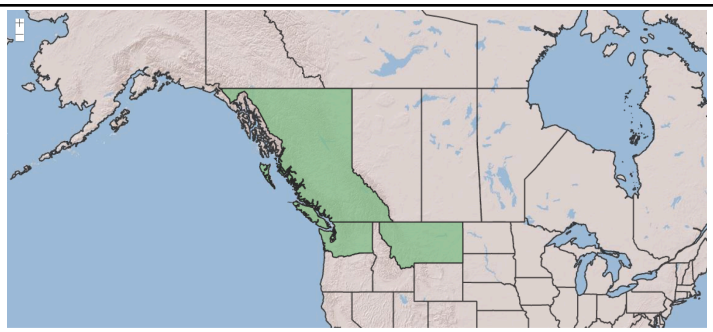
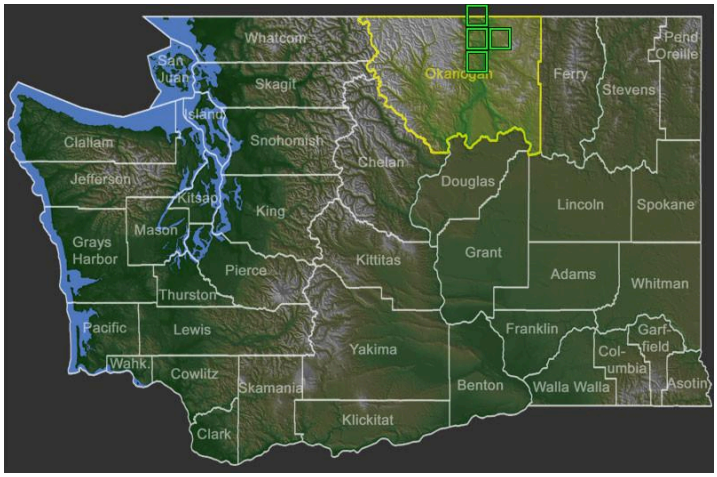
Plant Propagation Protocol for *Crataegus phippsii*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2026/CRPH2.pdf*


Figures 1 and 2: Images of *Crataegus phippsii* taken on September 21, 2004, by Peter Zika in Okanogan County, Washington [2]

TAXONOMY	
Plant Family	
Scientific Name	Rosaceae Juss. [1]
Common Name	Rose family [1]
Species Scientific Name	
Scientific Name	*Crataegus phippsii* R. O'Kennon[1]
Varieties	None
Sub-species	None
Cultivar	None
Common Synonym(s)	None
Common Name(s)	Phipps' Hawthorn[1], Phipps's Hawthorn[11]
Species Code (as per USDA Plants database)	CRPH2
GENERAL INFORMATION	

Geographical range	 Figure 3: North America Distribution [1]  Figure 4: Washington Distribution [2] Found at fourteen localities ranging from the Okanagan Valley of southern British Columbia and northern Washington to the Flathead Valley of Montana. [2,4]
Ecological distribution	The species occurs in palustrine environments, including scrub–shrub wetlands and riparian habitats. It is also found in terrestrial settings such as forests and woodlands, conifer-dominated woodlands, and shrubland or chaparral communities. [2,8]
Climate and elevation range	Climate: Temperate biome [9], Rocky Mountain Subalpine-Montane [7] Microclimate: Open [8] to partially shaded thickets [3] Elevation: 260-350 m (850-1150 ft). [7,8] Observed wider range 280-2920 ft from another source [3]
Local habitat and abundance	Local habitat: Found in open thickets [7,8] and gravelly beaches.[7] Associated with black cottonwood (*Populus trichocarpa*), ponderosa pine (*Pinus ponderosa*), chokecherry (*Prunus virginiana*), and Mackenzie's

