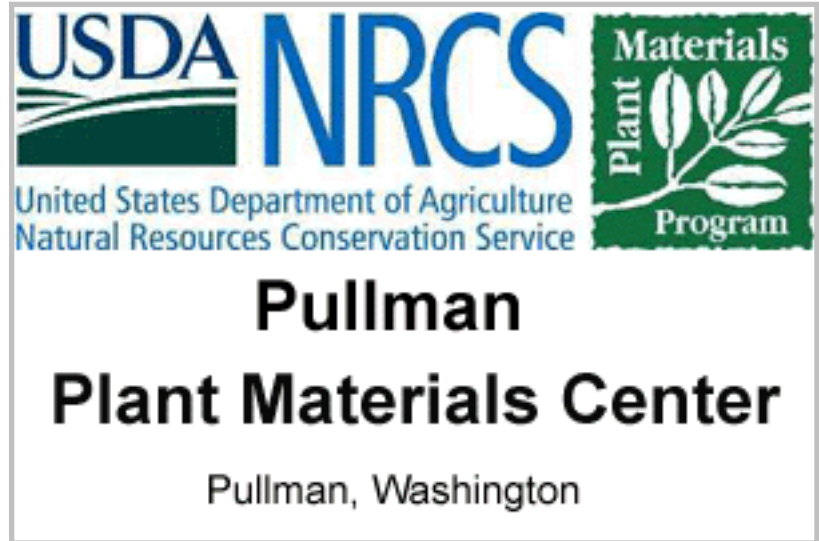


Protocol Information

Dave Skinner
PMC Farm Manager
Pullman Plant Materials
Center
Room 211A Hulbert Hall
WSU
Pullman,
Washington 99163-6211

509-335-9689
509-335-2940 Fax
abbie@wsu.edu



Family Scientific Name: **Liliaceae**

Family Common Name: **Lily**

Scientific Name: ***Fritillaria pudica*(Pursh) Spreng.**

Common Name: **Yellow bell**

Species Code: **FRPU2**

Ecotype: **Eastern Whitman County, WA.**

General Distribution: **Western North America east to Alberta and south to New Mexico and California, except Arizona. Occurs where mean annual precipitation is 8-16 inches (USDA NRCS 2006). In eastern Washington it is found in dry areas from sagebrush to open forest land, including areas of southeastern Washington and adjacent northern Idaho which receive around 20 inches of mean annual precipitation.**

Propagation Goal: **Bulbs**

Propagation Method: **Seed**

Product Type: **Container (plug)**

Time To Grow: **3 Years**

Propagule Collection: **Seeds are collected when the capsules begin to split in late June or early July. Capsules can be collected individually or seed can be shaken from the capsules. Seed is light brown in color and flattened. Seed is stored in paper bags or envelopes at room temperature until cleaned.**

Propagule Processing: **Seed shaken from capsules needs no cleaning. Capsules are crushed to release the seed and then seed is cleaned with an air column separator. Clean seed is stored in controlled conditions at 40 degrees Fahrenheit and 40% relative humidity.**

We determined 165,996 seeds/lb (366 seeds/gram) for this ecotype.

Pre-Planting Treatments: **90 days of cold, moist stratification in the dark or 120 of cold, moist stratification in light resulted in highest germination (Nauman 2002).**

Seed should be sown in autumn and will take 3-6 years to flower (Kruckeberg 1996).

In trials at the PMC, no germination occurred without stratification and no seed germinated after 30 days cold, moist stratification. High germination was obtained from seeds sown in flats in November and left outside under cool, fluctuating spring temperatures. Germination occurred at cool temperatures. Cool growing conditions may also be needed.

Growing Area Preparation/
Annual Practices for Perennial Crops:

In late November or early December seed is sown in flats filled with a 2:1 mix of Sunshine #4 and sharp sand. Seeds are covered lightly. A thin layer of pea gravel is applied to prevent seeds from floating. Flats are watered deeply and placed outside.

Establishment Phase: Flats are left outside subject to cool winter and spring temperatures. They are watered only during extended dry periods. Germination begins in late March or early April. Germination is complete by late April. However, some seed will germinate after a second winter outdoors.

Length of Establishment Phase: 4-5 months

Active Growth Phase: Flats are moved to the lath house in May. Plants are watered as needed and fertilized once every other week with a water soluble, complete fertilizer. They will go dormant during the hot, dry part of summer. Senescent plants are given only enough water to prevent the medium from drying completely. Plants will grow from the bulb in following years, usually emerging in March.

