

How air pollution harms pollination

February 7 2024, by Robert Emmerich



A wild mustard leaf damaged by ozone showing necrotic spots. A healthy leaf would be entirely green. Credit: Laura Duque

Pollination, the transfer of pollen grains from the male to the female organs, is an essential part of reproduction for the majority of plants. For

many of these plants, this transfer is carried out by insects in search of food—this is known as insect pollination.

The impact of humans on the environment extends to pollination and pollinators and can have lasting effects on these sensitive relationships.

The Chair of Animal Ecology and Tropical Biology at Julius-Maximilians-Universität Würzburg (JMU) is investigating precisely such effects on our ecosystems. Dr. Laura Duque and Professor Ingolf Steffan-Dewenter have now summarized the latest research findings on how air pollutants—in particular ozone, [diesel exhaust](#) and [particulate matter](#)—could endanger insect pollination.

Their [review article](#) is published in the journal *Frontiers in Ecology and the Environment*.

Numerous potential problems

"Our article shows that air pollution can pose many problems for pollinators and plants," says Duque. "Plants could change the timing of their flowering or the insects could no longer be attracted to the flowers."

Polluted air can also have negative effects on the orientation of pollinators, reduce the quality of pollen, or cause fundamental changes in the composition of plant and insect communities.

"Further research on the effects of [air pollutants](#) on insect pollination is important to identify the interactions between plants and pollinators that are most vulnerable to air pollution," explains Duque.

Insect pollination and humans

Insect-pollinated plants also include most cultivated plants. For some of them—such as coffee, strawberries, or rapeseed—a lack of pollination by insects would lead to enormous crop losses.

"With this article, we want to draw attention to the risk of air pollution to [insect pollination](#) and to the importance of taking appropriate protective measures," says the biologist.

In addition to its influence on the relationships between plants and [pollinators](#), air pollution also affects the interactions of plants with other organisms. In a planned project, Duque wants to investigate how ozone pollution affects the pollination and predation of a specific group of insects: predatory hoverflies.

"These hoverflies are very interesting because they pollinate plants as adults, but feed on aphids in the [larval stage](#) and can thus reduce aphid populations." Aphids, in turn, are well-known plant pests.

More information: Laura Duque et al, Air pollution: a threat to insect pollination, *Frontiers in Ecology and the Environment* (2024). [DOI: 10.1002/fee.2701](#)

Provided by Julius-Maximilians-Universität Würzburg

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