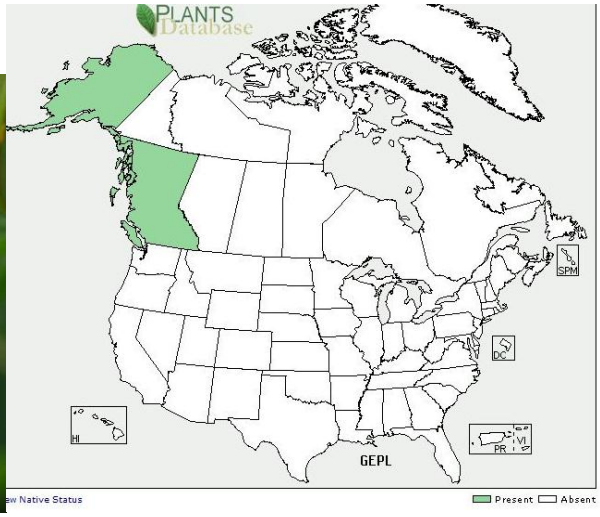
Plant Propagation Protocol for *Gentiana platypetala*
ESRM 412 – Native Plant Production



Source: USDA plant database

TAXONOMY	
Family Names	
Family Scientific Name:	Gentianaceae
Family Common Name:	Gentian family
Scientific Names	
Genus:	*Gentiana*
Species:	*platypetala*
Species Authority:	Griseb
Variety:	n/a
Sub-species:	n/a
Cultivar:	n/a
Authority for Variety/Sub-species:	n/a
Common Synonym(s) (include full scientific names (e.g., *Elymus glaucus* Buckley), including variety or subspecies information)	n/a
Common Name(s):	Broad-petal gentian
Species Code (as per USDA Plants database):	GEPL
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	From British Columbia to Alaska region. See map above.
Ecological distribution (ecosystems it occurs in, etc):	Northern species of lakeshores, meadows, grassy slopes, talus slopes and weathered rock outcrops and rocky slopes. [5]
Climate and elevation range	Widely distributed in high mountain wet meadows, subalpine to alpine and bogs. The elevation is 900m in the north to 3050m to the southern region. Water source is needed to keep soil moist since it grows in wet meadows,

	bogs and high mountain. [4]
Local habitat and abundance; may include commonly associated species	It is abundant and common from Queen Charlotte Islands north through the Akaskan portion of the north coast region. *G. acaulis* is very similar to *G. platypetala*. Both occur in similar high elevation habitat and except that *G. acaulis* has a smaller range in southern Oregon and northern California. [5]
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	It can tolerate -10°F to 39°F temperature ranges. [2]
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	It is a perennial alpine forb/herb. Hairless, stems 1 to several, 10-40 cm tall. The egg-shaped to elliptic leaves are opposite and 1.5-3 cm long. The flowers are bright blue, spotted with green inside, and 2.5-4cm long. The fruits are capsules, elliptic-oblong. Seeds are small and numerous.[5]
PROPAGATION DETAILS	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	Logan Pass, Glacier National Park, Glacier County, MT 2030 meters elevation.[1]
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Seeds [4]
Propagation Method (Options: Seed or Vegetative):	Seed [4]
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Container (plug)[4]
Stock Type:	Seeds [3]
Time to Grow (from seeding until plants are ready to be outplanted):	9 months [8]
Target Specifications (size or characteristics of target plants to be produced):	Stock Type: Container seedling Height: 2 to 3 cm Caliper: N/A Root System: Firm plug in container. [6]
Propagule Collection (how, when, etc):	Collect seeds in mid to late fall, capturing them before the fruits explode. Seeds are hand collected when capsules begin to split at the top. Seeds are tan at maturity. This species flowers in late summer and mature seeds are sometimes difficult to obtain before snowfall in September. A cutting test is essential prior to collection to ensure seed maturity and fill. [7]
Propagule Processing/Propagule	Seed Processing: Small quantities are cleaned by hand using