	willow (*Salix prolixa*).[7] Additionally, *Salix rigida ssp. mackenzieana.* [8] May co-occur with large-thorned hawthorn (*Crataegus macracantha*) and Okanogan hawthorn (*Crataegus okanaganensis*). [7] Abundance: The estimated number of element occurrences is 21- 80. [8]
Plant strategy type / successional stage	Assume stress-tolerant and early seral/colonizer (due to gravelly and rocky habitat [3,8]), but not explicitly stated
Plant characteristics	Life Form: Tree, shrub [1,7] Longevity: 50-70 years [10] Key Characteristics: *Branches & Thorns:* Young branches are dark purple-brown, turning gray as they age. New shoots are soft and fuzzy. It has thin, slightly curved thorns, about 2–4 cm long, spaced out along the branches.[4] *Leaves:* The plant loses its leaves in winter.[2,4] Leaves are on short stems about 1.5–2 cm long, and the stems are a bit hairy. Leaf blades are 4–8 cm long (sometimes longer on fast-growing shoots). The shape ranges from broadly oval to triangular-oval. Each side of the leaf usually has 3 shallow, rounded lobes. Leaf edges have small teeth. The top of the leaf is slightly hairy, and the underside is hairy along the veins. Leaves become a bit leathery as they mature.[4] *Flowers:* Flowers grow in flat clusters with up to 12 flowers. The flower stems are densely fuzzy. Flowers are 15–22 mm wide. The outer flower cup is densely hairy. Petals are round, and the anthers are pale pink. There are 2–4 styles (female parts), each with a rounded tip.[4] Flowers in May[7] to July[2]. *Fruit:* Fruits are about 12 mm wide, short-hairy, and change color from red to purple to black as they ripen. They are round to slightly flask-shaped. The dried calyx (the little leaf-like parts at the top) bends backward. Inside are 3 small nutlets with shallow ridges.[4] Other Considerations: Found in private lands. Threats and limiting factors of this species include habitat loss, fire, and competition from introduced shrubs. [7]

PROPAGATION DETAILS: FROM SEED

Propagation details in this section are based on congeners:

The stratification methods used in this project were based on the germination protocol developed by Greg Morgenson for *Crataegus mollis*.[5] This species was selected because it is the closest relative with published stratification data, differing from the focal species by only one node in the phylogeny presented by Phillips.[4] A more distantly related species, *Crataegus douglasii*, is separated by five nodes in the same phylogenetic tree[4], and its propagation guidelines were described by Tara Luna.[6] For the remaining sections of the propagation table—aside from the Pre-Planting Propagule Treatments—I used Luna's protocol as the primary reference.

Aside about vegetative propagation:

Multiple sources have stated that vegetative propagation of hawthorn species by stem cuttings is not a useful method due to the difficulty of rooting, that seed propagation achieved much better results compared to vegetative propagation[14], or that information is limited with rare success[13]. Vegetative propagation of hawthorns by grafting and budding is used in the horticultural industry for cultivars of hawthorns [13], but is not particularly relevant to this species.

Ecotype	The seed used in the study came from downy hawthorn, *Crataegus mollis,* growing in Bismarck, North Dakota.[5]
Propagation Goal	Plants [5,6]
Propagation Method	Seed [5,6]
Product Type	Container (plug) [6]
Stock Type	172 ml conetainers [6]
Time to Grow	9 months [6]
Target Specifications	Height: 22 cm [6] Caliper: 7 mm [6] Root System: Firm plug-in containers [6]
Propagule Collection Instructions	Fruits should be collected when fully ripe, which occurs in late August through early September for *Crataegus mollis* [5], and *Crataegus phippsii* ripens at a similar time in September [7].
Propagule Processing/Propagule Characteristics	The pulp is removed by wet maceration. Because the seeds have very hard stony endocarps, cutting tests are impractical; instead, seeds are floated in water several times to remove empty seeds. Cleaned seeds are air-dried and stored at 4 °C (40 °F) until stratification. [6]
Pre-Planting Propagule Treatments	The seeds were placed in moist peat moss and sealed in polyethylene bags for both the warm and cold stratification periods. [5,12] At the end of each stratification period, the seeds were moved to room-temperature conditions for germination, where

	temperatures ranged from 20 to 25 °C (68 to 77 °F). Seeds require at least 60 days of warm stratification at 18–22 °C (64–72 °F) followed by at least 120 days of cold stratification at 2–4 °C (36–40 °F). Longer cold periods (180–240 days) cause excessive radicle elongation and are not recommended. Acid scarification does not improve germination and may cause seed decay; therefore, it should not be used for *Crataegus phippsii*. [5]

