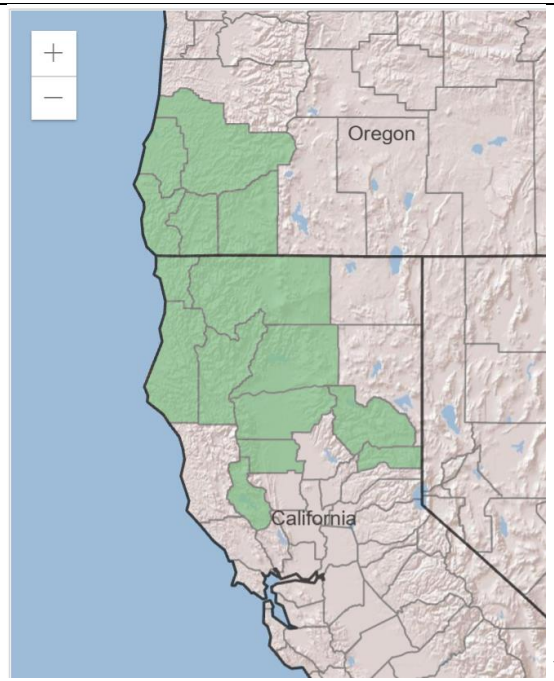
Plant Propagation Protocol for *Sedum laxum*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2022*/*SELA2.pdf*

TAXONOMY	
Plant Family	
Scientific Name	Crassulaceae
Common Name	stonecrop
Species Scientific Name	
Scientific Name	*Sedum laxum* (Britton) A. Berger
Varieties	USDA recognizes the subspecies of *Sedum laxum* listed in the next box (USDA). No other varieties are listed in the USDA database.
Sub-species	*Sedum laxum* (Britton) A. Berger ssp. *flavidum* Denton *Sedum laxum* (Britton) A. Berger ssp. *heckneri* (M. Peck) R.T. Clausen *Sedum laxum* (Britton) A. Berger ssp. *laxum* *Sedum laxum* (Britton) A. Berger ssp. *latifolium* R.T. Clausen *Sedum laxum* (Britton) A. Berger ssp. perplexum R.T. Clausen *Sedum laxum* (Britton) A. Berger ssp. retusum (Rose) R.T. Clausen
Cultivar	None recognized by USDA
Common Synonym(s)	None recognized by USDA
Common Name(s)	Rose-flower stonecrop, Roseflower stonecrop, Heckner's stonecrop
Species Code	SELA2
GENERAL INFORMATION	
Geographical range	Southwestern Oregon through California Douglas County in Oregon through Mendocino and Lake Counties in California (USDA). includes large portions of the Klamath and Six Rivers National Forests and extends south into the Mendocino National Forest (OregonFlora, 2022).

	 USDA Plant Profile map of *Sedum laxum* native range in the US (USDA)
Ecological distribution	Cliffs, boulder fields, outcrops, roadcuts and other exposed rocky areas. Dry rocky mountainous areas in the southern Oregon to northern California range (CalScape). *S. laxum* is one of many *Sedum* species found in the Siskiyou Mountains region (Kruckeberg and Chalker-Scott 2019).
Climate and elevation range	Low moisture climates • *S. laxum* is reported to be hardy in USDA zones 6a to 9b To 5600 meters depending on *S. laxum* subspecies (Evans, 1983).
Local habitat and abundance	Dry, rocky, mountainous and other exposed areas (CalScape). Local habitat Includes several species of butterflies and moths that are supported by *S. laxum (CalScape)*. *S. laxum* is also visited numerous species of bees, including mason bees and leaf- cutter bees, and some species of flies (Shahani 2007). Range overlaps with that of various other *Sedum* species
Plant strategy type / successional stage	Stress-tolerator in exposed rocky areas (Kruckeberg and Chalker-Scott 2019). • Well adapted to tolerate water stress • Adapted to tolerate poor soils

