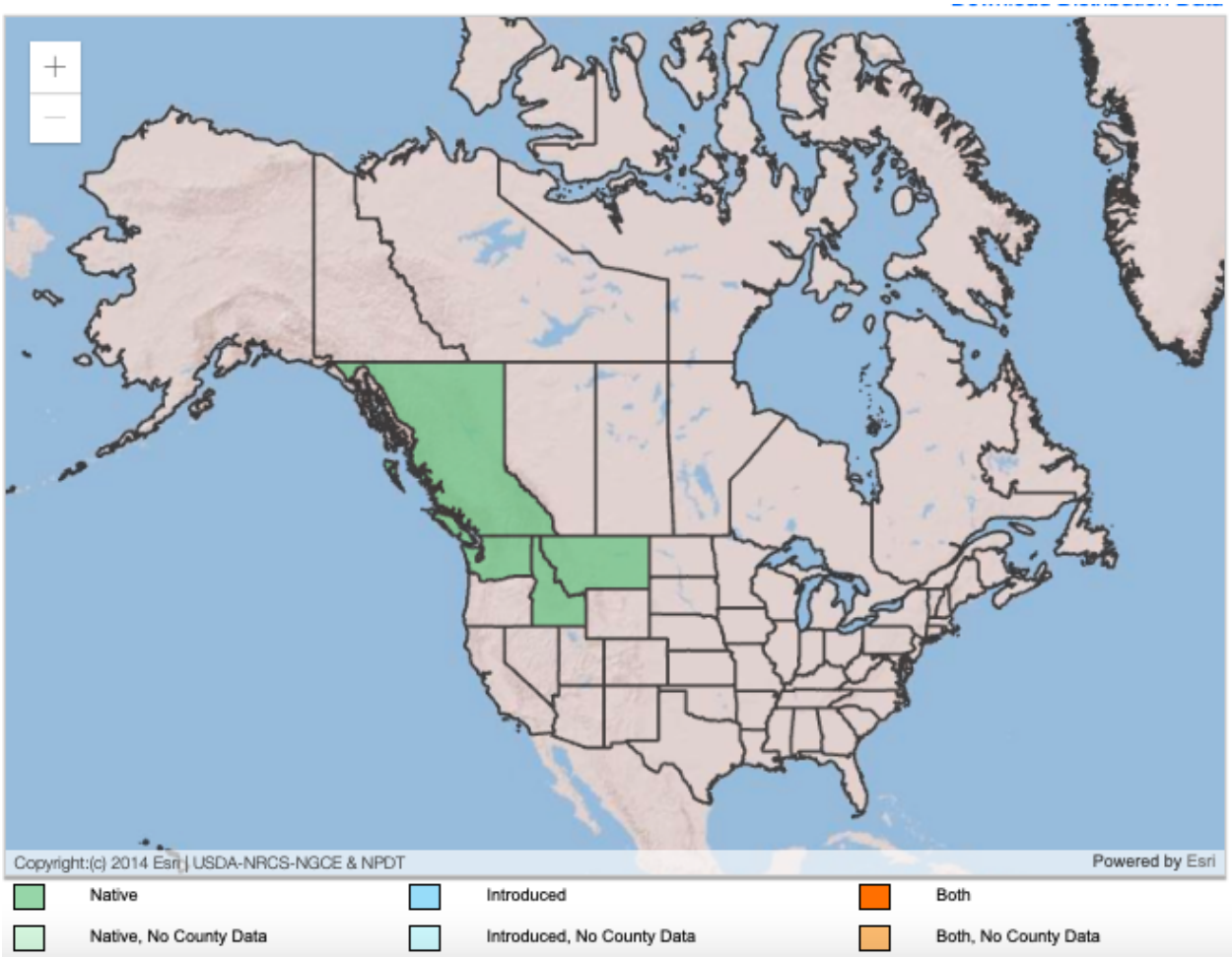
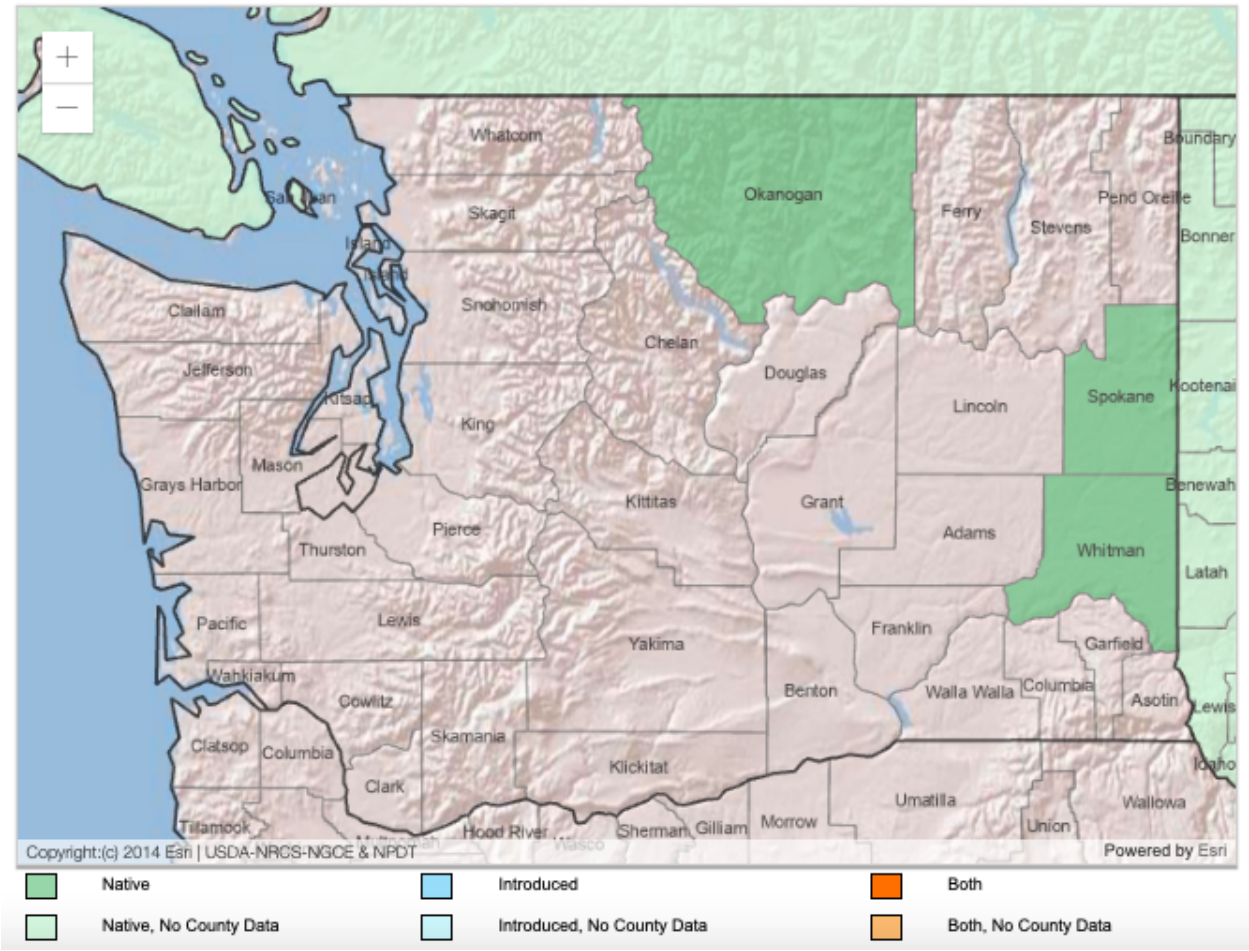
Plant Propagation Protocol from Seed for *Crataegus okennonii*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*[2023]*/*[CROK2.pdf]*



