

# Propagation *of* Interior British Columbia Native Plants *from* Seed

*Shelley Hudson and Michael Carlson*



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*Foreword*

In 1994 the British Columbia Forest Service staff at the Kalamalka Forestry Centre began propagating native shrub and non-commercial tree species of the B.C. Interior. The initial seed work involved seed collection, stratification and the growing of planting stock for revegetation projects along the Salmon River near Salmon Arm. This started as a cooperative effort with the Federal Department of Fisheries and Oceans and the community-based Salmon River Enhancement Society and since has expanded to include revegetation projects with forest districts, native bands and municipalities.

Forest Renewal B.C. funding for this project was obtained in 1996 under FRBC Research Award: HQ96363-RE and continues today. The plant propagation monographs (by species) included herein were produced by Ms. Shelley Hudson, Horticultural Specialist at the Kalamalka Forestry Centre, Vernon.

Questions about propagation techniques can be directed to Shelley at (250) 260-4771 or fax (250) 542-2230. Questions about other aspects of the project can be directed to Michael Carlson at (250) 260-4767 or fax (250) 542-2230.

*Introduction* British Columbia's considerable diversity of soils, topographies and climates have given rise to a rich variety of native plant species. Many commercially valuable tree species have well-established protocols for seed collection, planting stock production, seedling handling and planting. Comparatively little is known about these activities for non-commercial shrub and tree species. Many of these deciduous shrub and tree species are being used for watershed restoration and rehabilitation of eroded slopes, road edges and landings. Demands for planting stock are increasing each year.

The following plant propagation monographs were developed to aid provincial growers in the production of high quality planting stock.

- Growing objectives*
1. To develop a growing system for non-commercial native shrubs and trees compatible with those of commercial conifers, using the styro container growing system already in place.
  2. To ensure the ability to direct sow with filled, viable seed, into styro containers with minimal transplanting.
  3. To identify techniques for effectively pretreating seeds to ensure fast, even germination.

In 1997 there was a change made from hot planting 2-year-old growing stock in June of the 2nd growing year, to planting 1-year-old dormant stock in the spring of the 2nd year. In general, we have determined that dormant planting stock survives and grows better than hot-planted 2-year-old stock.

*Standard growing procedures for all native plant species*

**Soil media:** 100% peat moss

**Containers:** styros – 77/125 ml (412A), 77/170 ml (415D), 60/250 ml (515A), 45/340 ml (615B)

**Sow dates:** April 1 – slow growing plants,  
May 1 – fast growing plants

**Germination temperatures:** cool germinators – 20°C day/  
15°C night; warm germinators – 24°C day/20°C night  
(20 hour daylength for growing in greenhouse)

**Propagation environment:** germinate in greenhouse; move outdoors if desirable

**Fertigation:** enough nutrients to provide healthy growth. 30–75 ppm N 1–2 times per week. This may be done by overhead or bottom watering. Dry soil down between watering cycles.

**Pruning/shearing:** soft tissue prune one or more times as required – preferably before mid-August

**Seedling specifications: height:** 15–60 cm; **rcd:** 3–6+ mm; firm root plug

**Lift and cold storage:** same procedure as conifers. Wait for leaves to drop, around mid-November, store at -2°C.

*Seed pre-treatment*

**Hydrogen peroxide:** used to clean the coats of seed that tend to get too mouldy during stratification (e.g., soopolallie, saskatoon, twinberry).

Use 5–10% H<sub>2</sub>O<sub>2</sub> for about 15 minutes. Rinse well. This may have to be repeated later. Seed is placed between layers of tissue in a plastic bag, top open slightly for air exchange.

**Sulfuric acid (96%):** may be required to soften tough coats (e.g., kinnickinnik, sumac, chokecherry). Handle H<sub>2</sub>SO<sub>4</sub> with extreme care. Wear protective gear – respirator, eye protection, gloves; protect clothing. Always pour small amounts of acid into large volumes of water to prevent a heat reaction between the acid and water. Check seed every 15–30 minutes to ensure seed is not being damaged by the acid. Rinse seed well.

