Chemical Communication:

It is probably safe to say that insects rely more heavily on chemical signals than on any other form of communication. These signals, often called **semiochemicals** or **inføchemicals**, serve as a form of "language" that helps to mediate interactions between organisms. Insects may be highly sensitive to low concentrations of these chemicals -- in some cases, a few molecules may be enough to elicit a response.

Semiochemicals can be divided into two groups based on who "sends" a message and who "receives" it:

1. **Pheromones:** are chemical signals that carry information from one individual to another member of the same species. These include sex attractants, trail marking compounds, alarm substances, and many other intraspecific messages.e.g Ants are able to recognize their nest-mates by the taste and smell of hydrocarbons (lipids) found on the surface of the cuticle The signal is between members of the same species).

2. **Allelochemicals:** are signals that travel from one animal to some member of a different species. These include defensive signals such as repellents, compounds used to locate suitable host plants, and a vast array of other substances that regulate interspecific behaviors.

Allelochemicals can be further subdivided into three groups based on who "benefits" from the message:

1. **Allomones:** benefit the sender -- such as a repellent, or defensive compound (*e. g.* cyanide) that deters predation.e.g Caterpillars of *Lycaena arion* produce a chemical that attracts ants and elicits care-giving behavior. When carried into the ant's nest and placed among the brood, these caterpillars will eat the ant larvae (The caterpillars benefit from the chemical they produce)
2. **Kairomones:** benefit the receiver -- such as an odor that a parasite uses to find its host. e.g A parasitic fly, *Euclytia flavahe*, is attracted to the odor of its host The host produces the odor, but the fly benefits from it).

3. **Synomones:** benefit both sender and receiver -- such as plant volatiles that attract insect pollinators. e.g Caterpillars that feed on plants sometimes unwittingly induce those plants to release a defensive compound that attracts parasitoids of the caterpillars(Both the plant and the parasitoid benefit)

Insects use their sense of taste or smell to detect the presence of semiochemicals. Specialized receptors may be located anywhere on the body, but are especially common on the feet, antennae, palps, and ovipositor . The sense of smell (olfaction) is used for remote chemoreception -- detecting semiochemicals with low molecular weight that are volatile enough to become airborne. The sense of taste (gustation) is used for contact chemoreception -- detecting molecules that adhere to a substrate or to the outside of an insect's body.

Advantages:

- Not limited by environmental barriers
- Effective over distances and around corners
- Effective either day or night
- Longer lasting than visual or auditory signals
- Metabolically "inexpensive" because only small quantities are needed

Disadvantages:

- Low information content (presence/absence)
- Not effective in an upwind direction