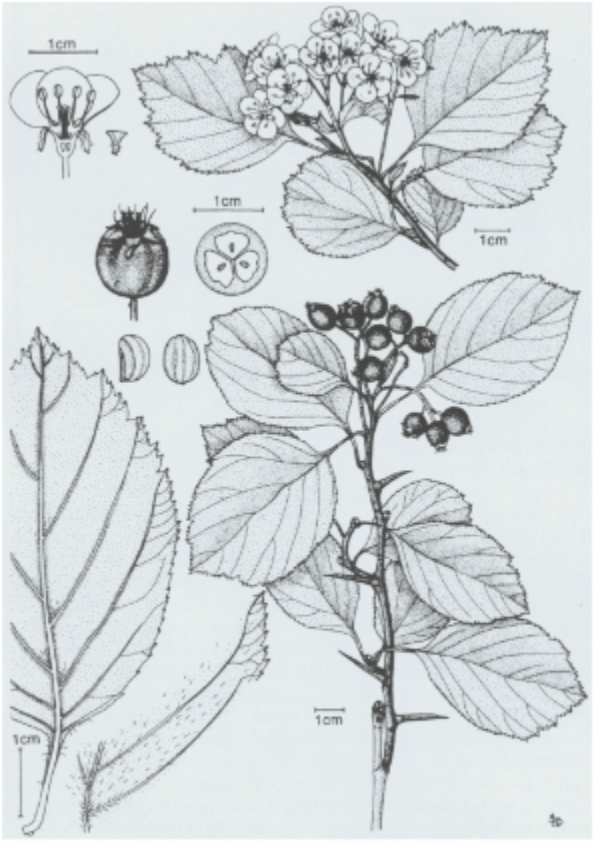
Range in North America Provided by the USDA[1]