**Temperature requirements:** some seed may need a combination(s) of warm and cold stratification temperatures for specific periods of time. This sometimes coincides well with the seasons. Fall sow or stratify this seed outdoors to take advantage of the naturally fluctuating warm and cold temperatures from fall to spring (e.g., rose, snowberry, chokecherry).

**Media:** can provide a useful buffer to maintain moist conditions while seed is stratifying. This is especially convenient with long stratification periods of small seed where the ideal moisture levels are hard to maintain. The media can be chosen by the length of stratification time, size of the seed, the thinness of the seed coat and the tendency of the seed to mould.

**Stratification time/media:** (soak seeds 24–48 hours before stratification)

- *up to two months:* put bare seed in a vial or plastic bag allowing for air to exchange. Place moist cotton or tissue above seed. Gently shake seed weekly to move it around and prevent mould from growing. Remoisten cotton/tissue as required.
- *more than two months:* Place seed in a mesh bag and put between layers of peat. Check peat moisture weekly and check for mould. Move seed around occasionally to prevent moulding.

*Germination test* Seeds are tested prior to sowing to determine germination capacity and vigour. Soopollalie should be tested at cooler temperatures for best results.

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# Black Hawthorn

## *Crataegus douglasii*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Clean with H <sub>2</sub> O <sub>2</sub> 10% for 15 minutes. Stratify 4 months in mesh bag, between layers of peat, at 2°C. Soak seed for 24–48 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D) or try 77/125 ml (412A)
<i>Sow date</i>	April – May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 20–40 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Seed is usually only one-third filled and difficult to separate the empties. May want to sow into a mini block or propagation tray with insert and transplant later. Grows quite slowly; group with other slow growers and water less often.



# Black Twinberry

## *Lonicera involucrata*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Clean seed with 5–10% H <sub>2</sub> O <sub>2</sub> for 15 min. Stratify 3 months in a plastic bag with tissue at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles. Responds well to bottom watering.
<i>Pruning/shearing</i>	soft tissue prune one or more times as required before mid-August. Grows vigorously – multiple shearing required.
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Seed subject to excessive moulding. May have to clean with H <sub>2</sub> O <sub>2</sub> again. Check stratifying seed weekly; avoid mould growth by opening the bag and moving the seed around.

## Blue Elderberry

*Sambucus cerulea*

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### PROPAGATION NOTES

<i>Seed pre-treatment</i>	Stratify for 1 month warm, 3–4 months cold in mesh bag, between layers of peat, or can fall sow or stratify seedlot naturally outdoors. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50–75 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Attracts mites – check regularly beginning early. Treat immediately – predator mites can be effective, especially when used at early stages of infestation.

# Chokecherry

*Prunus virginiana*

## PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Treat with H <sub>2</sub> SO <sub>4</sub> 15–90 min. Stratify 2 months warm followed by 4 months cold in mesh bag, between layers of peat; can fall sow or stratify seedlot naturally outdoors. Soak seed for 24–48 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August.
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Can germinate unevenly. May want to sow in a mini block or propagation tray with inserts and transplant later.

# Douglas Maple

*Acer glabrum douglasii*

## PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 6 months warm and 6 months cold in mesh bag, between layers of peat. Begin warm stratification in April and stratify naturally to sow the following April. Soak seed 24–48 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A)
<i>Sow date</i>	April 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	To reduce stratification time, collect fresh seed in fall, put it directly into stratification before it is allowed to dry and go hard. Stratify naturally over winter to sow the following spring.

# Flat Top Spirea

## *Spiraea betulifolia*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 2 months in mesh bag, between layers of peat, at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Seed is very fine and matted together. Dry seed enough to aid in sowing it sparingly. Shearing improves diameter growth.

# Hardhack

## *Spiraea douglasii*

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### PROPAGATION NOTES

<i>Seed pre-treatment</i>	Stratify 2 months in mesh bags, between layers of peat, at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles. Dense growth – responds well to bottom watering.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August. A vigorous grower – requires multiple shearing.
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Seed is very fine and matted together. Dry seed enough to aid in sowing it sparingly. Shearing improves diameter growth.