	• Tolerant of full sun conditions • May colonize areas with conditions that exclude many other plant species
Plant characteristics	Forb/Herb (USDA) Succulent perennial
PROPAGATION DETAILS: Leaf Cuttings	
Ecotype	N/A *Sedum laxum* lacks published experimentally derived propagation information Many propagation details are adapted from *Sedum* propagation protocols for: • *Sedum lanceolatum* (Luna et al, 2008) • *Sedum roseum* (Evans, 2008)
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Container (plug)
Stock Type	5” pot or larger depending on growth and spreading that may occur (Manda et al., 2019).
Time to Grow	5-12 months (Toogood, 2019).
Target Specifications	Type: Container cutting Height 4 cm. (Evans, 2008) Caliper: N/A Root system: well developed, firm hold in container (Luna et al, 2008) Cuttings should have grown into a small plant with sufficient foliage that they will not be at high risk of mortality in the event some leaves are shed.
Propagule Collection Instructions	Sedum leaf cuttings should be taken in early spring (Manda et al., 2019). Cuttings should be taken from larger more healthy stems. Cutting collection should be spread out across multiple mother plants to optimize diversity and minimize damage to any one mother plant. Leaf cuttings may not require any direct cutting, as leaves may readily drop or break from the with light pressure or “flicking” by hand (Toogood, 2019).

Propagule Processing/Propagule Characteristics	Time to maturity may limit the effectiveness of using seed propagation for restoration outplanting. Leaf cuttings should be struck after one day of allowing callus to form. *S. laxum* leaf cuttings should be stuck at an initial spacing of about 1 cm" (Toogood, 2019). This density will need to be adjusted as cuttings develop into plant
Pre-Planting Propagule Treatments	Cuttings can be stored overnight at 8° C while callus forms (Manda et al., 2019). It is recommended to allow cuttings to first callus, for at least 1 day, before striking to reduce the risk of infection taking hold in the exposed vascular tissues (Toogood, 2019).
Growing Area Preparation / Annual Practices for Perennial Crops	Greenhouse Outdoor nursery Growing media should be a 50:50 mix of sand and 6:1:1 milled sphagnum peat, perlite, and vermiculite blend (Luna et al., 2008). Trays kept in greenhouse and watered by hand. Even watering to moisten rooting medium. Avoid excessively frequent watering as *S. laxum* is a succulent sensitive to over watering. Soil should be allowed to dry out between waterings (Evans, 2008).
Establishment Phase Details	After 4-6 weeks rooting should have occurred. Once cuttings have rooted irrigation should be decreased to allow drying to take place between each instance (Luna et al., 2008).
Length of Establishment Phase	4-6 weeks (Toogood, 2019).
Active Growth Phase	Cuttings should be irrigated once in containers and allowed to dry out between subsequent irrigations. Producing a small, viable *Sedum* plant from a single leaf cutting may take up to 12 months, due to the smaller starting point compared to stem cuttings (Toogood, 2019).
Length of Active Growth Phase	6- 12 weeks
Hardening Phase	10-20-20 NPK fertilizer applications should be given in late summer, from August through September (Evans, 2008). Watering a final time before winterization improves likelihood of success.
Length of Hardening Phase	4 weeks
Harvesting, Storage and Shipping	Total: 5 months from when cuttings are taken (Evans, 2008) Harvest timeframe: July-August

	Storage conditions: Overwinter in indoor nursery conditions (Evans, 2008). Use insulating foam covers (Luna et al., 2008).
Length of Storage	5 months
Guidelines for Outplanting / Performance on Typical Sites	• Out-planting should occur during spring or summer (Toogood, 2019) • Outplant into well drained, rocky soils. • *S. laxum* will see best results when outplanted on sites with full sun to partial shade • *Sedums* are generally very tolerant of direct light but may suffer damage at extremes • *S. laxum* has relatively high drought tolerance
Other Comments	Collections and outplanting may be restricted in protected areas and by the difficulty involved with safely reaching mother plants in rocky terrain. *S. laxum* may vary in specific due to its range and the morphological differences associated with each subspecies based on their distribution through the Siskiyou mountains region. If restoration is the goal of collection of specific locally native varieties is of importance for meeting objectives.
PROPAGATION DETAILS: Stem cuttings	
Ecotype	N/A *Sedum laxum* lacks published experimentally derived propagation information Many propagation details are adapted from *Sedum* propagation protocols for: • *Sedum lanceolatum* (Luna et al, 2008) • *Sedum roseum* (Evans, 2008)
Propagation Goal	Plants
Propagation Method	Vegetative (stem cuttings)
Product Type	Container (plug)
Stock Type	5” pot or larger depending on growth and spreading that may occur (Manda et al., 2019).
Time to Grow	Approximately 5 months (Evans, 2008)
Target Specifications	Type: Container cutting Height: 4 cm (Evans, 2008) Caliper: N/A Root system: well developed, firm hold in container (Luna et al, 2008)

