

# Social Behaviour In Insects



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# Introduction

Insects are arthropods with six legs and usually with one or two pairs of wing. Their body is covered by exoskeleton and divided into three parts, head , thorax and abdomen. They are placed in the class insecta or hexapoda. Social insects like bees, wasps, ants & termites are insects, placed in the order Hymenoptera and Isoptera. Certain kind of community living or social behaviour is seen among these insects .Social behaviour is behaviour among two or more organism within the same species.

All these Social insects exhibit certain complex behaviour that involves cooperation in building nest, protecting against enemies or taking care of offspring. They live in complex societies and are referred to as eusocial. Social insects have certain speciality which characterises their social behaviour.

- ▶ Polymorphic form
- ▶ Division of labour
- ▶ Overlapping generations
- ▶ Cooperative brood care
- ▶ A sterile worker caste
- ▶ The presence of several generations in a single hive or nest at the same time
- ▶ Greater rate of reproduction
- ▶ Greater communication

# Important social insects

Wasp



Ants



Honey Bee



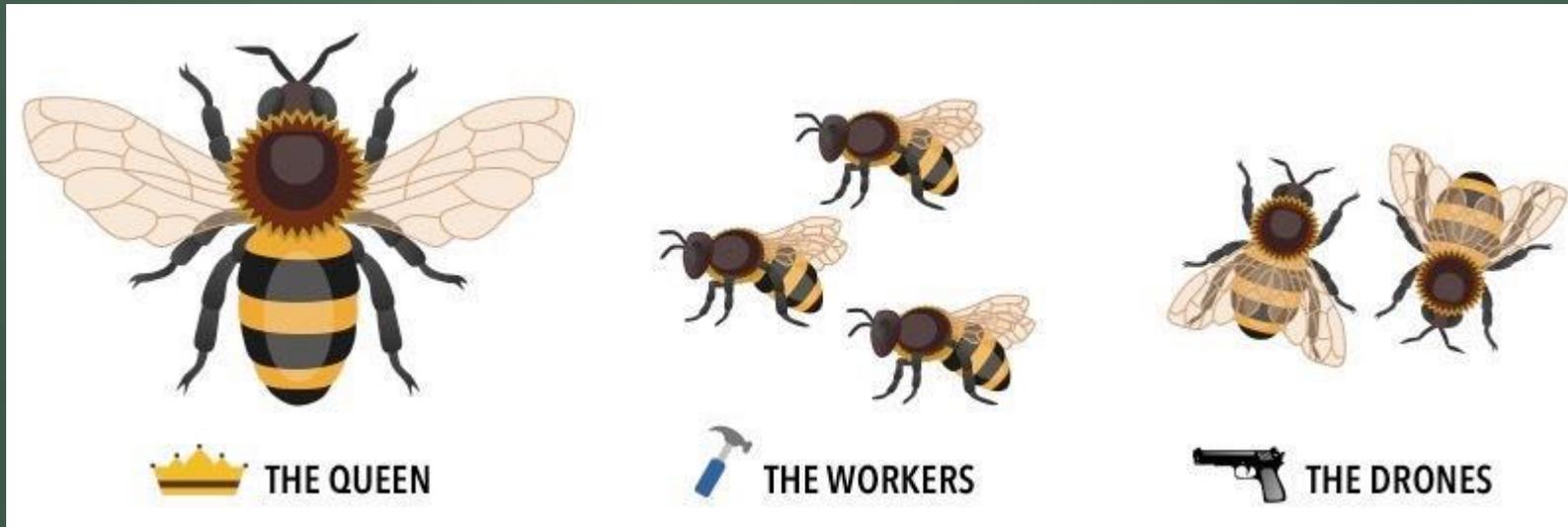
Termites



# General overview of social insects

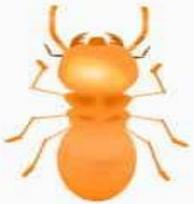
- ▶ Social insects are differentiated in structure, function, and behaviour into castes, the major ones being the reproductives (e.g., the queen) and the sterile (workers and soldiers).
- ▶ Besides carrying out the basic function of reproduction, the members of the reproductive caste generally select the site for a new colony and excavate the first galleries.
- ▶ The workers care for the eggs and larvae, collect food for other members of the colony, and construct and repair the nest,
- ▶ while the soldiers defend the colony against predators.

