Chapter 19

ANIMAL BEHAVIOUR

Major Concept

In this Unit you will learn:

- The Nature of Behaviour
- Innate Behaviour
- Learning Behaviour
- Social Behaviour

The Living organisms are different from non-living things because they have capacity to response to change in the environment. The response of the organism is adaptive that is, it enhances the probability of an organism to survive and reproduce. One of the most important ways of adapting to environmental change is behaviour. Behaviour means the response of an organism to stimuli. Usually, the behaviour of an organism is inherited but it can be modified by experience.

19.1THE NATURE OF BEHAVIOUR

19.1.1 Behaviour of Organisms in Response to Stimuli

All those responses to stimuli involved in the integrated functioning of the entire organism are called **behaviour**. In simple words, what an organism does, and how it acts after being stimuli is called behaviour. An organism has ability to response to stimuli may vary from relatively simple action as an odour of food. In this sense, a bacterial cell behaves by moving toward higher concentrations of sugar. On the other hand, the complex sexual behavioral patterns of territory defense and mating are seen in fishes, birds and mammals. In other words, what a human, animal or any other organism does after being exposed to stimuli is part of its behaviour. The study of animal behaviour is called **Ethology** (Gr. *ethiologica*, depicting character).

19.1.2 Relationship between stimuli and behaviour

The **stimulus** is a detectable change (physical or chemical) happens in the environment that causes an organism to response. The sensory cells (receptors) of an organism located in many places on or in the body which detect different changes receive form the environment and convert into signals (nerve impulses). The organism then processed or interprets the signals received from the sensory cells resulting in a response or being ignored.

Interpretation and response to stimuli

The receptors send signals through nerve cells to CNS (Central Nervous System). In CNS the signals are interpreted on the basis of stimuli. For example, thermoreceptors in the skin of baby detect heat, if the heat interpreted as dangerously high, the baby will jerk

away from the source of heat through a fast process called **reflex action** without involvement of the brain. On the other hand, the chemoreceptors in the nose of dog detect odour coming from food. The signal reaches the brain which interprets that some is good to eat. The dog then responds by salivating and perhaps begging for treat.

Different ways of responses to stimuli

The response of an organism to the stimuli can be positive, negative or ignored. A **positive** response is that in which one wants more or is attracted to the stimulus. For example a person becomes happy after hearing a good news is a positive response. A **negative** response is that in which one wants to avoid the stimulus. For example, a dog hides when you want to give it a bath is a negative response. The **ignored** reaction is that in which an organism decides to ignore the stimulus. For examples, you pay no attention to slight changes in the room's temperature.

19.1.3 Relationship between Heredity and Behaviour

The behaviour of an organism depends on neural and hormonal mechanisms such as sensory cells, nerve cells and CNS. Therefore, Genes are associated with behaviour because they control the development of all physiological systems such as the nervous system. Genes also produce proteins which are important in the behaviour response, including turning on a gene for a specific hormone or its receptor or affecting the growth of nerve cells and its activity.

When the classical methods were experimentally demonstrated the genetic basis of behaviour among animals including inbreeding and artificial selection. The animals show vary in the expression of certain behaviour because of variation in their genes. For example, all dogs belong to same species, after artificial selection different breeds have different behaviour such as variation in the hunting skills among breeds due to variation in their genes.

19.1.4 Biological Rhythms

Biological rhythms are cyclic physiological patterns of activities in an organism that are in response to periodic

environmental changes. The internal mechanism or device that controls the physiological activities in the living organism independent from external stimuli is termed as **biological clock**.

The activity of most organisms is synchronized with the daylight or night (darkness) cycle, with most organism their pattern of activity to a specific portion of the day or 24 hours called a day-night rhythms or **circadian rhythms**. The animals that are not active throughout 24 hours of a day, such as butterflies, birds including mammals which are most active during the day light are called **diurnal animals**. Other animals that are active at night (darkness) such as cockroaches, owls and bats are called **nocturnal animals**. There are still some species of the animals such as mosquitoes that are active in the early morning (dawn) or early in evening (dusk) are called **crepuscular animals.** Some animals have annual rhythms called **annual cycle** or circannual **rhythms**, including bird migration, reproductive cycles in many insects, fishes, birds and mammals and hibernation of animals.

