

# Social behaviour in Insects

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Behavior is defined as the way that organisms respond to their environment and to internal signals. In addition to many basic behaviors that are shared by other invertebrates, such as mating, there are some insect species that are capable of more advanced forms of interaction with each other and with their environments. There are two types of behaviour observed in organisms: **innate behaviour** and **learned behaviour**.

Innate behaviour is genetically encoded. Flight and mating habits are considered innate behaviours. Flying insects will sense the direction of light coming from the sun and fly in a way that keeps the sun overhead, or on their dorsal side. This is a means for the insect to maintain a flight plan parallel to the ground.

Learned behaviors are those that are not encoded genetically and are not present in the organism at birth. They are obtained through life experiences, and change or improve over time. Learned behaviours require acute sensing of environmental signals and a complicated network of nerve cell connections for transmitting those signals in order to process the information and modify or initiate a behaviour. Insects are capable of performing this behaviour. In order to forage for food and return to the same food source repeatedly, they use a type of learning called **associative learning**. Associative learning is when separate ideas or environmental stimuli are connected to each other. For example, the location of a food source can be associated with a series of visual cues seen on the way to the source. Thus, the organism learns that if it follows a path that includes all of those visual signals; it will again find the food source. For example, honeybees can be taught to obtain their food from a particular source based on color cues, even when the location of that source changes. They can learn that their food is located on a yellow dish next to a blue dish containing only water. If the dish positions

are switched, the bees remember which color has the food, and they seek that dish.

### **Social Insects and Communication**

Insects and other organisms living together in well-organized and tightly integrated colonies are called **eusocial** animals. These include species of ants, termites, bees, and wasps. Certain colonies can have millions of individuals. These are two of the major features of eusocial insects:

- I. Division of reproductive labour
- II. Cooperative care of the young members of the colony

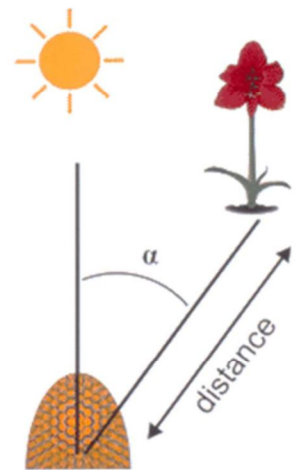
Social ants present a very nice example of the division of reproductive labour. The individual ants within a colony are divided into three major groups:

1. Fertile females (queens)
2. Infertile or sterile females (workers)
3. Fertile males (drones)

Fertile males and queens perform the reproductive activities of the colony, while workers perform the function of food obtaining as well as building and maintaining the nest. Certain social insect colonies have some specialized individuals such as nurses for feeding and caring for young larvae, some individuals involved in defensive activity for defending the nest.

Communication between members of a colony takes place through various means. They usually communicate using pheromones. Pheromones are chemicals released by one individual to be sensed and responded to by another individual.

Honeybees have developed a more fascinating form of communication using their body movement. They perform “waggle dance” to tell other members of the colony about the source of food. The angle of the dance indicates the specific direction of the food source relative to the sun, and the length of the dance correlates with how far away the food is, as shown in side figure. This is considered a form of abstract symbol communication, meaning that they use a behaviour to represent information about something in the environment.



### **Altruism:**

It is another feature of many social insects. Altruism is the act of self-sacrifice for the benefit of others. For example, a worker bee loses her own reproductive potential for obtaining food and providing shelter for the benefit of the queen. This allows the queen honeybee to focus on the reproduction of her genetic material at the cost of the workers.