

Fritillaria camschatcensis - New Crop Summary & Recommendations

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Series: New Floricultural Crops: Formulation of Production Schedules for Wild, Non-domesticated Species

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Horticultural Science 5051: Plant Production II  
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# Floratech

**To:** Grower Staff, Technical Staff, Sales Staff and the President

**From:** Joshua Lynn, New Crops Specialist

**Re:** New Crop Summary and Recommendations for *Fritillaria camschatcensis*

The following is a review of pertinent information gathered from published taxonomic information, seed/vegetative catalogs, scientific and trade journals regarding *Fritillaria camschatcensis*. I have also included my recommendations for uses of this species in floriculture and a preliminary production schedule as an herbaceous perennial. Please follow my recommendations for the initial production trial.



<http://plants.thompson-morgan.com/uk/en/product/7585/1?RA=tiscali>

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## New Crop Report

### Taxonomy

- *Fritillaria camschatcensis*
- *Synonym:* none
- *Common Names:* Rice root, black lily, chocolate lily, Kamchatka lily, Mission Bells
- *Family:* Liliaceae

### Geographic Distribution

- *Continents:* North America, Asia
- *Countries:* United States, Canada, Siberia, Japan[Jeffers-Brown and Pratt, 1997]
- Washington, Oregon, Alaska, British Columbia
- *Latitudinal Ranges:* 45° N to 62° N
- *Altitude:* 0-5,000 feet[Washington State DNR, 2003]
- *Climatic Conditions:* High rainfall, cool summers, winters to USDA Zone 4 (-30°F). Reportedly hardy to soil temperatures of 5°F.[PFAF, 2007]
- Not common in its native habitat, thus probably not invasive.



Flora of North America

[http://www.efloras.org/object\\_page.aspx?object\\_id=8341&flora\\_id=1](http://www.efloras.org/object_page.aspx?object_id=8341&flora_id=1)

### Native Habitat

- *Habitat:* Sun to shade, soils in cool summer areas.
- *Plant communities:* Tidal basins, coniferous (sphagnum) bogs and moist, sunny meadows, alpine meadows[USDA, 2007]

### Taxonomic Description

- Herbaceous perennial to 24 inches tall, single stemmed, with deep purple, nodding and bell shaped flowers in midsummer.
- Bulb with few scales, 2 inches
- *Leaves:* Lanceolate in 1-3 whorls of 5-10 leaves and wider at the base Shiny green color.
- *Flowers:* 1-8 flowers are deep purple to near black, sometimes speckled with yellow, nodding and campanulate, malodorous. A yellow and double flowered form reported.[Jeffers-Brown and Pratt, 1997]

- *Bloom time:* late spring to early summer depending on location (May-July)
- *Uses by Indigenous People:* Bulbs and bulbils used by Pacific Northwest natives as a food source. They were boiled and eaten whole or mashed into a paste. Reports of medicinal uses in Asia.[USDA, 2007]
- The species is said to be “shy-flowering”

### **Propagation Methods**

- Vegetative and seed can both be used. Vegetative is recommended to maintain genotype. Seed can take three to five years to flower. Vegetative propagation also yields flowering plants faster. Typically one year sooner than seed propagation
- Propagation methods include division, scaling and bulblets[Jeffers-Brown and Pratt, 1997]
  - Division: mature field or pot grown clumps can be divided into single bulbs
  - Bulblets: Harvest the bulblets in late summer or fall and sow under several inches of soil or medium. After a cool treatment of approximately fifteen weeks, leaves should emerge. The plant should flowers the following summer.
  - Scaling: Since the bulb has few scales, only remove one scale. Soak for 15 minutes in a fungicide solution. Place in an enclosed bag with damp vermiculite for 6-8 weeks at 65-70°F. Pot the scale with bulblets to enter production.
- Germination trials were done with seed since this is a viable option. The species is said to be very homogenous throughout its distribution so little variation may be seen with seed propagation. A six-week stratification was unsuccessful as well as treatments with Giberellic Acid. Further study would be needed to determine seed germination requirements. The species does not flower for three to five years from seed.

