Less is more: choosy wasps used in biological control show why a diverse diet is not always an asset.

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The question of why species should specialize, i.e. use only a fraction of all resources available to them, has puzzled scientists and non-scientists alike. The proverbial saying *"the Jack of all trades is master of none"* provides an intuitive explanation. It implies that there should be a trade-off between the ability to use many different resources and the efficiency of using each single one. Thus, specialists should gain advantages on their resource compared to generalists. However, empirical tests so far have had problems showing such trade-offs and their importance for the evolution of specialization is still debated.

Parasitic wasps are one of the largest insect groups with maybe more than 1 million species. They parasitize other insect species by laying their eggs upon or inside the host's body, where hatching larvae develop and eventually kill the host. For about 100 years, parasitic wasps have been widely used for the biological control of insect pests worldwide. Within this insect group all degrees of diet breadth are found, however, narrow host ranges prevail.

We analysed the history of parasitic wasps that were released to control pest insects and found that specialised wasps, i.e. those that can only parasitize a few pest species, establish better than generalist species with a wide host range. Thus, this is the most comprehensive test for the hypothesis that specialists are generally better able

Parasitic wasp searching for its leafminer host.

to use their hosts than generalists. The results provide the first robust support for the general importance of trade-offs in the evolution of specialization in the mega-diverse group of parasitic wasps. However, specialization is not always more advantageous; in environments where the preferred host is not always available, generalists will profit from being able to utilise a variety of different hosts.