# Honey bee



# Termites

**worker**



**soldier**



**reproductive**



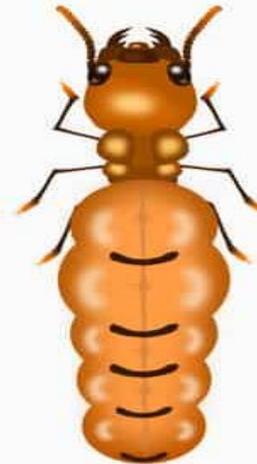
**winged  
reproductive**



**king**



**queen**



**secondary  
queen**



# Ants

## Types of Ants



*Black Carpenter Ant*



*Red Carpenter Ant*



*Bullet Ant*



*Pharaoh Ant*



*Fire Ant*



*Banded Sugar Ant*



*Argentine Ant*



*Bull Ant*



*Pavement Ant*



*Red Wood Ant*



*Dracula Ant*



*Green-Head Ant*



*Electric Ant*



*Saharan Silver Ant*



*Yellow Meadow Ant*



*Raspberry Crazy Ant*



*Black Garden Ant*



*Dinosaur Ant*



*Cornfield Ant*



*Meat Ant*



*Little Black Ant*



*African Driver Ant*

# Wasp

## WASP SPECIES



Yellow Jacket



Red Wasp



Mud Dauber

# Social behaviours

## **Polymorphism:**

- ▶ Polymorphism is the occurrence of several forms within the same species. It refers to specialization of individuals within a species. In the animals exhibiting polymorphism, individuals at the center of the colony develop gonads and reproduce sexually. Individuals at the periphery expose themselves to danger, and do not reproduce sexually. This is also an example of altruistic behaviour. The polymorphic individuals are sometimes called super-organisms, as in polymorphic individuals the unit for natural selection is not a single individual but the whole colony. The social insects are the most prominent examples of super-organisms. They are found in two orders of class Insecta namely Isoptera and Hymenoptera.

## **Large population:**

- ▶ All the individuals of the social insects species live in an integrated manner and hence the term colony is commonly used to describe their complex society. These colonies are matriarch or in other words, all the members of the colony are the offspring of a single female and so all of them have similar genotype. Also these colonies do not accept the members from other colonies of same species.

## Extra populations:

- ▶ Some aphids, beetles, mites etc. are attracted into the nests of ants and termites by the high temperature and surplus food. These extra populations are protected and fed by the ants and termites. In return the ant and termite populations feed on a fluid secreted by them. Sometimes intruders and thieves rob the social insects of their food. Some beetles live in the nest of the ant and feed on the ant larvae. All these form the extra populations of the social insects.

## Parental care:

- ▶ Parental care is an instinct behaviour whereby the young ones are provided with food, shelter and defence by the parents as a part of the family relationship. The social life in insects is linked with parental care. Parental care provides way for stronger association between the parents and the young ones. Parental care includes activities like providing the young ones with food, cleaning the nests, feeding the young and queen, removal of debris and bodies, arranging eggs in proper chambers, protecting the queen from all adversities, cooling the nest in summer season.

## **generous food facility:**

- ▶ After laying the eggs, stingless bees and some other insects provide sufficient mass of food for development of the larvae which hatch out of the eggs. This phenomenon is known as mass provisioning of the food. At the same time, other social insects daily feed their young ones continuously and extensively. The young ones are fed until they metamorphose into adults. For example, in the ant colony army ants hunt insects or flesh; pastoral ants feed on the honey dew produced by aphids. Also the pastoral ants carry the aphids into the overwintering locations to protect them from predators. Harvesting ants gather and store seeds in summer to tide them throughout the winter.

## **Trophallaxis:**

- ▶ Exchange of regurgitated food that occurs between adults and larvae in colonies of social insects is called trophallaxis. For example, termites and ants feed each other from mouth to mouth. Similarly young ones exchange food with the adults. Also beetles, aphids and coccids are fed by ants and then in return ants drink a fluid secreted by them. This is a form of mutual feeding. Trophallaxis is an important phenomenon in determination and regulation of castes in termite colony. During trophallaxis, ectohormones with certain inhibitory substances are passed on to the young nymphs and this prevents them from developing into individuals of same sex or caste. This also work as a tool to maintain the number of individuals in a particular caste.

## Swarming:

- ▶ The behaviour of the insects to come out of the nest in large numbers to relieve the overcrowding is called as swarming.
- ▶ It takes place during spring or early summer seasons.
- ▶ Swarming occurs for feeding and migration.
- ▶ It is a means of the colony reproduction.
- ▶ The queen and the males mate during swarming flight and this is also known as nuptial flight.
- ▶ Helps in formation of new colony.

# Advantages of social insects

- ❖ Living in a colony provide them strength, as there is strength in numbers.
- ❖ Work together to find food and other resources and use them more efficiently.
- ❖ Communicate their findings to others in the community or colony.
- ❖ Defend their home and resources at the time of danger.
- ❖ Outcompete other insects or animals for territory and food.
- ❖ Quickly construct shelter and expand it accordingly.
- ❖ Distribution of work.
- ❖ Provide parental care to their offspring.