

EVOLUTION

The price of beauty and fragrance

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Credit: Antje Schulte / Alamy Stock Photo

The sweet spring season is a good time for life rebirth and renewal. In addition to enjoying the aroma of this beautiful season, Sergio Ramos and Florian Schiestl at the University of Zurich, Switzerland, have decoded messages on plant evolution from the interactions among blooming flowers, buzzing bees and wiggling caterpillars.

Pollinators and herbivores (bumble bees and caterpillars of cabbage butterfly in this study) both interact with plants but exert different selection pressures. Pollinators select attractive flowers for pollen and nectar, while herbivores favour plants with fewer defences. To track the combined effects of pollinators and herbivores on the evolution of plant reproductive traits over multiple generations, Ramos and Schiestl used rapid-cycling *Brassica rapa* plants to set up four treatment groups: 1) hand pollination (no bees or caterpillars); 2) hand pollination and caterpillars (no bees); 3) bee pollination and caterpillars; and 4) bee pollination (no caterpillars).

Interestingly, they found that group 4 evolved larger and more fragrant flowers. However, when caterpillars were present (group 3), the selection effects fade away. Also, they observed that bees spent less time on plants with caterpillars (group 3), and that this group of plants showed significantly reduced pistil length as well as a higher rate of self-compatibility and autonomous selfing at the eighth generation. Although the mechanism has not yet been determined, this work demonstrates an important impact of herbivores on pollinator-induced reproductive evolution.

Now we know that rapid evolution could be driven by the previously overlooked interplays between mutualists and antagonists. Next time, when encountering a bee or a caterpillar, what would you reminisce?

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