# Mountain Alder

*Alnus incana ssp. tenuifolia*

## PROPAGATION NOTES

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<i>Seed pre-treatment</i>	2 months in plastic bag with tissue at 2°C; 24 hour soak prior to stratification
<i>Soil media</i>	100% peat
<i>Container</i>	styro 45/340 ml (615 B) – no smaller than 60/250 ml 515A
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times as required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm root; plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Vigorous grower; requires larger cavity to facilitate root and top growth and aid in effective irrigation. Very slow to cease top growth and become dormant in fall. Needs less nutrients than Sitka alder.

## Ninebark

### *Physocarpus capitatus*

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#### PROPAGATION NOTES

<i>Seed pre-treatment</i>	Stratify 4 months in mesh bag, between layers of peat, at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C Susceptible to post-emergence fungal attack (damping off).
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 25–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Attracts mites – check regularly beginning early. Treat immediately – predator mites can be effective, especially when used at early stages of infestation.



# Nootka Rose

*Rosa nutkana*

## PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 3 months warm and 5 months cold in mesh bag, between layers of peat. Begin warm stratification in August and stratify naturally. Sow in fall or spring. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A)
<i>Sow date</i>	April 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Collect fresh seed in late summer; put it directly into stratification before it is allowed to dry and go hard. Stratify naturally over winter to sow the following spring. Attracts aphids and mites.

# Paper Birch

## *Betula papyrifera*

### PROPAGATION NOTES

<i>Seed pre-treatment</i>	No stratification required for most seedlots. Do not cover seed when sowing; some lots germinate better with light. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A) – best stock type based on trial with 615 and 415Ds
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C (lower germination temperature for northern seedlots)
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. Grow leaves from 3–5 cm in length. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times as required before mid-August. Use other means of height control when growing for lumber production.
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Germinates rapidly within 5–7 days. Mist as required to ensure seed does not dry out. Responds favourably to blackout treatments similar to western redcedar.

# Prickly Rose

## *Rosa acicularis*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 3 months warm and 5 months cold in mesh bag between layers of peat. Begin warm stratification in August and stratify naturally. Sow in fall or spring. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A)
<i>Sow date</i>	April 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm diameter: 3–6+ mm root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Collect fresh seed in late summer, put it directly into stratification before it is allowed to dry and go hard. Stratify naturally over winter to sow the following spring. Attracts aphids and mites.

## Red Elderberry

*Sambucus racemosa*

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### PROPAGATION NOTES

<i>Seed pre-treatment</i>	Stratify for 1 month warm and 4 months cold in mesh bags, between layers of peat, or can fall sow or stratify seedlot naturally outdoors. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50–75 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Attracts mites – check regularly beginning early. Treat immediately – predator mites can be effective, especially when used at early stages of infestation.

# Red-osier Dogwood

## *Cornus stolonifera*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 4–6 months in mesh bag, between layers of peat, at 2°C or can fall sow or stratify seed naturally outdoors. Soak seed 24–48 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 45/340 ml (615A) or can try 60/250 ml (515A)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	If bottom watering, do not allow plant roots to stay saturated for prolonged periods of time.

## Sitka Alder

*Alnus sinuata*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	No stratification required; 24 hour soak prior to sowing
<i>Soil media</i>	100% peat
<i>Container</i>	styro 45/340 ml (615 B) – no smaller than 60/250 ml (515A)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50–75 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times as required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Vigorous grower; requires larger cavity to facilitate root and top growth and aid in effective irrigation. Responds well to mycorrhiza treatments. Very slow to cease top growth and become dormant in fall.

# Thimbleberry

## *Rubus parviflorus*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 4–5 months in mesh bag, between layers of peat, at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles. Responds well to bottom watering.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August. May need to prune lateral growth as well to balance plant and ease watering.
<i>Seedling specs</i>	height: 20–40 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Attracts mites – check regularly beginning early. Treat immediately – predator mites can be effective, especially when used at early stages of infestation. Avoid overfertilization – leaves become large making irrigation difficult.

