

Tobacco budworm moths have receptors in their eggs, laying organs that detect odorants

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When most insects reproduce, they lay eggs that hatch into juveniles known as larvae. To provide good sources of food for the larvae, the adult insects have to carefully select where to lay the eggs. Host plants

produce specific sets of chemicals known as odorants that the adult insects are able to smell using proteins called odorant receptors.

It is generally thought that [odorant receptors](#) in the antennae on the head are responsible for guiding adult [insects](#) to good egg-laying sites. However, recent studies have reported that odorant receptors are also present in the egg-laying organs of several different species of moth. It remains unclear what role these odorant receptors may play in egg-laying.

The oriental tobacco budworm (*Helicoverpa assulta*) is considered a serious pest in agriculture. The adult moths lay their [eggs](#) on a narrow range of plants in the nightshade family including tobacco and hot pepper. Li Ruiting, together with colleagues from the Institute of Zoology of the Chinese Academy of Sciences, has investigated the odorant receptors of *H. assulta* and found that one gene for an odorant receptor called HassOR31 was much more expressed in the egg-laying organs of the moths than in the antennae.

Further experiments showed that this receptor was tuned to respond to 12 odorants that also stimulated responses in the egg-laying organ of *H. assulta*. These findings suggest that this odorant receptor in the egg-laying organ helps the moths find suitable [host plants](#) to lay their eggs on.

This work may be helpful to understand how *H. assulta* evolved to lay its eggs on specific members of the nightshade family and lead to new methods of controlling this pest. An insect's sense of smell guides many other behaviors including finding food, mates and avoiding enemies. They may inspire researchers to investigate whether [odorant](#) receptors in the antennae or other organs guide these behaviors.

More information: Rui-Ting Li et al. A moth odorant receptor highly expressed in the ovipositor is involved in detecting host-plant volatiles,

eLife (2020). [DOI: 10.7554/eLife.53706](https://doi.org/10.7554/eLife.53706)

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