CHAPTER 11

Olfactory-Released Behaviours

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B. S. Hansson (ed.), Insect Olfaction
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1 Introduction

Insects are often found in environments consisting of a complex mixture of odours originating from plants and other insects. From this multitude of signals, the insect must be able to discern and respond only to those that are relevant. For example, a mated female looking for an appropriate oviposition site must have the ability to not only detect the signals from the preferred host plant but also to ignore irrelevant signals from other plants.

Interactions between odours and other sensory cues are common. In many cases a behaviour is elicited only when the right combination of cues is present. At a distance from the odour source interaction with visual stimuli may be needed to elicit a behavioural response; during physical contact with the odour source, tactile and contact chemoreceptive cues may interact with the odour cues.

Odours are classified according to their function and to their effect on the emitter and the receiver of the signal. Olfactory stimuli that act as information messengers between individuals of the same species are called pheromones. If the odours convey information between individuals of different species, they are called kairomones if they are advantageous for the receiver of the signal, allomones, if they are advantageous for the emitter, or synomones if both the emitter and the receiver benefit from the signal.

Specific olfactory receptor neurons (ORN) are found on the antennae of insects (Chaps. 1–3), enabling the insect to detect behaviourally active compounds and restrict the input of odour stimuli. The signals from the ORNs are processed in the central nervous system (Chaps. 4–9) and a behavioural response is elicited if the signals are appropriate. A behavioural response can be innate or it can be modulated by prior experience of the insect. The behav-