There are two types of animal behaviour i.e. **innate behaviour** and **Learning behaviour**

19.2 INNATE BEHVIOUR (INBORN OR INSTINCTIVE BEHAVIOUR)

19.2.1. Innate (inborn) behaviour

The behaviour of an organism that is performed in response to stimulus at the time of birth without prior experience is called **innate behaviour or inborn behaviour**. Innate behaviour is inherited behaviour performed by the animals in a very similar way by all the members of species. For example, a human newborn baby instinctively grasps objects placed on his palm. Innate behaviours are important in the survival of specially those animals that have short life span and poorly developed nervous system. There are two types of innate behaviours i.e. orientation and non-orientation behaviours.

Orientation behaviours

The behaviour in which an organism moves or changes its direction in response to a source of stimuli is called **orientation behaviour**.

19.2.2. Taxis (Plural: Taxes)

Taxis is a directional movement toward or away from the particular stimulus (e.g. light, heat), if the response is movement toward the stimulus, it is a **positive taxis** and response is movement away from stimulus, it is a **negative taxis**. Moth shows positive taxis by moving toward the light and cockroach shows negative taxis by moving away from light. With respect to type of stimuli, a taxis might be classified as **phototaxis**, response to light ray, **chemotaxis** response to chemical substance, **thigmotaxis** response to contact, **hydrotaxis** response to moisture and so on.

Kinesis (Plural, kineses)

Kinesis is a simple form of non-orientation movement that be can be slow or fast. In this behaviour the animal alters its rate of movement according to intensity of the stimulus. For example, **woodlice** (Fig. 19.1) move rapidly over the dry environment, and slowdown at high humid environments.

Fig 19.1 Woodlice

Non-Orientation behaviours

In these behaviours the animals do not show movement toward particular directions in response to stimuli. These are more complex behaviours than orientation. These include, reflexes, instincts and motivations etc.

19.2.3. Reflexes

Reflex behaviour is the simplest form of response to stimulation. It describes the rapid automatic response of the body or part of the body to simple stimuli. A stimulus below the knee provokes the spinal cord which relays it through the motor nerve to extensor muscle, causing them to contract causing a kicking action. In the bright light, the pupil will contract, blinking of your eyes, withdrawing your hand from a hot object are also examples of reflexes. Sometimes, the whole body of animals may be involved in the reflex response. Withdrawal response of invertebrates such as polychaetes worms and various mollusks involve the whole body,

when triggered by nerve fibers that carry very fast messages to all muscles, so that they contract suddenly and simultaneously.

19.2.4. Instincts

The **Instinct** or **instinctive** (innate or inborn behaviour) is an inherited behaviour pattern that does not require learning or practice. These are complex behaviour patterns that are genetically programmed, which develop along with the developing nervous system and can evolve gradually over the generations, so it is also called **fixed action pattern**. In this behaviour the whole body of the animal is involved and displays its own characteristics, following behaviours are instinctive or inborn patterns of behaviour.

Migration of Salmon Fish

In fish, the migration of the salmon is remarkable. Salmon spends their life in two different habitats i.e. river and ocean. In the freshwater, the female deposits her eggs and male deposits his sperms over eggs, this process is called **Spawning**. Young spends early life in the fresh water and then leave the freshwater, moving thousands of kilometers into the open ocean. In the ocean, salmon lives six months to seven years, where they continue to feed and grow and after two or three years transform into **smolt** (stag of sexual maturity). During breeding season smolts stop feeding and then start their journey approximately hundreds miles back to exact stream for spawning where they hatched. The journey from oceanic feeding grounds to freshwater spawning grounds, risking death from exhaustion or predation, a small percentage of salmon reach their spawning ground. This migration of salmon is an instinct or innate behaviour as they do it to perfection without having prior experience. (Figure 19.2)