Propagule Collection Instructions	Stem cuttings should be collected in late summer. Cuttings should be 2-4 cm long section of stem (Evans, 2008). Cutting collection should be spread out across multiple mother plants to optimize diversity and minimize damage to any one mother plant.
Propagule Processing/Propagule Characteristics	Cuttings should be "struck" into rooting media in container as soon as possible following their acquisition (Evans, 2008). Density of one cutting per container is ideal, given the likelihood that *Sedum* will spread to fill any available space.
Pre-Planting Propagule Treatments	Cuttings can be stored overnight at 8 degrees C (Manda et al., 2019). Cuttings can be treated with 1000ppm Hormex rooting powder to improve rooting (Evans, 2008).
Growing Area Preparation / Annual Practices for Perennial Crops	Greenhouse Outdoor nursery Growing media should be a 50:50 mix of sand and 6:1:1 milled sphagnum peat, perlite, and vermiculite blend (Luna et al., 2008) Trays kept in greenhouse and watered by hand. Even watering to moisten rooting medium. Avoid excessively frequent watering as *S. laxum* is a succulent sensitive to over watering. Soil should be allowed to dry out between waterings (Evans, 2008).
Establishment Phase Details	Stem cuttings root in 2-4 weeks. Once rooted cuttings are able to be moved into outdoor growing conditions (Evans, 2008)
Length of Establishment Phase	2-4 weeks should allow adequate time for *Sedum* cuttings to root firmly (Evens et al., 2008). 4 weeks should provide sufficient rooting time for plants to be safely removed from indoor nursery setting
Active Growth Phase	Growing media should be a 50:50 mix of sand and 6:1:1 milled sphagnum peat, perlite, and vermiculite blend (Luna et al., 2008). Cuttings should be irrigated once in containers and allowed to dry out between subsequent irrigations.
Length of Active Growth Phase	12 weeks (Evans, 2008).
Hardening Phase	10-20-20 NPK fertilizer applications should be given in late summer, from August through September (Evans, 2008). Watering a final time before winterization improves likelihood of success.

Length of Hardening Phase	4 weeks
Harvesting, Storage and Shipping	Total: 5 months from when cuttings are taken (Evans, 2008) Harvest timeframe: July-August Storage conditions: Overwinter in indoor nursery conditions (Evans, 2008). Use insulating foam covers (Luna et al., 2008).
Length of Storage	5 months
Guidelines for Outplanting / Performance on Typical Sites	• Out-planting should occur during spring or summer () • Outplant into well drained, rocky soils. • *S. laxum* will see best results when outplanted on sites with full sun to partial shade • *Sedums* are generally very tolerant of direct light but may suffer damage at extremes (Kruckeberg and Chalker-Scott 2019) • *S. laxum* has relatively high drought tolerance
Other Comments	Collections and outplanting may be restricted in protected areas and by the difficulty involved with safely reaching mother plants in rocky terrain. *S. laxum* may vary in specific due to its range and the morphological differences associated with each subspecies based on their distribution through the Siskiyou mountains region. If restoration is the goal of collection of specific locally native varieties is of importance for meeting objectives.
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References	Calscape. (n.d). Rose flowered stonecrop: Sedum laxum. California native plant society. https://calscape.org/Sedum-laxum-() Evans, Jeff. 2008. Propagation protocol for production of Container (plug) Sedum roseum (L.)Scop. plants 490 ml containers; USDI NPS - Glacier National Park West Glacier, Montana. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2022/05/02). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. Evans, R. L. (1983). *Handbook of cultivated sedums*. Science reviews publishing. Print. Manda, M., Nicu, C. VÂȘCĂ-ZAMFIR, D. (2019) Study on the vegetative propagation of seven Sedum L. species cultivated outdoors. Horticulture. Vol. LXIII, No. 1.

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