

# Pheromones

## Pheromones

Pheromones are chemical messengers that affect the behaviour of other individuals of the same species. They are effective over a long range. Sound and sight receptors are not needed for pheromone detection. Hormones commonly work internally, and they only have a direct effect on the individual secreting them. Pheromones are ectohormones that are secreted outside the body, and influence the behavior of another individual of the same species.

1. Pheromones are similar to hormones that work outside the body.
2. They induce activity in other individuals, such as sexual arousal.
3. Most insects use pheromones as communicating agent.
4. There are four types of pheromone: releaser, primer, signaller and modulator.

Animals secrete pheromones to trigger many types of behaviours, such as:

1. raising an alarm
2. signalling a trail for food
3. triggering sexual arousal
4. warning another animal to back off
5. delineating a territory
6. bond between mother and offspring

Pheromones are very important in the lives of insects for mating, as in some of the silkworm family moths, where males travel nearly 30 miles to a female, following a pheromone trail in the air. Male Cecropia moths are estimated to

detect and respond to a few hundred molecules of pheromone in a cubic centimeter of air. In Honeybee colonies, the queens secrete a glandular substance (a pheromone) that is passed among worker castes, and this secretion coordinates nearly all activities of the workers. One effect is the non-development of the ovaries of the workers. The normal effect of a sex pheromone is to attract male mealworm beetles to the female, but it has been found that the first male to mate with the female then covers her with another pheromone, an anti-aphrodisiac, which dissuades other males from mating with her. This strategy may conserve the energy of the female or have other benefits. Some tiny parasitic wasps are known to have evolved to recognize and follow the sex-attractant pheromones of the hosts that they parasitize or of the prey that they eat. These wasps come from afar, attracted by the pheromones of scale insects, and lay their eggs in the bodies of the scale insects. There, the wasp larvae feed and grow as parasites. Some male cockroaches and crickets produce a pheromone called *seducin* from their bodies, on which the females nibble during copulation. This pheromone is an aphrodisiac. In 1987, Mark K. Stowe of Harvard University and his colleagues reported that bolas spiders manufacture and release pheromones that are identical to the sex attractant pheromones of females of certain night-flying moths. Thus, male moths following the pheromone in the air for some distance find a spider waiting for them instead of a female moth.

Beet army-worms are a serious pest in cotton-producing areas of the United States, causing multi-million dollar losses in 1995 in Texas alone. In 1997, researchers reported success in disrupting mating procedures between male and female Beet army-worms by flooding 35-acre cotton field plots with sex attractant pheromones. With such a pervasion of female scent, the males could

not find females for more than 100 days. Certain pheromone traps have been developed and are in common usage by homeowners. Indian Meal Moths (Pantry Moths) are attracted to a pheromone in a small box lined with a sticky substance and are thus captured for disposal.

The first pheromone, **bombykol**, was identified in 1959. Bombykol is secreted by female moths to attract males. Its signal can travel enormous distances, even at low concentrations. Mammals detect pheromones vomeronasal organ (VNO), or Jacobson's organ, which connects to the hypothalamus in the brain. Pheromones are commonly used in controlling insect. They can be used as bait to attract males into a trap, prevent them from mating, or to disorient them.

Copulins are pheromones secreted by rhesus monkey. It is mainly acetic acid and is found in female's vaginal fluid. In humans, most of the women have all six types of copulins, which increase in quantity before ovulation. Copulins are used to signal ovulation.