Range in Washington Provided by the USDA[1]

TAXONOMY	
Plant Family	
Family Scientific Name	*Rosaceae Juss.*
Family Common Name	Rose
Species Scientific Name	
Genus	Crataegus L.
Species	*Crataegus okennonii*
Species authority	J. B. Phipps
Varieties	N/A
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	N/A
Common Name(s)	O'kennon's hawthorn

Species Code (as per USDA Plants database)	CROK2
Geographical range	*C*ommon in southern interior British Columbia and the eastern half of northern Washington, extending to Idaho and northwestern Montana.[1]
Ecological distribution	Usually along streams or other water sources.[2]
Climate and elevation range	Northern temperate climate 1000–2300 ft elevation[3]
Local habitat and abundance	This species occurs in mesic thickets, natural hedgerows, and scrub. The shrubs prefer a sunny to half-shady situation on fresh to moist soil. The substrate should be loamy soil, sandy loam or sandy clay.[4]
Plant strategy type / successional stage	Earlier to mid successional species
Plant characteristics	**Shrub:** 30–100 cm. **Stems:** <usually single-trunked>; 1-year old twigs deep mahogany, shiny, older gray-brown; thorns on twigs <single>, slightly recurved, usually brown young, 2 cm. **Leaves:** (fall color plum to crimson or light crimson); petiole 1–2 cm, pubescence and glandularity not recorded; blade elliptic to broadly elliptic, sometimes ± narrowly ovate or rhombic, 4–6 cm, lobes 2 or 3 per side, lobe apex acute to ± obtuse, margins serrate, venation craspedodromous, veins 4 per side, apex subacute to obtuse, abaxial surface glabrous except on veins, adaxial finely appressed-pubescent. **Inflorescences:** 12–20-flowered; branches glabrous, sometimes ± sparsely pubescent; bracteole margins stipitate-glandular. **Flowers:** 15–20 mm diam.; hypanthium glabrous; sepals broadly triangular, 3 mm, margins obscurely glandular; stamens 10–12, anthers pale pink; styles 3 or 4.

	Pomes: red-burgundy to chestnut or reddish brown (late Aug), deep purple to black at full maturity, ± ampulliform-orbicular, 8–10 mm diam., glabrous; sepal remnants reflexed, apex obtuse; pyrenees 3 or 4, sides ± eroded, sometimes plain. 2*n* = 68. Flowering May; fruiting Sep–Oct. Mesic thickets, natural hedgerows, scrub; 300–700 m; B.C.; Idaho, Mont., Wash.[2]  FIG. 2. Line drawing of *C. okanoganii* J.B. Phipps. Inflorescence, flowers and parts from *Phipps* 6959 (UWO); infructescence, fruit and parts from *Phipps 6991, 6995 and O'Kennon* (UWO). Scale bars = 1 cm.
PROPAGATION DETAILS	
Ecotype	NO INFORMATION
Propagation Goal	Plant
Propagation Method	Seed
Product Type	Bareroot
Time to Grow	NO INFORMATION
Target Specifications	NO INFORMATION
Propagule Collection Instructions	*Mature fruits of most hawthorn species are collected readily from the ground in autumn, whereas fruits of