# Trembling Aspen

## *Populus tremuloides*

### PROPAGATION NOTES

<i>Seed pre-treatment</i>	No stratification required. Do not cover seed when sowing – needs light to germinate.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D) – best stock type based on trial with 615 and 515s
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times as required before mid-August. Caution: Does not respond well to heavy shearing.
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm root; plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Germinates rapidly within 3–5 days. Mist as required to ensure seed does not dry out. Watch for disease on leaves – susceptible to <i>Venturia tremulae</i> . Can use Daconil 2787 @ 40 ml/11 l H <sub>2</sub> O/100 m <sup>2</sup>



# Common Juniper

*Juniperus communis*

## PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 3 months warm and 5 months cold in mesh bag between layers of peat. Begin warm stratification in August and stratify naturally. Sow in fall or spring. Soak seed for 24–48 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/125 ml (412A) or can try 77/170 ml (415D)
<i>Sow date</i>	April 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	not required
<i>Seedling specs</i>	height: 10–20 cm; diameter: 2–3+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November.
<i>Grower's notes</i>	May want to try a 1 hour seed soak in 35% H <sub>2</sub> O <sub>2</sub> to clean and soften coats prior to stratification. Grows slowly – may want to group with other slow growers and water less. Try rooting cuttings.

# Mock Orange

## *Philadelphus lewisii*

### PROPAGATION NOTES

<i>Seed pre-treatment</i>	Stratify 5 months in mesh bag, between layers of peat, at 2°C. Fall sow or stratify seed naturally outdoors. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles. A heavy water user – intolerant of drought stress.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Seed is very fine and matted together. Dry seed enough to aid in sowing it sparingly. Shearing improves diameter growth.

# Ocean Spray

## *Holodiscus discolor*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 4–5 mths in mesh bag, between layers of peat, at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C Intolerant of approaching 30°C germination temp.; can use shade cloth.
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles. Heavy water user – responds well to bottom watering.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 25–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Seed is very fine and matted together. Dry seed enough to aid in sowing it sparingly. Shearing improves diameter growth.

## Red Stem Ceanothus

*Ceanothus sanguineus*

### PROPAGATION NOTES

<i>Seed pre-treatment</i>	Put seed into 88°C H <sub>2</sub> O and let cool. Soak for 24 hours prior to stratification. Put in mesh bag, place between layers of peat. Stratify for 2 months at 2°C.
<i>Soil media</i>	100% peat or try a more porous media. Try 5–10% coarse fir sawdust.
<i>Container</i>	styro 77/125 ml (412A) or try 77/170 ml (415D)
<i>Sow date</i>	April 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles. Does not respond well to bottom watering. Watch for signs of fertilizer burn. Try raising pH to 6.5 or reducing fertilizer nutrient levels.
<i>Pruning/shearing</i>	not required
<i>Seedling specs</i>	height: 10–25+ cm; diameter: 3–5+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November.
<i>Grower's notes</i>	Likes dryer soil conditions – may want to use a coarser media. Grows slowly – may want to group with other slow growers and water less often.

# Saskatoon

## *Amelanchier alnifolia*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Clean seed with 5–10% H <sub>2</sub> O <sub>2</sub> for 15 min. Stratify 4 months in a plastic bag with perlite at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 60/250 ml (515A) or try 77/170 ml (415D).
<i>Sow date</i>	April 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Seed subject to excessive moulding. May have to clean with H <sub>2</sub> O <sub>2</sub> again. Watch for disease on leaves. Identify and treat if necessary – could cause cessation of top growth.

## Snowberry

*Symphoricarpos albus*

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### PROPAGATION NOTES

<i>Seed pre-treatment</i>	Stratify 4 months warm and 6 months cold in mesh bag, between layers of peat. Begin warm stratification in June and stratify naturally. Sow in June or spring. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/125 ml (412A) or 77/170 (415D)
<i>Sow date</i>	April 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August
<i>Seedling specs</i>	height: 15–25 cm; diameter: 2–4+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	May want to try rooting cuttings.

