

What are 'supergenes' and how do they impact evolution

Biologists identified 37... so-called 'supergenes' in wild sunflower populations, and found they govern the modular transfer of a large range of traits important for adaptation to local habitats. Those include seed size, timing of flowering, as well as the ability to withstand environmental stresses such as drought or limited nutrient availability, among many others.

"We were quite surprised," says University of British Columbia (UBC) geneticist Marco Todesco. "Cases in which individual supergenes controlled adaptive traits had been reported before, but it wasn't clear if they were the rule or just a small number of odd exceptions. What we found is that supergenes have a pervasive role in adaptation, and can be truly massive."

The largest of the supergenes identified in the study is comprised of more than 100 million base pairs (larger than many human chromosomes) and 1,819 genes.

The study could help resolve a question left unanswered by Darwin's theory of natural selection—namely, how populations of organisms that live side-by-side and mate with each other are still able to adapt unique traits and diverge into separate [species](#).

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"What we think could have happened is that a species arrives in a new habitat, 'steals' adaptive supergenes from a local [related species](#), and then replaces that species," says Todesco. "We could call this a 'ghost supergene', the lingering contribution of a species that no longer exist."

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