



Differential interactions of sex pheromone and plant odour in the olfactory pathway of a male moth

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Résumé en anglais	<p>Most animals rely on olfaction to find sexual partners, food or a habitat. The olfactory system faces the challenge of extracting meaningful information from a noisy odorous environment. In most moth species, males respond to sex pheromone emitted by females in an environment with abundant plant volatiles. Plant odours could either facilitate the localization of females (females calling on host plants), mask the female pheromone or they could be neutral without any effect on the pheromone. Here we studied how mixtures of a behaviourally-attractive floral odour, heptanal, and the sex pheromone are encoded at different levels of the olfactory pathway in males of the noctuid moth <i>Agrotis ipsilon</i>. In addition, we asked how interactions between the two odorants change as a function of the males' mating status. We investigated mixture detection in both the pheromone-specific and in the general odorant pathway. We used a) recordings from individual sensilla to study responses of olfactory receptor neurons, b) in vivo calcium imaging with a bath-applied dye to characterize the global input response in the primary olfactory centre, the antennal lobe and c) intracellular recordings of antennal lobe output neurons, projection neurons, in virgin and newly-mated males. Our results show that heptanal reduces pheromone sensitivity at the peripheral and central olfactory level independently of the mating status. Contrarily, heptanal-responding olfactory receptor neurons are not influenced by pheromone in a mixture, although some post-mating modulation occurs at the input of the sexually isomorphic ordinary glomeruli, where general odours are processed within the antennal lobe. The results are discussed in the context of mate localization.</p>
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