Fig 19.2 Salmon Fish

Dances of bees

Honey Bees have one of the interesting behaviour of communication systems to signal other bees of hive the distance and direction of the food. Bees (scout) leave hive and forage for food when they return back at their hive, other bees gather around and detect the odour of nectar source the scout has discovered. The scout performs a dance on the wall of hive, which indicates the distance and often direction of food. Scout performs two types of dance round dance and waggle dance. If the source of food is less than 90 meters away from the hive, the bees perform a **round dance** (Fig. 19.3 a.). If the source of food is farther 90 meters away, the scout bee performs a **waggle dance** (Fig. 19.3 b.) indicating both direction and distance. The dance is repeated many times and using the sun as compass and speed of the dance indicate the distance of food source from the hive, they can communicate about food up to 2 kilometers away. This type of communication among bees is instinct or inborn, bees born with this ability to understand this type of behaviour.

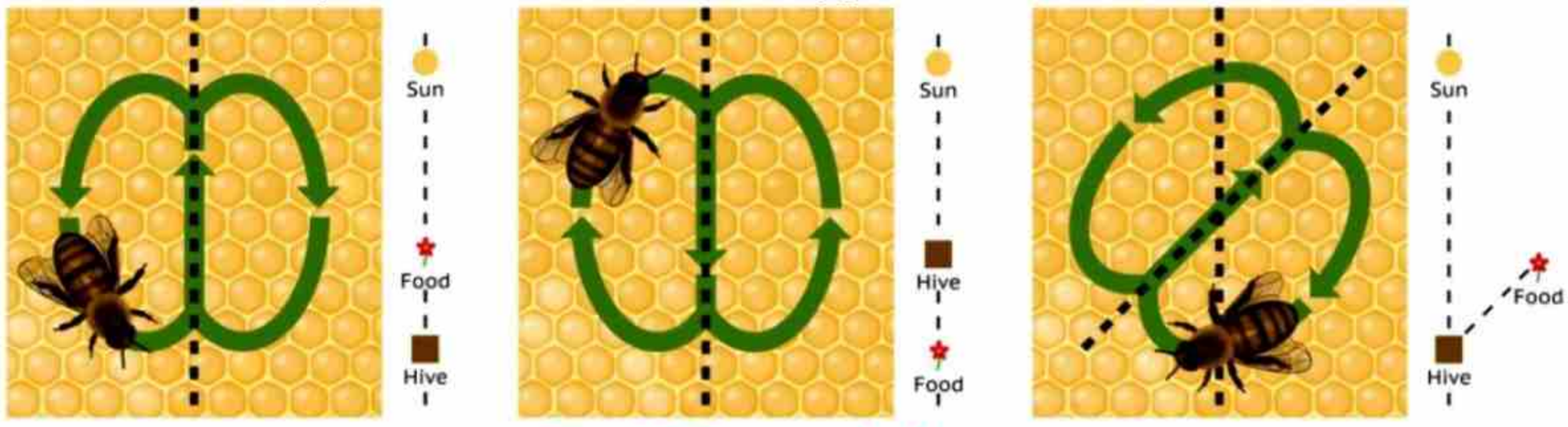

Fig. 19.3a waggle dance

Fig. 19.3 b Round dance

Nest building by birds

All birds have different strategies to build nests for their eggs deposition, the long tailed **tailor-birds** have ability to build a hanging nest. A young long tailed tailor-bird to acquire a mate builds nest for their eggs laying. This bird builds nest between hanging leaves with twigs and grass. The tailor bird has not learned nest building by older birds and had no prior experience in such a task, however it builds a nest by its instinct behaviour. (Figure 19.4)

Fig 19.4
Tailer Bird woven Hanging nest

Building of spider's orb web

The circular or orb web is spun by common spiders all over the world. The orb web is built of silk threads which are secreted by special **silk glands** present in the abdomen. A scleroprotein secretion emitted as a liquid hardens on contact with air to form the silk. Spider applies the main rule contains a set of sub rules for measuring angles and walking set distances up certain threads. By following the program of elementary rules the spider can build a complex structure without having a plan for it in her head. The orb web of spider is the outcome of highly complex and instinct or inborn behaviour patterns. (Figure 19.5)

