

## BIOLOGY

# Why more blooms aren't on the rose

We know why some sweethearts show up with only a half dozen roses on Valentine's Day: They're balancing the costs and benefits of going for the full dozen.

Plants take a similar approach. They could produce many more flowers than they do, but the benefits of large bouquets don't outweigh the costs.

Researchers have known for some time how flowers help plants, but the costs have remained less clear. Now, a new study finds that producing more flowers may take a toll on the health of the plants' offspring, report Lawrence D. Harder of the University of Calgary in Alberta and Spencer C.H. Barrett of the University of Toronto.

Flowers benefit plants by attracting pollinators. "For plants, the show is only a means to an end — the end being mating success," Harder explains.

Hermaphrodites by nature, many plants have the advantage of being able to mate with themselves, in a process called selfing, or with others, called outcrossing. However, the offspring that result from outcrossing generally grow bigger and faster and reproduce more often.

Researchers had thought that selfing does not diminish the frequency of outcrossing, because self-pollination uses such a small portion of the pollen pool, Harder explains.

But Harder and Barrett found that producing more flowers in fact decreases a plant's chances of mating with others by increasing the likelihood of self-pollination, they report in the Feb. 9 *Nature*. They suspect that the pollen used in selfing would otherwise go for outcrossing.

The scientists came to this conclusion after examining the seed output of water hyacinths (*Eichhornia paniculata*) grown in a plot in Etobicoke, Ontario. Barrett had engineered the plants to include genetic markers that would show up in the seeds the hyacinths would eventually produce. These markers would help the researchers identify the seeds' parents.

The team had also manipulated the hyacinths to produce 3, 6, 9, or 12 flowers. The researchers grew enough plants to ensure that they had an equal number of flowers from each group of hyacinths.

The local bumblebees came courting and pollinated the flowers. The resulting seeds matured quickly, within 12 days. The team counted the total number of seeds from each group and determined which plants had pollinated which seeds.

All of the plants produced a similar number of seeds per flower.

The team found that hyacinths with more flowers produced a larger proportion of self-pollinated seeds. The plants with more flowers also produced a smaller percentage of outcrossed seeds — those pollinated by a different plant.

Moreover, plants with fewer flowers managed to pollinate a larger proportion of all seeds.

These findings suggest that the pollen used in selfing amounts to a sizable portion of what would otherwise have gone to a different plant, the authors contend.

The team is now investigating how some plants, such as larkspur, can grow big floral displays at less cost to themselves.