On track.
Pollinators prefer bilateral flowers on *Erysimum*, hinting at how such symmetry evolved.

Credit: Gómez *et al., American Naturalist*

Pollinators Power Flower Evolution

By Michael Balter
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Flowers come in an astonishing variety of forms, but all can be classified into two basic shapes: those with radial symmetry, such as the lily, and those with bilateral symmetry, such as the orchid. Studies of fossil flowers and plant genetics have shown that radial symmetry is the ancestral condition, whereas bilateral symmetry has evolved many times independently in various plant families. Yet few researchers have looked into just why natural selection favors bilateral symmetry. Now scientists have caught the evolution of flower shape in action, and they conclude that bilateral symmetry is favored because pollinating insects prefer it.

The team, led by José Gómez of the University of Granada, Spain, studied 300 plants of the herb Erysimum mediohispanicum, which grows in the mountains of southeast Spain. In a very rare trait among plants, the herb produces both radially and bilaterally symmetrical flowers on the same plant. Gómez and his coworkers first identified the insects pollinating the flowers by observing them for a minute at a time, with a total of 2000 separate observations. The most frequent visitor, representing more than 80% of all flower visits, was the small beetle *Meligethes maurus*. The team then carefully measured the three-dimensional shape of the flowers using a technique called geometric morphometry.

They found a slam dunk for natural selection: Not only did the flowers with bilateral symmetry receive more visits from pollinating beetles than did those with radial symmetry, but the plants harboring them produced more seeds and more progeny plants over the course of the study. This means that over generations there would be more bilaterally symmetrical flowers than radial flowers. The insects also seemed to prefer certain types of bilateralism, for example when two petals were parallel to each other, the team reports in the October issue of *American Naturalist*. The study leaves open the question of just why the beetles favored bilateralism, although Gómez speculates that bilaterals might provide a better landing platform for the insects.

Risa Sargent, a plant evolutionary ecologist at the University of California, Berkeley, says that Gómez and colleagues "make a strong case for a link between plant fitness" and bilateral symmetry. She adds that a plant such as *E. mediohispanicum* that has flowers with both radial and bilateral symmetry is "an excellent and rare system to examine natural selection on flower symmetry." She's sure other

researchers will also try to figure out just what drives the beetles' taste in flower shape.

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