Fig 19.5
Spider's Orb Web

Courtship behaviour of stickleback Fish

The **three-spined stickleback** fish have ritualized courtship, aggressive and parental behaviour. Sexually mature male develops a bright throat and red belly called nuptial colouration. During the breeding season, territorial male builds nest and becomes aggressive and dominant to protect from the other males. The female with

prominent silver belly approach to the male's territory, the male leads female to the nest and shows the entrance of the nest. Once the female is inside the nest the male stimulates spawning by pods the base of her tail. After spawning, the female leaves the nest and the male enters and fertilizes the eggs. The male stays close to the nest to look after the offspring, fanning the eggs and protecting the newly hatched fish for several days. This mating behaviour of the stickle-back is instinct or inborn without prior experience (Fig. 19.6).

Fig 19.6 Three-spined stickleback fish (Male and female)

19.3. LEARNING BEHAVIOUR

Learning is a process in which the animals modify their behaviour as a result of specific experience. This modification is adaptive, because it allows an animal to not only change its response to fit a given situation, but also to improve its response to subsequent, similar environmental changes. Learning behaviour is not controlled by genes like innate behaviour but it is achieved by the experience from the environment. Learning behaviour is more prominent in those animals that have a comparatively long life span and well developed nervous system.

19.3.1. Distinguish between learning and innate behaviour

Innate behaviour	Learning behaviour
Innate behaviour is inherited come with the someone's birth	Learning behaviour is acquired by knowledge/experience from society
It is reflex action of organism when exposed to stimulus	It is learned or acquired behaviour which is based on knowledge or experience
It is permanent, cannot be modified and remains same in the next generation	It can be modified by the experience and does not remain same in the next generation.
It contributes in the survival and proper functioning of organism	It improves the behavioral traits in an organism to fit in a given situation
It is more common in those animals having short life span	It is more common in those animals having long life span
In this behaviour animal requires no time to adapt them	In this behaviour animals requires more time to adapt them
Leg moving upward by newborn baby is the example of innate behaviour	Playing cricket is the example of learning behaviour

19.3.2. Habituation

Habituation is the simplest form of learning, in which the animals learn not to respond or ignore to a repeated, irrelevant stimulus. The animals learn that repeated harmless stimuli from humans or other animals then ignore the stimuli and behave accordingly. Habituation occurs at the level of the brain and may involve more complex stimuli; the stimulus is still perceived, but the animal has simply "decided" to no longer pay attention.

Fig 19.7 Wild squirrel (Habituation)

For example the wild squirrels commonly inhabits the park. If a person wants to take a picture of a squirrel it will move away from the people due to fear of danger. After this happens many times the squirrel will learn that it is not dangerous to him. This process repeats over time and squirrel will be less afraid. Eventually, the squirrel will completely lose its fear and will not respond to a stimulus. This happens due to habituation behaviour and when the people give them feed then the squirrel will approach the human without any fear (Fig. 19.7).

19.3.3. Imprinting

Imprinting is a type of learning in which a young one fixes its attention on the first moving object or another animal then follows soon after birth or hatching. It refers to a particular form of learning that occurs during a usually very short sensitive period early in the life of an individual. Once the animals learn, this information is firmly fixed and may be used later in life in identifying mates, in forming flocks, and in other social interactions. Imprinting was first observed in birds when chicks, ducklings, and goslings followed the first moving object they saw after hatching.