### **Production Description**

- Crop Ideotype
  - Deep purple flowers with yellow speckling
  - Little or no fragrance if in fact the smell is unpleasant
  - Either tall(24”) or short(8”)
  - Consistently large and numerous flowers

### **Market Niche—Identification and Justification**

- *Target Sales Date:* Late spring to midsummer. Approximately the time it would naturally flower in the garden.
- *Potential holidays:* A yellow cultivar exists that may be suitable for forcing for Easter or Mother’s Day as a potted plant or cut flower. However, the bad fragrance may limit the use of this species. The dark-purple color may not be suitable for any holiday. This color may be useful as a specialty cut flower for mixed bouquets.

- *Programmability*: This species could be forced in a manner similar to other *Fritillaria* species as well as *Lilium* species as a potted plant or cut flower. An estimated schedule would be 15 weeks of cold treatment followed by 12 weeks at approximately 65°F to reach market stage.
- *Competing Crops*: As a forced crop, the main competitors would be the Lilies and other spring bulbs that can be forced. As a landscape plant, it has several traits that make it unique. This includes the near black flower color, shade tolerance and tolerance of wet soils.
- *Ethnobotany*: The fact that Native Americans used this crop as a food source could be an interesting story to tell. Using the name rice root in the marketing could help tell the story. It is also a North American native, that is also commonly found in wet areas that may be popular with native plant gardeners or water gardeners. The species could also prove useful in rain gardens.
- *Limitations and Problems*: The plant will not be familiar to consumers. The flower color is different, yet may not be eye-catching. The yellow flowered variety may be better in this respect. Outside of its native habitat, it will probably require shade since the species is not heat or drought tolerant. pH tolerance is also a question. The adaptability of this species is not well known. If it is considered a “fussy” plant, the consumer will not like it as a landscape plant. Little is known about the species production schedule and would have to be determined. There is probably not a large supply of bulbs available on the market, so efforts would have to initially be geared towards propagation to increase availability. Bulbs currently are quite expensive.
- *Product Recognition*: This product would probably not be recognized by consumers and growers. The genus *Fritillaria* in general is not widely known despite the great number of species.
- *Availability*: Bulbs are available now, though probably in limited quantities through specialty companies. Small-scale production could yield plants for the summer of 2008. Efforts in propagation would need to be made to increase availability.

### **Anticipated Cultural Requirements**

- USDA Zone 4-8. However, warmer zones where the species is native are cool summer areas. (Heat Zones 1-3(4)).
- *Heat/Drought tolerance*: Poor. From cool summer areas. Needs constant moisture, even after flowering. [Jeffers-Brown and Pratt, 1997]
- *Temperatures*: Likely not heat tolerant because in its native habitat the temperatures are moderated by the Pacific Ocean and elevation. Higher elevations also provide for cooler nights. An ideal range during the growing season would be daytime temperatures of 70-80°F and night temperatures of 50-60°F.
  - Under greenhouse conditions, flower bud abortion may occur under high temperatures as shown in *Fritillaria meleagris*. [van Leeuwen and Dop, 1990]
  - Greenhouse temperatures in the 50-65°F range should be ideal. High temperatures can cause flower abortion in many lilies [Smith, 2003]

- *Light:*
  - Full sun to full shade.
  - No photoperiod response known
  - Being of northern latitude, has long summer nights
  - May need supplemental light when forced during winter. In lilies, low light levels can cause flower abortion and leaf yellowing.
- *Nutrition:* 100-200ppm N on a constant liquid feed should be sufficient during growth.
- *Soils:* Moist, well drained though tolerates wetter soils. Tolerates salt. Prefers, or perhaps, requires an acid soil, probably around pH 6.0.
- *Plant Growth Regulators:* The use of plant growth regulators would have to be studied on this species along with DIF and morning temperature drops. Since the species is relatively short, usually not taller than 8-24 inches, they may not be required.
  - A study on *Fritillaria imperialis* showed that the cold treatment could affect the ultimate height of the forced plants. They found that a 9 weeks at 48°F versus 3 weeks, with the rest of the cold treatment at 40°F, yielded shorter plants.[van Leeuwen *et al*, 2002] However, the optimum cool temperature for *F. meleagris* was found to be 41°F.[van Leeuwen and Dop, 1990]
- *Container size:* A standard 6" pot with enough depth to cover the bulb and allow for root development.
- *Diseases:* None mentioned. May be somewhat resistant to root rots given its tolerance for wet soils. Being closely related to Lilies, the species might be susceptible to similar diseases and insects under greenhouse conditions.
- *Fungicides/Insecticides:* A standard dusting or soaking of the bulbs with fungicide before cold treatment to prevent rotting. Insecticides as needed, though no information regarding problems such as phytotoxicity was found. A preemptive fungicide drench, such as Banrot, could be used before cooling begins or at the start of production.