	species that tend to hold their fruits through the winter must be hand-picked from the trees.[5]
Propagule Processing/Propagule Characteristics	Fruit 8mm diameter 2 to 3 seeds per fruit.[2] *Seeds of hawthorns, in general, can remain viable for 2 to 3 years in cold storage.[6]
Pre-Planting Propagule Treatments	*Harvested fruits can be macerated to separate the seeds from the fleshy pericarp. The macerated pericarp material can be removed by water flotation, and the seeds should then be air-dried.[7] *Seeds of many hawthorns exhibit double dormancy. Therefore, pre-germination treatments usually consist of acid scarification followed by a period of cold stratification.[8] *seeds should be stratified for 5 months at 4 degrees Celsius.[9]
Growing Area Preparation / Annual Practices for Perennial Crops	NO INFORMATION
Establishment Phase Details	NO INFORMATION
Length of Establishment Phase	NO INFORMATION
Active Growth Phase	NO INFORMATION
Length of Active Growth Phase	NO INFORMATION
Hardening Phase	NO INFORMATION
Length of Hardening Phase	NO INFORMATION
Harvesting, Storage and Shipping	NO INFORMATION
Length of Seed Storage	After extracting, cleaning, and drying, the seeds should be stored under refrigerated conditions.[8] All indications are that hawthorn seeds are orthodox in storage behavior, but reports on long-term seed viability during storage do not all agree. Seeds of hawthorns, in general, can remain viable for 2 to 3 years in cold storage.[10]
Guidelines for Outplanting / Performance on Typical Sites	Seeds should be sown in early fall (versus spring) to satisfy any potential requirements for cold stratification.[5]
Fun Fact	Crataegus belongs to the subfamily Maloideae in the Rosaceae, a natural group of complex genera with the ability to interbreed freely (or hybridize), as they all possess the basal chromosome number of 17[5]
INFORMATION SOURCES	
References	See Below
Protocol Author	Kyle Costa
Date Protocol Created or Updated	21/May/2023

*This information is based on *Crataegus L.* genus and not specific to *Crataegus okennonii*

[1]USDA plants database. (n.d.). https://plants.usda.gov/home/plantProfile?symbol=CROK2

[2]Crataegus okennonii in flora of North America @ efloras.org. (n.d.). http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250100140

[3]*Flora of North America species comparison*. FNA: Crataegus+schuettei vs. +Crataegus+okennonii. (n.d.). https://nwwildflowers.com/compare/?t=Crataegus%2Bschuettei%2C%2BCrataegus%2Bokennonii

[4]*Crataegus okennonii*. Hortipedia. (n.d.). https://en.hortipedia.com/Crataegus_okennonii

[5]Brinkman, K. A. 1974. *Cretaegus* L. In *Seeds of Woody Plants in the United States*, edited by C. S. Schopmeyer. Agricultural Handbook #450. Forest Service, U.S. Department of Agriculture, Washington D.C.

[6]PHIPPS, J. B., & O'KENNON, R. J. (1998). THREE NEW SPECIES OF CRATAEGUS (ROSACEAE) FROM WESTERN NORTH AMERICA: C. OKENNONII, C. OKANAGANENSIS AND C. PHIPPSII. *SIDA, Contributions to Botany*, *18*(1), 169–191. http://www.jstor.org/stable/41967292

[7]Munson RH. 1986. Extracting seeds from fleshy fruits. Plant Propagator 32(2): 14-15.

[8]Hartmann HT, Kester DE, Davies Jr. FT, Geneve RL. 1997. Plant propagation: principles and practices. 6th ed. Upper Saddle River, NJ: Prentice Hall. 770 p.

[9]Rosaceaecrose family Crataegus L. - US forest service. (n.d.). https://www.fs.usda.gov/nsl/Wpsm/Crataegus.pdf

[10]Dirr MA, Heuser Jr CW. 1987. The reference manual of woody plant propagation: from seed to tissue culture. Athens, GA: Varsity Press. 239 p.