The classic experiment was done by **Konrad Lorenz** in the 1930s. He used the greylag goose (*Anser anser*) to demonstrate imprinting. Lorenz found that by substituting himself for the mother during this critical period, he could induce young geese to imprint on him. When incubator-hatched goslings spent their first few hours with Lorenz, rather than with their mother, they steadfastly followed Lorenz and showed no recognition of their mother or other adults of their species. Even as adults, the birds continued to prefer the company of Lorenz and other humans to that of geese. Lorenz demonstrated that the most important imprinting stimulus for greylag geese was movement of an object (normally the parent bird) away from the hatchlings. (Figure 19.8)

Fig 19.8
Konrad lorenz with greylag goose

19.3.4. Differentiate habituation and imprinting as reversible and irreversible learned behaviour

Habituation is a reversible. For example a snail crawling on a sheet of glass retracts into shell when glass is tapped. After pause, it emerges and continue moving. A second tap causes retraction again but it emerges more quickly. Ultimately, tapping has no effect and snail ceases to respond. It is reversible learning behaviour because after some time this habituation will vanished and snail again will show same response. Imprinting is learning that is limited to as specific time period in animals life and that is irreversible i.e. it remains throughout life.

19.3.5. Classic Conditioning

The animal learns the same response for two different stimuli, which are presented together to the animal is called **classic conditioning**. The most famous experiment of classical conditioning was developed by **Ivan Petrovich Pavlov**. He presented food to the dog and rang the bell simultaneously. After a while, the dog began to salivate at the sound of the bell, whether or not food was available. To begin with, consider a normal stimulus, such as the odor of food; this is likely to elicit salivation in dogs. Food (or its odor) is a highly relevant stimulus; a bell, of course, is not and means nothing to a dog unless something happens that causes the animal to associate the bell with food. In this situation, as classical conditioning begins, the odor is termed the unconditioned stimulus (UCS) and the bell becomes a conditioned stimulus (CS) which produces the conditioned response of salivation. When Pavlov rang the bell (a neutral stimulus-NS) at the same time he presented food (a UCS) and did so repeatedly and consistently, the dog formed an association between the bell and food. (Figure 19.9)

Fig 19.9 Pavlov's Experiment

19.3.6. Instrumental conditioning (Trial and error learning)

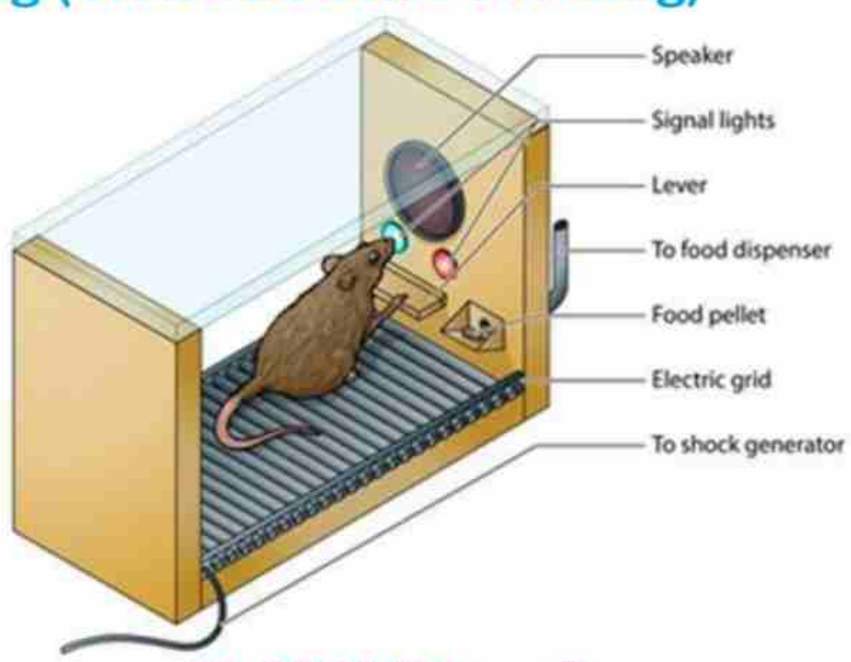

Fig 19.10 Skinner Box

The animal learns while carrying out certain searching actions such as walking and moving about. When the animal finds food during these activities, the food reinforces the behaviour and the animal associates the reward with the behaviour is called operant learning. A classic example of instrument conditioning is that in a 'Skinner box' developed by well-known psychologist **B.F Skinner** (1904-1990). When, he placed rat in the box, the rat began to explore. It moves all about the box and by accident or eventually presses a lever and is rewarded with a food pellet. Because food rewards are provided each time the rat presses the lever, the rat associates the reward with behaviour. Through repetition, the rat learns to press the lever right away to receive the reward. In this type of learning, the animal is instrumental in providing its own reinforcement. Finally, the rat learns to press the lever to obtain food. (Figure 19.10)

