

The mechanics of speciation

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Mate choice, competition, and the variety of resources available are the key factors influencing how a species evolves into separate species, according to a new mathematical model that integrates all three factors to reveal the dynamics at play in a process called sympatric speciation.

Titled "Factors influencing progress toward sympatric speciation," the paper appears in today's edition of the [Journal of Evolutionary Biology](#).

New species more commonly occur when [plants](#) or animals cannot interbreed because of strong mate choice, and therefore they become isolated genetically. A less common type of speciation, called "sympatric," occurs when a new species arises from a single population that has no geographic or physical barriers. A famous example is the *Rhagoletis pomonella* fruit fly that originally feasted on the fruit of hawthorn trees, then shifted and began to feed on apples, evolving into a more genetically distinct type of fly.

The new model integrates three key factors that can lead to sympatric speciation: the degree to which male foraging traits influence female mate choice, the degree to which different individuals compete for resources, and the variety of resources available. By incorporating three different factors together, the study's authors, Xavier Thibert-Plante, a postdoctoral fellow at the National Institute for Mathematical and [Biological Synthesis](#), and Andrew P. Hendry, an associate professor at McGill University, have taken a different more inclusive approach than in previous studies, which examine one or a few primary factors.

"This way we can consider the effects of multiple factors and their interactions simultaneously. At the very least, having a variety of resources available in the model is a productive way of generating insights into [biological diversity](#)," Thibert-Plante said.

According to the results, competition was much less important factor for sympatric speciation to occur than strong mate choice and the variety of resources available.

Yet, even under ideal conditions, sympatric speciation occurred only a fraction of the time in the model. But that does not mean sympatric speciation is not impossible in nature, the authors argue. "Mate choice allows the population to specialize to different resources and become reproductively isolated," Thibert-Plante said.

More information: Thibert-Plante X, Hendry AP. Factors influencing progress toward sympatric speciation. *Journal of Evolutionary Biology*. Online edition 24 June 2011.

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