

Insects sense danger on mammals' breath

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When plant-eating mammals such as goats chomp on a sprig of alfalfa, they could easily gobble up some extra protein in the form of insects that happen to get in their way. But a new report in the August 10th issue of *Current Biology*, a Cell Press publication, shows that plant-dwelling pea aphids have a strategy designed to help them avoid that dismal fate: The insects sense mammalian breath and simply drop to the ground.

"Tiny insects like aphids are not helpless when facing large animals that rapidly consume the plants they live on," said Moshe Inbar of the University of Haifa in Israel. "They reliably detect the danger and escape on time."

Inbar said he had always wondered about accidental predation of small plant-dwellers based on his observations of insects that don't really move around. "As soon as we started to work on this problem, we suspected that the aphids responded to our own breath," he said. (The researchers later used snorkels to keep their own breath from mucking up their experiments).

The researchers allowed a goat to feed on potted alfalfa plants infested with aphids. "Strikingly, 65 percent of the aphids in the colonies dropped to the ground right before they would have been eaten along with the plant," the researchers write.

That mass dropping might have been triggered by many cues: plant shaking, sudden shadowing, or the plant-eater's breath. While a quarter of the aphids dropped when plants were shaken, more than half fell to

the ground in response to a lamb's breath, the researchers report.

Shadows had no effect on the aphids' dropping behavior. Ladybugs, an insect enemy of aphids, didn't inspire that kind of synchronous response either.

Further studies with an artificial breath apparatus allowed the researchers to test what it was about the breath that tipped the aphids off. It turned out it wasn't [carbon dioxide](#) or other known chemical ingredients found on mammalian breath. Only when the controlled airstream was both warm and humid did it lead to impressive dropping rates of 87 percent in a room with otherwise low humidity.

Inbar said that the aphids' "elegant solution" to the problem of incidental predation is likely practiced by other species as well.

"This remarkable response to mammalian-specific cues, in spite of the inherent cost of an aphid's dropping off the plant, points to the significance of mammalian herbivory to plant-dwelling [insects](#)," the researchers concluded. "We predict that this sort of escape behavior in response to mammalian breath may be found among other invertebrates that live on plants and face the same threat."

More information: Inbar et al.: "Mammalian herbivore breath alerts aphids to flee host plant." Publishing in *Current Biology*, August 10, 2010. www.current-biology.com.

Provided by Cell Press

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