

## **Fabulous, Fantastic, *Frasera* Facts**

**by Kelly Chadwick**

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The star plant of the Montana Native Plant Society annual meeting this year—the belle of the floral banquet—was Miss Gravelly herself, *Frasera speciosa*! If you get the chance, look very closely at this beautiful, detailed, interesting plant, and then look again.

*Frasera speciosa* belongs to the class Magnoliopsida, the order Gentianales, the family Gentianaceae, the genus *Frasera*, and the species *speciosa*. Its common names are green gentian, monument plant, elkweed, and deer tongue.

David Douglas first collected *Frasera speciosa* in the Spokane area in the early 1830s. The genus *Frasera* is named for John Fraser, an 18<sup>th</sup> century Scots nurseryman who botanized in the southern Appalachians from 1786-1807 and collected for Kew Gardens and the Linnaean Society. He also sold plants privately, including to the Empress of Russia, becoming Russia's main plant collector of that time. The species name, *speciosa*, means showy, describing the leaves and the massive flower display.

*Frasera speciosa* is found in mountain meadows throughout western North America. The reproductive plant is a rosette with a tall, cylindrical inflorescence. The flower is four-petaled and hermaphroditic, with both male and female organs. Purple spots on the petals, known as nectar guides, attract pollinators. The nectar is under two fringes of hairs that may serve to keep it cool and prevent it from crystallizing.

Until recently this plant was thought to be a biennial, a plant that normally requires two years for its life cycle. Biennials store food in the first season of their growth, flower, bear fruit, and die. Studies by Dr. David Inouye, who has researched the plant for decades, indicate that *Frasera speciosa* is actually a monocarpic plant, flowering only once in a lifetime of 20-80 years, then dying.

Inouye's research also shows that large numbers of *Frasera speciosa* flower every 2-4 years, with sporadic yet synchronous flowering. The average age of a flowering plant seems to be about 35-40 years, though at high altitudes the plants may wait until they are 75-80 years old to bloom.

Inouye's research shows that the "number of leaves in the swirl of basal leaves roughly corresponds to the age of the plant, but individual plants may produce fewer, the same number, or more leaves in one season than in the previous season."

He believes that when the plants get to a certain age, anywhere between 20 and 80 years, they are ready for an environmental cue that signals them to bloom. After intensively watering a plot of about 100 wild green gentians for two consecutive summers, he observed that the plants pre-form leaves and flowers two years in advance. The third year, he left the plot alone and the gentians in the plot flowered significantly more than in other areas across the mountains. Inouye hypothesizes that the plants received an environmental cue two years prior to blooming, prompting their floral display. Inouye believes the cue is summer precipitation, rather than drought, though he's not sure if it's the amount of rain throughout the summer, or density of rain during a certain month, or another formula altogether.

A.J. Beattie, D.E. Breedlove, and P.R. Ehrlich state, "The local synchrony revealed by the occurrence of discrete colonies and the overall synchrony revealed in the almost total absence of floral colonies in some years and the abundance in others is viewed as a strategy for predator avoidance. The flowering regime of *Frasera* combines a predator avoidance system which yields widely dispersed colonies in space and in time with a pollination system which successfully exploits the maximum diversity of floral visitors (15%) and maintains excellent seed-set (not less than 52%) whenever and wherever the colonies appear. The systems are clearly complementary in preventing the build-up of predator populations while maintaining an attractive forage source for potential pollen vectors."

As for germination and survival in the wild, the seeds of *Frasera speciosa* fall to the ground beneath the mother plant, which soon keels over on top of them. In a year with typical rainfall, Wied and Galen's green gentian seeds germinated regardless of whether the researchers planted them on bare ground or on places scattered with parts of an adult plant. Green gentian seedlings were almost twice as likely to survive if they grew among the fallen leaves and stems of an adult plant as they were if they grew in the open. The soil under the collapsed mother plant was moister than that in open spots, where the sun and wind drove faster evaporation. The dead mother plant was thus providing postmortem drought insurance, the researchers claimed. They called this one of the first demonstrations of a plant nursing its own seedlings.

To grow *Frasera speciosa*, the Permaculture Information Web says to sow seed in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frost. Divide in late winter. There is little or no seed dormancy, and germination occurs the following spring. Sources from the Seed Germination Database say to sow seeds at 4° C (40° F) for 6 weeks, and move to 20° C (68° F) for germination. *Frasera speciosa* prefers moist, sandy or loamy soils and good drainage. It can grow in semi-shade to full sun, and prefers a neutral to acid soil.