Characteristics (including seed density (# per pound), seed longevity, etc):	screens. Seed Storage is at least 3 years in sealed containers and storage temperatures maintained at 3 to 5C with low relative humidity.[3]
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Seeds are treated with 1000 ppm gibberellic acid soak with distilled water for 15 minutes. After treatment, seeds are rinsed with running water for 10 minutes. Imbibed seeds are placed on moistened paper towels using distilled water in open plastic bags under refrigeration at 2C for 100 days. Seeds are checked every other day to monitor moisture content.[8]
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Growing Area: Fully controlled greenhouse Sowing Method: Direct Seeding. Seeds are surface sown. Growing Medium: Sunshine Mix #2 containing 70% milled sphagnum peat moss, 20% perlite and 10% washed sand added to commercial medium. Container Type and Volume: 160 ml (7 cu. inch) Ray leach containers.[2]
Establishment Phase (from seeding to germination):	Greenhouse temperatures are maintained at 25C day for 12 hours and 15C night for 12 hours. Medium is kept evenly moist during germination by misting twice per day. Cotyledons emerged 8 days after sowing and are thinned to 1 per container after the appearance of true leaves. Seedlings had 4 true leaves 4 weeks after sowing. [9]
Length of Establishment Phase:	1-2 months [1]
Active Growth Phase (from germination until plants are no longer actively growing):	Like most alpine species, most growth is allocated to the root system. The roots are slender and somewhat fleshy. Care must be taken not to overwater seedlings. Seedlings are fertilized with 20-10-20 NPK liquid fertilizer at 100 ppm once per week and are moved to the outdoor nursery in full sun 3 months after germination. Temperatures range from 20 to 25C during the day and 12 to 15C at night. Seedlings produce 6 to 10 true leaves on a short shoot and form branched shoots from the bottom of the main shoot later during the active growth phase. Shoot height averages 2 to 3 cm at the end of the growing season.[3]
Length of Active Growth Phase:	2 months [1]
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	Seedlings are fertilized with 10-20-20 NPK liquid fertilizer at 50 ppm during September and irrigation is gradually reduced through the months of September and October. Plants are given a final irrigation of water prior to winterization.
Length of Hardening Phase:	2 months [2]
Harvesting, Storage and Shipping (of seedlings):	Total Time to Harvest: 9 months Harvest Date: September Storage Conditions: Seedlings over winter in the outdoor nursery under insulating foam cover and snow.[5]

Length of Storage (of seedlings, between nursery and outplanting):	3-4 months [2]
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	There will be a higher survival rate growing at the sites in the rock garden or alpine garden; a raised bed or a narrow strip beside the house may be equally suitable. Spots shaded by dwarf shrubs, evergreen or deciduous are very useful for gentians. It is the best to avoid unduly vigorous species which might soon overwhelm the clump of gentians during flowering season. [2]
Other Comments (including collection restrictions or guidelines, if available):	Gentian do not like excessive light in active growing period, so avoid excessive sunlight is recommended. [2]
INFORMATION SOURCES	
References (full citations):	See below
Other Sources Consulted (but that contained no pertinent information) (full citations):	
Protocol Author (First and last name):	Xincai Cai
Date Protocol Created or Updated (MM/DD/YY):	6/7/2012

References

[1]Addison, B. A. (1999, January 28). Alpine and Perennial Propagation through the Year. *The International plant Propagation Society* , pp. 281-283.

[2]G.R.Miller. (2002). Size and Longevity of Seed Banks of Alpine Gentian . *Center for Ecology & hydrology*, 9.

[3]G.R.Miller&C.Geddes. (2002). Seed-setting by Alpine Gentian . *Center for Ecology &Hydrology*, 8.

[4]Halliwell, B. (2009). *The propagation of Alpine plants and dwarf bulbs.* Portland: B. T Batsford Ltd.

[5]Kathleen A. Robson, A. R. (2008). *Encyclopedia of Northwest Naitve Plants for Gardens and Landscapes.* Portland: Timber Press.

[6]Kohlenin, F. (1936). *Gentians.* New York: Country life LTD. .

[7]Mackinnon, P. (2004). *Plants of The Pacific Northwest Coast.* Vancouver: Lone Pine Publishing.

[8]P.Smith, A. (2000). Tropical Alpine Plant &Ecology. *Ann.Rev.Ecol.Syst*, 12.

[9]Toogood, A. (1999). *Plant Propagation.* New York: DK publishing.