19.3.7. Latent Learning

Fig 19.11 Latent Learning

Sometimes animals seem to learn without any obvious immediate reward. For instance, an animal can learn important characteristics of its environment during unrewarded explorations and then use this information later. If food or another reward is provided, the animals suddenly respond quickly to it by previous learning, but remain latent or hidden until an obvious reinforcement is provided called Latent learning. The

American psychologist **K.L. Lashley** used a maze, a rat was put in the maze. The rat explores the maze in order to find the exit. Eventually, the rat found the way to exit but it also learned the location of food in the maze. The rat was not hungry at that time so it did not pay attention to the food. Then the same rat was put in the maze when it felt hungry. The rat, because of its previous experience, found the food quickly than a rat has been put without previous exploratory experience. (Figure 19.11)

19.3.8. Insight Learning

In the insight learning animals use cognitive process, practice or judgment to solve the problem, it is based on trial and error without prior experience. German psychologist **Wolfgang Kohler** in the 1920s performed an experiment on the behaviour of chimpanzees. Kohler placed chimpanzees in a cage, provided several sticks and boxes and hung a bunch of bananas that were out of reach. The chimpanzees first looked at the bananas and tried to reach but they could not reach, after that they thought and observed to solve this problem to reach the bananas. In the first they placed the sticks into another stick to make a long stick that could be used to knock down the hanging bananas. The chimpanzees would also solve the problem by stacking the boxes on top of each other, which allowed them to climb up to the top of the stack of boxes and reach the bananas. This type of learning based on observation Kohler called insight learning. (Figure 19.12)

Fig 19.12 Insight learning

19.4. SOCIAL LEARNING

The interaction between two or more individuals of the same species living together is called social behaviour. The animals live together have its benefits, it can help an animal avoid predators, find food and rear offspring.

19.4.1. Aggregation and Animal Societies

Aggregation is a simple group of animals that may be together due to feeding, drinking or mating but do not interact behaviorally. Fruit flies hovering on a piece of rotting fruit, huge flocks of birds of many species living on trees together, groups of zebra, school of fish are examples of aggregations.

The living organisms are often organized into groups. The group of animals of the same species living together that have cooperative social relationships is called social group or **society**. Social or mutual behaviour is the key characteristic of the society. These are relatively permanent unions of individuals held together by mutual attraction of its members. The basis of social life is the interaction of individual members who exchange food, water, body care and sexual favor

19.4.2. Hostile and helpful intraspecific interaction.

Hostile and helpful interaction seen in many social insects, the best known interaction is observed in the honey bees. In the hive, there are three different castes i.e. workers, drones and queen. In the hostile interaction, the workers become old and unable to perform their duties, furthermore than these workers are killed by other workers. On the other hand, in helpful interaction all castes work together like workers collect nectar and convert into honey, drones are specific to provide defense mechanisms and fertilize the eggs and queen lay eggs.

19.4.3. Agonistic Behaviour

In the society of animals, conflicts arise due to limited resources, such as food, mates or territory; these conflicts are settled by the **agonistic behaviour.** In this behaviour, one animal is aggressive or attacks another animal including threats, rituals and sometimes combat that determine which competitor gains access to the resources. In many species, males show their aggressiveness in the form of signals that warn other males of an intention to defend an area or territory. Agonistic behaviour is important in the maintenance of territories and dominance hierarchies.

