Plant Propagation Protocol for *Viola adunca*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/ VIAD.pdf


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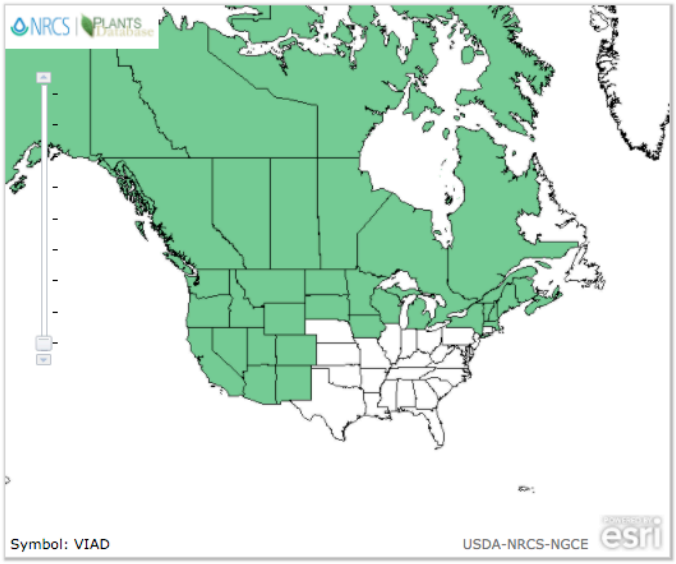
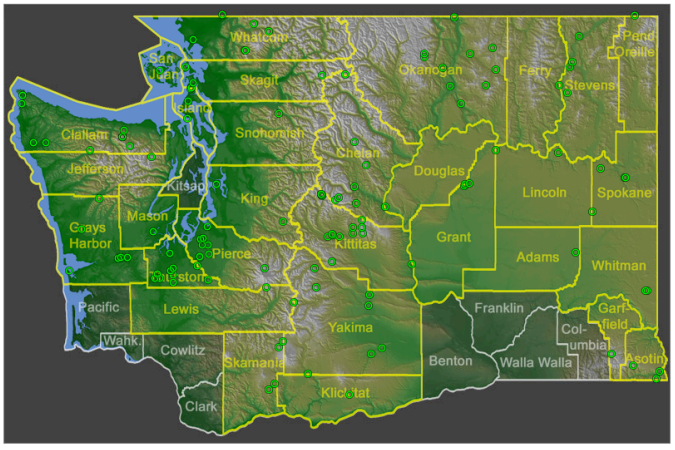
TAXONOMY	
Plant Family	
Scientific Name	Violaceae
Common Name	Violet
Species Scientific Name	
Scientific Name	*Viola adunca* Sm. (USDA 2017)
Varieties	*Viola adunca* Sm. var. *adunca* *Viola adunca* Sm. var. *bellidifolia* (Greene) Harrington *Viola adunca* Sm. var. *cascadensis* (M.S. Baker) C.L. Hitchc. *Viola adunca* Sm. var. *kirkii* V.G. Duran *Viola adunca* Sm. var. *minor* (Hook.) Fernald *Viola adunca* Sm. var. *oxyceras* S. Watson ex Jeps. *Viola adunca* Sm. var. *uncinulata* (Greene) C.L. Hitchc. (USDA 2017) *(Alden 1998)*
Sub-species	*Viola adunca* Sm. ssp. *oxyceras* (S. Watson) Piper *Viola adunca* Sm. ssp. *uncinulata* (Greene) Applegate *Viola adunca* Sm. ssp. *typica* M.S. Baker *Viola adunca* Sm. ssp. *radicosa* M.S. Baker *Viola adunca* Sm. ssp. *ashtonae* M.S. Baker (USDA 2017)
Cultivar	None found
Common Synonym(s)	*Viola bellidifolia* *Viola cascadensis* ("Viola Adunca." 2017)

Common Name(s)	hookedspur violet early blue violet sand violet western dog violet marsh violet western blue violet western long-spurred violet hooked violet ("Viola Adunca." 2017) (Gunther 1992)
Species Code	VIAD
GENERAL INFORMATION	
Geographical range	 (USDA 2017)  (*WTU 2017)* Can be found in Alaska, Canada, and ranging across much of the northern contiguous United States. (USDA 2017) (Alden 1998)