# Snowbrush

## *Ceanothus velutinus*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Put seed into 88°C H <sub>2</sub> O and let cool. Soak for 24 hours prior to stratification. Put in mesh bag, place between layers of peat. Stratify 4–5 months at 2°C.
<i>Soil media</i>	100% peat or try a more porous media. Try 5–10% coarse fir sawdust.
<i>Container</i>	styro 77/125 ml (412A) – no larger to start
<i>Sow date</i>	April –May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles. Does not respond well to bottom watering. Watch for signs of fertilizer burn. Try raising pH to 6.5 or reducing fertilizer nutrient levels.
<i>Pruning/shearing</i>	not required
<i>Seedling specs</i>	height: 10–25+ cm; diameter: 3–5+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November.
<i>Grower's notes</i>	Likes dryer soil conditions – may want to use a coarser media. Grows slowly – may want to group with other slow growers and water less often.

## Soopolallie

### *Sheperdia canadensis*

#### PROPAGATION NOTES

<i>Seed pre-treatment</i>	Clean seed with 5–10% H <sub>2</sub> O <sub>2</sub> for 15 min. Stratify 5 months in a plastic bag with perlite at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat. May need more porous media – try 5–10% coarse fir sawdust.
<i>Container</i>	styro 77/125 ml (412A) – no larger to start
<i>Sow date</i>	April–May 1
<i>Temperature</i>	Prefers cooler temp. germination: 20°C day/15°C night; growing: 15–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles. Does not respond well to bottom watering. Watch for signs of fertilizer burn. Try raising pH to 6.5 or reducing fertilizer nutrient levels.
<i>Pruning/shearing</i>	not required
<i>Seedling specs</i>	height: 15–25+ cm diameter: 2–4+ mm root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November.
<i>Grower's notes</i>	Seed subject to excessive moulding. May have to clean with H <sub>2</sub> O <sub>2</sub> again. Likes dryer soil conditions – may need a coarser media. Grows slowly – may want to group with other slow growers and water less often. Attracts mites.



# Spreading Dogbane

*Apocynum androsaemifolium*

## PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Stratify 2 months in mesh bag, between layers of peat, at 2°C. Soak seed for 24 hours prior to stratification.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/170 ml (415D)
<i>Sow date</i>	May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	soft tissue prune one or more times if required before mid-August. Spreads out – may have to prune lateral growth.
<i>Seedling specs</i>	height: 30–60 cm; diameter: 3–6+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Seed is small – sow sparingly to reduce thinning. Dry seed enough to aid in sowing it sparingly. Grows vigorously – do not overfertilize.

## Sumac

*Rhus glabra*

### PROPAGATION NOTES

<i>Seed pre-treatment</i>	No stratification required. Treat with H <sub>2</sub> SO <sub>4</sub> for 15–30 min. Soak 24 hours prior to sowing.
<i>Soil media</i>	100% peat
<i>Container</i>	styro 77/125 ml (412A)
<i>Sow date</i>	April – May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	may not be required
<i>Seedling specs</i>	height: 15–25 cm; diameter: 2–4+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November. Wait for leaves to drop.
<i>Grower's notes</i>	Fairly slow growing – may want to group with other slow growers and water less.

# Tall Oregon-grape

## *Berberis aquifolium*

### PROPAGATION NOTES

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<i>Seed pre-treatment</i>	Soak for 24 hours prior to stratification. Put in mesh bag and place between layers of peat. Stratify 4–5 months at 2°C.
<i>Soil media</i>	100% peat or try a more porous media
<i>Container</i>	styro 77/125 ml (412A) or try 77/170 ml (415D)
<i>Sow date</i>	April – May 1
<i>Temperature</i>	germination: 24°C day/20°C night; growing: 18–20°C
<i>Daylength</i>	20 hours
<i>Greenhouse</i>	for germination and early growing, then grow outdoors
<i>Fertigation</i>	enough balanced nutrition to provide healthy growth. 30–50 ppm N 1–2 times/week. This may be done by overhead or bottom watering. Dry down soil between cycles.
<i>Pruning/shearing</i>	not required
<i>Seedling specs</i>	height: 10–20+ cm; diameter: 2–5+ mm; root plug: firm
<i>Lift and cold store</i>	same procedure as conifers. Lift around mid-November.
<i>Grower's notes</i>	Likes dryer soil conditions – may want to use a coarser media. Grows slowly – may want to group with other slow growers and water less often.

*Suggested reading*

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