

Why closely related species do not eat the same things

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Parasitoid wasp laying an egg in an aphid. Credit: Dirk Sanders

Closely related species consume the same resources less often than more remotely related species. In fact, it is the competition for resources, and not their kinship, which determines the food sources of the species of a community. Under the effect of this competition, closely related species have specialized on different food resources. This is the conclusion of a study carried out by researchers from CNRS, the Muséum National d'Histoire Naturelle and Exeter University. These results were obtained by studying trophic interactions between species at an extraordinary level of detail in an English meadow. Published on 20 June 2013 in the journal *Current Biology*, the work provides important insights into the evolution of ecological communities at a time when certain are being disrupted by climate change and the arrival of invasive species.

In ecology, the present paradigm considers that [kinship](#) relations between species determine the identity of the partners with which the species interact: the more closely related the species, the more chance they have of interacting with the same partners. Thus, according to this view, two closely related species should share the same predators and the same preys. Recent work carried out by a team of researchers from CNRS, the Muséum National d'Histoire Naturelle and Exeter University shows that this is not necessarily the case. For the first time, the scientists have shown that although kinship between species effectively determines what feeds on species, it is competition for resources and not degree of kinship that determines what species feed on.

To arrive at this conclusion, they made a series of observations over a ten-year period in a meadow in the south east of England. These observations, carried out at an extraordinary level of detail, made it possible to establish the interactions between one hundred or so species situated on four trophic levels: plants (23 species), aphids that feed on these plants (25 species), wasps that lay their eggs in the bodies of the aphids (22 species), and other wasps that lay their eggs in the larvae of the preceding wasps inside aphids (26 species).

The researchers have shown that two closely related species of aphid, for example, are generally the prey of the same species of wasp. It is thus the kinship of species that determines the identity of their predators. On the other hand, these two closely related species of aphid do not necessarily feed on the same plants. Going up the food chain, the scientists observed that there was little chance that the most closely related [wasps](#) feed on the same species of aphid. This is explained by the fact that under the pressure of competition for [food sources](#), closely related species diversify what they feed on, which has the effect of reducing competition. It was possible to reach this conclusion thanks to the level of detail of the observations made, enabling dynamics to be revealed at a very local scale.

At a time when global warming is creating an imbalance in communities and when numerous species are invading ecosystems to which they were previously alien, these conclusions need to be taken into account if it is wished to predict the new interactions that will result from such changes. In fact, these results show that the resources consumed by a species joining a community cannot be predicted by its kinship relations with those species already present.

More information: Elias, M. et al. Evolutionary history and ecological processes shape a local multilevel antagonistic network, *Current Biology*, 20 June 2013.

Provided by CNRS

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