of Storage	<p>Depends highly on what is necessary. As the <i>Peraphyllum ramosissimum</i> Nutt. will be sensitive it is likely in one's best interest to store in conditions most similar to that of the outplanting site (8).</p>
Guidelines for Outplanting / Performance on Typical Sites	<p>When outplanting your <i>Peraphyllum ramosissimum</i> Nutt. seedlings, the U.S. Federal Forestry Service recommends continuing protection for up to 3 years after outplanting (8). This difficulty with success has to do with the slow rate of growth as well as predation from insects such as grasshoppers (8).</p>
Other Comments	<p>There is not much <i>Peraphyllum ramosissimum</i> Nutt. seed that is able to be bought, and so the self-collection and seed cleaning process is crucial (8).</p> <p>Another popular form of propagation of apple trees is grafting, and while this can be done for Squaw Apples, there is little to no credible documentation on the subject. Many blogs carry personal explanations of the apple-tree grafting process, however these should be</p>

	carefully considered as they are not academically reliable and peer reviewed sources. They also, are quite different species to the <i>Peraphyllum ramosissimum</i> Nutt.
INFORMATION SOURCES	
References	<ol style="list-style-type: none"> <li>1. Auger, J. (2008, July). <i>Paraphyllum ramosissimum</i> Nutt.: <i>squaw-apple</i>. ResearchGate; unknown. <a href="https://www.researchgate.net/publication/314209235_Paraphyllum_amosissimum_Nutt_squaw-apple">https://www.researchgate.net/publication/314209235_Paraphyllum_amosissimum_Nutt_squaw-apple</a></li> <li>2. <i>CalPhotos: Peraphyllum ramosissimum; Squaw Apple</i>. (2021). Berkeley.edu. <a href="https://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0808+0421">https://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0808+0421</a></li> <li>3. <i>Crab apple - How To Grow Trees</i>. (2021). How to Grow Trees. <a href="https://treegrowing.tcv.org.uk/grow/tree-recipes/crab-apple">https://treegrowing.tcv.org.uk/grow/tree-recipes/crab-apple</a></li> <li>4. <i>Lady Bird Johnson Wildflower Center - The University of Texas at Austin</i>. (2014). Wildflower.org. <a href="https://www.wildflower.org/plants/result.php?id_plant=PERA4">https://www.wildflower.org/plants/result.php?id_plant=PERA4</a></li> </ol>

	<p>5. <i>Peraphyllum ramosissimum</i> - <i>Trees and Shrubs Online</i>. (2021). Treesandshrubsonline.org.  <a href="https://treesandshrubsonline.org/articles/peraphyllum/peraphyllum-ramosissimum/">https://treesandshrubsonline.org/articles/peraphyllum/peraphyllum-ramosissimum/</a></p> <p>6. <i>Peraphyllum ramosissimum</i> <i>Squaw Apple, Wild crab apple</i> <i>PFAF Plant Database</i>. (2021). Pfaf.org.  <a href="https://pfaf.org/user/Plant.aspx?LatinName=Peraphyllum+ramosissimum">https://pfaf.org/user/Plant.aspx?LatinName=Peraphyllum+ramosissimum</a></p> <p>7. <i>Plants 3</i>. (2021). Usda.gov.  <a href="https://plants.usda.gov/home/plantProfile?symbol=PERA4">https://plants.usda.gov/home/plantProfile?symbol=PERA4</a></p> <p>8. Shaw, N., Monsen, S., Stevens, R., &amp; Chapter. (2004). In <i>USDA Forest Service Gen</i>.  <a href="https://www.fs.fed.us/rm/pubs/rmrs_gtr136_2/rmrs_gtr136_2_539_596.pdf">https://www.fs.fed.us/rm/pubs/rmrs_gtr136_2/rmrs_gtr136_2_539_596.pdf</a></p> <p>9. <i>Squaw Apple, Peraphyllum ramosissimum</i>. (2021). Calscape.org.  <a href="https://calscape.org/Peraphyllum-ramosissimum-()">https://calscape.org/Peraphyllum-ramosissimum-()</a></p>
Other Sources Consulted	<p>10. <i>UCJEPS: Jepson Interchange: Peraphyllum ramosissimum</i> <i>Nutt</i>. (2021). Berkeley.edu.</p>

	<a href="https://ucjeps.berkeley.edu/cgi-bin/get_cpn.pl?P">https://ucjeps.berkeley.edu/cgi-bin/get_cpn.pl?P</a> ERA4
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