Treatment		Downy	
Days at 18-22 °C	Days at 2-4 °C	No. of seedlings	% of 400 seeds
0	0	0	0
0	180	1	0
0	360	3	0
60	120	202	51[b]
60	180	183	46[c]
60	240	185	46[b]
120	120	192	48[b]
120	180	200	50[c]
120	240	182	46[c]
90	120 (2 cycles)[d]	168+2[d]	43[c]
0	acid+180[e]	7	2
60	acid+180[e]	sr[f]	sr

Figure 5: Downy *Crataegus mollis* seed treatments and associated germination. Table modified from the original to only include Downy hawthorn species. [5]

Growing Area Preparation / Annual Practices for Perennial Crops	Seedlings are produced in a combined greenhouse-and-outdoor-nursery system. Seeds are sown directly into containers and lightly covered with the growing medium. The substrate consists of a 6:1:1 mixture of milled sphagnum peat, perlite, and vermiculite, amended with controlled-release Osmocote fertilizer (13N–13P_2O_5–13K_2O, 8–9 month release at 21 °C) and Micromax micronutrient blend (12% S, 0.1% B, 0.5% Cu, 12% Fe, 2.5% Mn, 0.05% Mo, 1% Zn). Each 172-ml container receives 1 gram of Osmocote and 0.20 grams of Micromax. Greenhouse temperatures are maintained between 21 and 25 °C during the day and 16 to 18 °C at night. [6]
Establishment Phase Details	Seedlings are watered by hand and remain indoors until approximately mid-May. Germination occurs consistently, with most seeds sprouting within about two weeks. Seeds germinate at a temperature of 21 °C, and seedlings are thinned once emergence is complete. [6]
Length of Establishment Phase	4 weeks [6]

Active Growth Phase	Then, seedlings are transferred to the outdoor nursery for the remainder of the growing season. Irrigation in the outdoor facility is provided by an automated Rainbird system, which runs in the early morning until the containers are fully leached. The nursery growing season typically begins in late April, once snow has melted, and continues until about October 15. Seedlings grow quickly once germination has occurred. They respond well to thinning and typically develop four to six true leaves within two weeks. During this stage, plants are fertilized with a 20-20-20 liquid NPK solution at 100 ppm. Under these conditions, seedlings reach an average height of about 16 centimeters in approximately thirteen weeks. By seventeen weeks, the plants have formed dense, well-developed root systems and are considered root-tight. [6]
Length of Active Growth Phase	16 weeks [6]
Hardening Phase	During August and September, plants are supplied with a 10-20-20 liquid NPK fertilizer at a concentration of 200 ppm. Irrigation is gradually reduced through September and October to slow growth and encourage hardening. Before winterization, the plants receive one final thorough watering. [6]
Length of Hardening Phase	4 weeks [6]
Harvesting, Storage, and Shipping	The full production cycle takes about nine months. Seedlings are typically harvested in September. After harvest, they are overwintered outdoors, where they are protected beneath insulating foam and the natural snowpack. [6]
Length of Storage	5 months [6]
Guidelines for Outplanting / Performance on Typical Sites	Not found
Other Comments	A 3-liter (1-gallon) container plant can be finished within one year, typically reaching about 25 cm in height with a stem caliper of approximately 1.0 cm. [6]
INFORMATION SOURCES	
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Date Protocol Created or Updated	5/19/2026