19.4.4. Territory

A **territory** is an area or home which is fixed by animals. The size of the territory varies with the species, it is typically used for feeding, mating, rearing young, or combinations of these activities. A territorial animal uses agonistic behaviour to defend their territory against other individuals. For example, a male actively defends his territory against other males so he can attract a female and court her without interference from other males. Once the territory is established through agonistic behaviour then other individuals will not enter in their territory because they will understand through aggressive behaviour that this is an occupied area of other animals. Territorial behaviour is seen in animals as diverse as worms, insects, fish, birds and mammals.

Territorial behaviour in Gorillas

Gorillas are non-territorial social mammals that live in groups (called Troops). Troops consist of 1-4 old and strong males called silverback, some immature males called black backs and several adult and young females. The adult male silverback is usually dominant in the troop and has exclusive breeding rights to the females. The adolescent female transfers from troop to another before reproducing age (about 8 years). The rank of female in the troop is determined by the order of recruits in the troop. Late arrivals in the family do not receive the benefit of high ranking females because having offspring remain close to the silverback male for protection. On the other hand, adolescent male split from his family due to lack of breeding opportunities. Usually, he remains alone until he forms his own family. Silverback is typically more aggressive than other group members because the troop's safety is his responsibility. He does exhibit territorial behaviour by standing upright on their two

Fig 19.13 Mountain Gorilla

legs and profoundly their chest in order to intimate whatever threat he has given. He is dominant over his family, makes all troop's decisions, is responsible for all calls, receives the dominant portion of food and can terminate troublesome behaviour with just a look. (Figure 19.13)

Territorial behaviour in Baboons

The Old World monkeys lack a prehensile tail, and their nostrils open downward. They include mandrills, macaques, rhesus monkeys, and baboons. Many species of old work monkeys are arboreal, but some are ground dwellers such as baboons that live in a troop in their territory. Baboons are dimorphic, the males are larger than the females. They threaten other family members of the troop with their long, sharp teeth (Canines).

Fig 19.14 Baboon

One or more male baboons become dominant by frightening other males. However, the dominant males pay costs for their dominance. Being dominant, it is their responsibility to fight predators and may get hurt and so forth. Baboons travel within a territory, foraging for food the whole day and sleeping in trees at night. Dominant males decide where and when the troop will move. If the troop is threatened, dominant males protect the troop as it retreats and attacks intruders when necessary. Vocalization and displays, rather than outright fighting, may be sufficient to defend a territory. (Figure 19.14)

19.4.5. Dominance hierarchy

A dominance hierarchy describes situations in which animals organized a rank that determine the resources such as access to food, mating, and grooming services of other members in their social group. Individuals at the top of hierarchies often have first access to more food, more mating opportunities, and safer territories than

individuals at the lower end of hierarchies. This relationship between individuals in a group as a result of aggressive behaviors and the response to aggressive behaviors. When aggression occurs in group-living species, and individuals interact with each other many times it can be measured dominance hierarchies.

Pecking order of chicken

Pecking order in chickens is a good example of a dominance hierarchy. When several hens unfamiliar with one another are placed together, they response by fighting, chasing and pecking among themselves until established a clear pecking order. The alpha, or top-ranked, hen in the pecking order is dominant, she is not pecked by any other hens and can usually drive off all the others by threats rather than actual pecking. The alpha hen also has first access to resources such as food, water, and roosting sites. The beta, or second-ranked, hen similarly subdues all others except the alpha, and so on down the line to the omega, or lowest, animal. Once the hierarchy is set, peaceful coexistence is possible and occasionally fights will occur if a hen tries to move up in the order. (Figure 19.15)

Fig 19.15 Chicken exibiting peck order

19.4.6. Altruism (L.: alter, the other)

Many social behaviours are selfish, in which they behave for their own benefits. Behaviours that increase the survival and reproductive success regardless of how much the behaviour may harm others. On the other hand, altruism is a behaviour performed by animals without regard of self-interest. Animals sacrifice some of their own reproductive potential to benefit other members of its society. Altruism behaviour is often found in the social animals. In insect societies, especially, reproduction is limited to only one pair, the queen and her mate.

