

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.

Harder



A water hyacinth in full display.

New trans fat studies muddy the waters

Manufacturers can transform oils into fats that remain solid or semisolid at room temperature — usually through a process known as hydrogenation. In recent years, many studies have linked heart disease risk to diets high in margarine, shortening, and other sources of these artificially hardened, *trans* fatty acids (SN: 5/21/94, p.325). But a pair of reports in the Feb. 4 LANCET now suggests that those studies may have given at least one *trans* fat a bum rap.

The first study compared the proportion of *trans*-oleic acid in fat from 671 male heart-attack survivors and 717 apparently heart-healthy men. This *trans* fat is made from the monounsaturated fat that predominates in olive and canola oils.

Trans-oleic acid varied widely among the men in the study, who hailed from eight European countries and Israel — with values highest (at least 2.25 percent of sampled fat) for men from Norway, the Netherlands, and Scotland and notably lower (just 0.4 percent of fat) for men from Spain. However, within each country, concentrations varied little between heart attack victims and the men to whom they were compared.

Moreover, within groups from Spain and Russia — where *trans* fat consumption proved lowest — men whose bodies contained the most *trans*-oleic acid actually exhibited an 80 percent lower heart-attack risk than men whose bodies stored the least. This trend did not hold, however, for Norway or Finland. There, men consuming the most *trans*-oleic had five times the heart attack risk of those in the group eating least.

Antti Aro of the National Public Health Institute in Helsinki, Finland, and his coworkers lacked the ability to quantify any *trans* fats other than *trans*-oleic. Therefore, they acknowledge, their data can't rule out the chance that some cultures may offset a *trans*-oleic benefit by eating too much fat overall or too much of potentially more deleterious *trans* fats.

Indeed, that's what the second study found. British researchers sampled abdominal fat from 66 men who died suddenly of a heart attack and from 286 healthy volunteers. But unlike the other team, this one measured relative concentrations of both *trans*-oleic and *trans*-linoleic acids. Linoleic acid is a polyunsaturate found in corn oil and nuts.

While they found no *trans*-linoleic link to heart attack risk, high body stores of *trans*-oleic acid appeared to protect against heart attacks.

Together, the studies seem to suggest that if one eats a lot of margarine or shortening, one might do well to look for brands that start with oils rich in monounsaturated fat, like canola.

A two-decade drop in sperm counts

Several researchers have observed signs of a decline in sperm counts throughout the industrial world recently — signaling, they suggest, a possible threat to men's fertility (SN: 1/22/94, p.56). In the Feb. 2 NEW ENGLAND JOURNAL OF MEDICINE, Jacques Auger of Université Paris Sud in France and his colleagues report a steady, 20-year drop in the concentration, motility, and percent of normal-shaped sperm among the 1,351 fertile men they studied. This unexplained drop occurred "independent of the age of the men," they add.

But these findings shouldn't necessarily cause concern, argues Richard J. Sherins of the Genetics and IVF Institute in Fairfax, Va. In an accompanying editorial, he points out that the data reflect one-time sampling of each man. Studies have shown that an individual's sperm count can vary widely from day to day — even after accounting for factors such as duration of recent abstinence. Moreover, he observes, "sperm concentration in itself is not the chief determinant of male fertility." Finally, he notes that the men studied — recruits from groups donating sperm, attending fertility clinics, or registering for a vasectomy — may not represent the general population.