# DOES LACK OF POLLINATION EXTEND FLOWER LIFE?

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The longevity of a flower will be determined partly by genetically determined factors, but may also have a plastic component. In particular, various authors have reported that floral senescence can be delayed if pollination is withheld. Such extensions are particularly noteworthy in orchids. In some orchid species, flowers will remain fresh and receptive for weeks if unpollinated, but will wither in a day or two after being pollinated. In non-orchids, reported extensions are shorter. However, even modest extensions take on new interest in the context of climate change. There is concern that changing seasonal cues may cause "phenological dislocations" between the flowering times of plants and the activity periods of their pollinators. But plants that can extend the lives of unpollinated flowers would be more resilient to such changes.

Reports of flower-lifetime plasticity are scattered in the literature. Some of the reports arise from secondary or incidental observations made while investigating other phenomena, and are not reflected in keywords. Therefore, it is hard to determine the frequency of such effects. We also expect that the apparent prevalence of floral-life extension may be subject to reporting bias. Cases where extension is observed are more likely to be reported than cases where no effects are seen.

To promote more systematic study of this phenomenon, we conducted experiments on a local collection of nine species from various plant families. These species grow wild in subalpine meadow habitats near near the Rocky Mountain Biological Laboratory (Colorado, USA), where many investigations of pollination biology have been carried out. Within plants, we selected pairs of unopened flower buds, matched for position and developmental stage, and bagged them to prevent pollination. As soon as stigmas appeared receptive, we pollinated one. Subsequently, we tracked the longevities of both flowers at intervals, devising species-specific visual criteria for floral senescence. We aimed for samples of 30 pairs, but lost some pairs.

Pollination significantly shortened flower life in only three of the nine species, although pollinated flowers had a shorter mean lifespan in all nine species, the differences were typically very small, and were significant in only three species. In only one species (see below) was the prolongation of flower life sufficient to be a consideration in alleviating phenological mismatches.

Flower of *Gentianopsis detonsa* (Gentianaceae), the species that showed the strongest extension of floral longevity (2.7 days). Photograph by Barbara A. Thomson.