Ecological distribution	Meadows, Coastal, Subalpine, Moist Riverbanks, Sheltered places, along streams. (Gunther 1992)
Climate and elevation range	**Sun** – Sun, Part Shade **Elevation –** -42' - 11286' **Annual Precip. –** 16.6" - 151.1" **Summer Precip. –** 0.24" - 5.95" **Coldest Month –** 19.5° F - 51.0° F **Hottest Month –** 42.2° F - 77.1° F **Humidity –** 0.01 vpd - 26.37 vpd **Soil Description** – Adaptable **Drainage** – Fast, Medium, Slow **Sunset Zones –** 1-24 (Calscape.com. 2017)
Local habitat and abundance	Found in the Olympic National Park, Mt. Rainier National Park, North Cascades National Park (Clark 1998) Dry to moist meadows and open woods, moderate to high elevations in the mountains, very abundant. (*WTU* 2017) (Alden 1998) (Gunther 1992)
Plant strategy type / successional stage	"coastal prairie adaptation" (*California's Coastal Prairies* 2017) Early successional (Western 2007)
Plant characteristics	Hookedspur violet is a common, native, perennial forb with short to elongate slender rhizomes. Plants typically grow to approximately 4 inches in height. A branched stem from hairy rhizomes terminates in round to oval 2 inch leaves. Flowers are pale to deep violet with a white patch and purple veins at the base of the lower three petals, which act as nectar guides for bees. The two side petals have white beards at the base and hooked spurs at the tips. In this species, open flowers with petals are produced in the spring while non-opening, self-pollinating flowers are produced later in the season ("Viola." 2017). Seeds are borne in unique pods and are explosively thrown some distance when pods burst. Hookedspur violet blooms in midspring (Clark & Trelawny 1998). **General:** Glabrous to densely puberulent perennial from slender rhizomes, from stemless to 10 cm. tall. **Leaves:** Leaves short- to long-petiolate, the blade cordate-ovate to lance-ovate, with fine, rounded teeth, 1-3 cm. long; stipules liner-lanceolate, 3-10 mm. long, entire to remotely slender-toothed. **Flowers:** Flowers 5-15 mm. long, the spur on the lowest petal slender, over half the length of the petal; petals blue to deep violet, the lower three with a whitish base penciled in violet, the lateral pair white-bearded; style head

	bearded with thick hairs. Some flowers also cleistogamous (do not open up but do self-pollinate and produce seed). **Fruits:** Fruit a 3-valved capsule, ovary superior, placentation parietal. (*WTU* 2017*)*
PROPAGATION DETAILS	
Ecotype	PNW
Propagation Goal	plants and seeds (Bartow 2014)
Propagation Method	Seed (grown and collected commercially) (Bartow 2014) (Robson 2008)
Product Type	Plugs to be outplanted into field rows for further seed production (Bartow 2014)
Stock Type	18ml size cone-tainers
Time to Grow	~ 9 months from seeding to being outplanted into field rows. (Bartow 2014)
Target Specifications	Small plug size (Bartow 2014)
Propagule Collection Instructions	Seeds are dispersed by explosive dehiscence so they are very difficult to collect in the wild. (Clark & Trelawny 1998) (Robson 2008) In the wild, or on a farm, they can be collected using a ground-cloth spread below the plant for several feet in all directions. Seeds are stored at 3 °C and 20% relative humidity in a cooler storage room. Seeds can be stored for up to 5 years without substantial loss. (Bartow 2014)
Propagule Processing/Propagule Characteristics	Seeds are relatively clean. If needed a Westrup brush machine and a #16 screen mantle are used to break any unopened seed capsules. An air-screen machine can be used to separate empty seed capsules, chaff, and soil. (Bartow 2014)
Pre-Planting Propagule Treatments	Seeds are psychologically dormant and require up to 120-day stratification. (Clark & Trelawny 1998). (Bartow 2014) (Robson 2008) Seeds are wrapped in plastic after they are sewn into flats and stored in a walk-in cooler for three months at 1-3 °C (Bartow 2014)
Growing Area Preparation / Annual Practices for Perennial Crops	Water: moderate to low Soil type: loamy to organic Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5 ("Practical Plants." 2017) Sow seeds in July into stubby cone-tainers (18ml size) and cover with 6mm of vermiculite. Planted into a standard growing medium of “sunshine #1” a soilless peat-based media amended with slow release fertilizer. (Bartow 2014)

Establishment Phase Details	Up to 120 days of cooling to break dormancy, plus up to 21 days for germination (Bartow 2014)
Length of Establishment Phase	Well established within 10—12 weeks after sowing (Bartow 2014)
Active Growth Phase	~4 months after germination (Bartow 2014)
Length of Active Growth Phase	~3 months (Bartow 2014)
Hardening Phase	Starting in February, night-time temperatures are decreased by 2.8 °C every two weeks for 6 weeks and then moved into a cold-frame for further hardening. (Bartow 2014)
Length of Hardening Phase	6-12 weeks (Bartow 2014)
Harvesting, Storage and Shipping	In commercial practices, seeds can be harvested by vacuuming the ground-cover. Harvested seeds are then placed in a tub in the greenhouse at ambient temperatures to continue to dry. One harvest takes place each year before fall rains begin. (Bartow 2014)
Length of Storage	Can be planted immediately after hardening-off, maximum storage time unknown. (Bartow 2014)
Guidelines for Outplanting / Performance on Typical Sites	Outplant plugs by hand using a dibble tool, spaced 1x1' apart. Irrigation is not necessary if planted in the spring during wet weather. Plants will produce seeds the first year with a heavier crop each year. Plants typically live about 5 years. (Bartow 2014) (Robson 2008)
Other Comments	none

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