#### **Preliminary Production Schedule**

- Total Time=15 weeks at 40°F + 12 weeks in the greenhouse = 27 weeks
- Bulbs would be received late fall or winter. Upon arrival they would be potted and the cold treatment would begin. Flower bud initiation should have been completed before arrival of the bulbs. Flower bud development occurs during the cold treatment. If the company grows the bulbs, they should be allowed to grow through at least mid-October to allow for flower initiation.[van Leeuwen *et al*, 2002.]
- This preliminary production schedule is based on methods to force *F. imperialis* and Oriental lilies.
- *Greenhouse:* Total time of 12 weeks
  - Cooler to Emergence = 1 week
    - 60°F, no light required
  - Emergence to Visible Bud = 5 weeks
    - Natural spring daylength and light intensities
    - 100-200ppm N CLF

- Day Temperature of 65°F
- During this stage, a few plants could be dissected to determine leaf numbers and be able to monitor the crop. The length of this stage of production is determined by the leaf-unfolding rate. This is determined by temperature light intensity. Changing these conditions can hasten or slow the crop as necessary.
- PGR application if necessary. They would have to be tested for efficacy. Being sold as a garden plant, no PGR may be necessary.
- Visible Bud to Market Stage=6 weeks
  - Market stage occurs when the flower buds have swelled and may be showing some color.
  - Same conditions as the leaf unfolding stage
  - Again, the lengths of this stage can be influenced by light and temperature
- Target Sales Date: June 15 as an herbaceous perennial. However, production could be staggered to provide near blooming plants over a longer period of time. Potted bulbs could be removed from cold treatment at two-week intervals to stagger production. A cold treatment longer than 15 weeks would not be detrimental.[Leeuwen *et al*, 2002]

### **Needs and Assessments for Genetic Improvements**

- General
  - Flower colors or degree of speckling to increase variation
  - Consistent flowering: Clones that consistently produce large quantities of flowers and produce yearly
  - Increased flower size
  - No (or more pleasant) fragrance, especially if the species were to be trialed for cut flower of potted plant production
  - Dwarf or tall types.

### **Summary**

*Fritillaria camschatcensis* is an herbaceous bulb crop of the Lily family native to the Pacific Northwest and parts of Siberia and Japan. Growing in sun or shade; it appears to require constant moisture. The other distinguishing characteristic of its climate is cool summers. While considered hardy to USDA Zone 4, summer heat may limit the species usefulness. Shade would likely be a requirement outside of its native habitat. The plant produces deep purple, almost black flowers, in May to July depending on the location. There is also a yellow flowered variant. Most sources describe the fragrance of the flowers as unpleasant, though may be short-lived.

Initially, the most likely use for this plant is as an herbaceous perennial suitable for USDA Zones 4 through 8. Like other members of the genus *Fritillaria* and the Lily family, the species could be forced as a cut flower or flowering potted plant. The main limitations include the unpleasant fragrance and lack of information regarding production. The deep-purple color, while unique, might relegate the species to specialty status. Bulbs are currently available on the market, though are quite

expensive. No selection has been done for superior types except for the yellow-flowered variant. Selection could be performed from seed grown plants and then propagated asexually.

The bulb of the species requires a cold treatment before greenhouse production begins. A 15-week treatment at 40°F is recommended followed by 12 weeks in the greenhouse. This 12-week production is likely long since soil temperatures will be higher than would naturally occur in the spring as the bulb is emerging. During production, I recommend doing leaf counts and measuring leaf-unfolding rates up to visible bud date. Like other lilies, this stage will be influenced by light and temperature. The plants should be sold when the buds are swollen and starting to show color. Production could be staggered provide blooming plants over a longer period of time.

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