Hardening Phase: Plants are grown outside, so no hardening is needed. Plants are dormant thru the fall and winter. Flats are stored in the lath house over winter. They should be afforded some protection from extreme cold temperatures. Mulch or foam sheets provide sufficient protection. The protection should be removed in late winter or early spring as temperatures begin to rise. The flats should also be protected from rodents, particularly when

they are covered with mulch or foam. Rodents will be active under the mulch and relish the bulbs.

Harvesting, Storage and Shipping: After 4 seasons in flats or containers, the bulbs are removed and planted to the field in late autumn. The largest bulbs are about 15 mm in diameter with multiple offsets. Offsets can also be planted in the field or replanted in flats. Large bulbs will sometimes flower the following spring. Offsets will take several more years to develop flowers. Overall, it may require 5-6 years from seed to flowering plants.

4 year old bulbs averaged 10.64 mm tall and 7.34 mm wide and weighed an average of 0.35 grams. The larger, more mature of these were wider than tall, but most were less mature and were taller than wide.

Other Comments: Plants should be propagated only from seed or bulbs obtained from a reputable nursery. Bulbs should never be dug up from the wild. The species is declining in the west (Hitchcock 1973, Kruckeberg 1996) and wild populations should be enjoyed where they occur but left strictly alone.

Native Americans ate the bulbs raw or cooked (Craighead et al 1963, Faust 1999, Lyons 1997, Parish et al 1996, Winegar 1982), but positive identification from the bulbs can be difficult and some species of Liliaceae are highly poisonous (Taylor 1992).

The bulbs, leaves, and green capsules are utilized by wildlife (Craighead et al 1963, Faust 1999, Winegar 1982).

References: **Craighead, John J., Frank C. Craighead, and Ray J. Davis. 1963. A Field Guide to Rocky Mountain Wildflowers. Houghton Mifflin Co. Boston, MA. 277 pp.**

Faust, Ralph and Peggy Faust. 1999. Wildflowers of the Inland Northwest. Museum of North Idaho. Coeur d'Alene, ID. 141 pp.

Hitchcock, C. Leo, and Arthur Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle, WA. 730 pp.

Jolley, Russ. 1988. Wildflowers of the Columbia Gorge. Oregon Historical Society Press. Portland, OR. 332pp.

Kruckeberg, Arthur R. 1996. Gardening with Native Plants of the Pacific Northwest. 2nd ed. University of Washington Press. Seattle, WA. 282 pp.

Larrison, Earl J., Grace W. Patrick, William H. Baker, and James A. Yaich. 1974. Washington Wildflowers. The Seattle Audubon Society. Seattle, WA. 376 pp.

Lyons, C.P. 1997. Wildflowers of Washington. Lone Pine Publishing, Renton, WA. 192 pp.

Nauman, C. 2002. Germination of 12 Palouse Prairie forbs after stratification under light and dark treatments. M.S. Thesis, University of Idaho, Moscow, Idaho.

Parish, Roberta, Ray Coupe, and

Dennis Lloyd (eds.). 1996. Plants of Southern Interior British Columbia. Lone Pine Publishing, Vancouver, BC, Canada. 463 pp.

Piper, C.V., and R.K. Beattie. 1914. The Flora of Southeastern Washington and Adjacent Idaho. Lancaster, PA. Press of the New Era Printing Company. 296 p.

Rickett, Harold W. 1973. Wildflowers of the United States: The Central Mountains and Plains. Vol. 6. (3 parts). McGraw Hill, New York.

St. John, Harold. 1963. Flora of Southeastern Washington and of Adjacent Idaho. 3rd edition. Outdoor Pictures. Escondido, CA. 583 pp.

Strickler, Dee. 1993. Wayside Wildflowers of the Pacific Northwest. The Flower Press, Columbia Falls, MT. 272 pp.

Taylor, Ronald J. 1992. Sagebrush Country. Mountain Press Publishing Co. Missoula, MT. 211 pp.

USDA, NRCS. 2006. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Winegar, David. 1982. Desert Wildflowers: Drylands of North America. Beautiful America Publ. Co. Beaverton, OR. 144 pp.

Citation:

Skinner, David M. 2007. Propagation protocol for production of container *Fritillaria pudica* (Pursh) Spreng. bulbs; Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 23 February 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.