Altruism in the organization of honeybee society

Honeybees are social insects that live together in an organized group or colony. A colony of honeybee consists of three types of castes i.e. the queen, the workers and the drones. These castes perform specific functions in the colony. The **queen** lays fertilized and unfertilized eggs from which other bees develop. New queen also develops from the fertilized egg, the larva of the queen feeds on the special food called (**Royal jelly**). The old queen and new developed queen may both be present in the hive for some time. Then, the new queen to emerge may be killed by the other members of the colony and assume the same rule or may create a swarm and leave the colony to establish the new hive. On the other hand, the old queen and swarm of females and drones leave to establish a new hive or accidentally killed, lost, or removed from the hive. The **drones** are male bees that develop form the unfertilized eggs. The main function of the drones is to fertilize the queen during her mating flight. But unfortunately they die after mating. The **workers** are sterile females (non-reproductive) developed from the fertilized eggs. The workers are relatively small in size but the greater number in the colony. The workers perform all the labor of the hive such as cleaning and polishing the hive, building beeswax combs, forage for nectar, care for the queen and guard the entrance. Even though sterile female workers spend their lives feeding and looking after their other members of the colony, they are prevented producing offspring. (Figure 19.16)

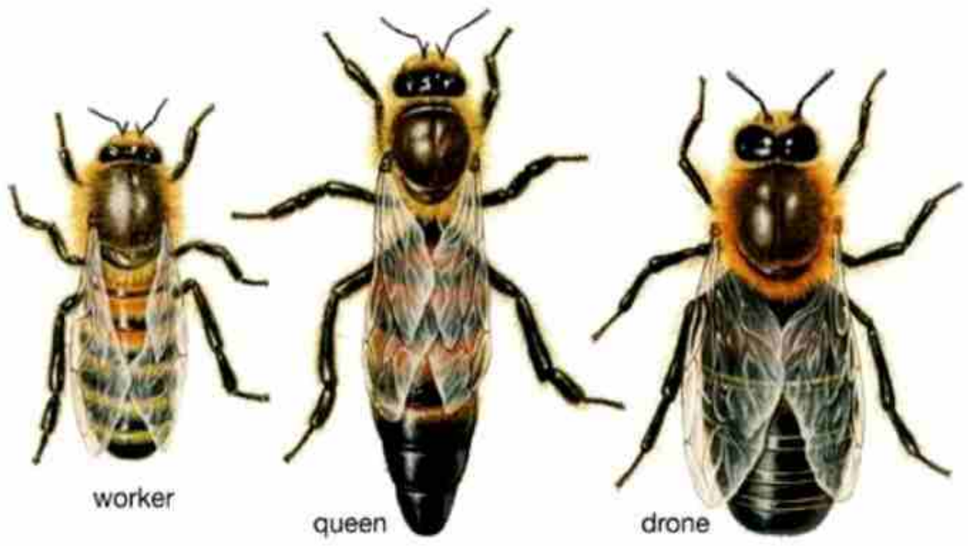

Fig 19.16 Honeybee (Apis mellifera)

SUMMARY

- All the activities performed by animals in response to stimuli called behaviour.
- The scientific study of animal behaviour is called Ethology.
- The stimulus is any detectable change (physical or chemical) in the environment of an organism. The behaviour of animals is depend upon the nerve impulse, hormones and physiological mechanisms.
- The internal mechanisms by which internal phenomenon occur without external stimuli is called the biological clock.
- Innate behaviour may be defined as the behaviour of an organism performed at the time of birth in response to stimuli without prior experience, it is inherited behaviour.
- Kinesis (plural, kineses; from the Greek word for "movement") is a simple form of orientation, in which the animal's response is proportional to the intensity of stimulation.
- Taxis is a directional movement toward or away from the particular stimulus (e.g. light, heat), if the response is movement toward the stimulus.
- The Instinct or instinctive (innate or inborn behaviour) is an inherited behaviour pattern that does not require learning or practice.
- Learning behaviour is a change in the behaviour of animals resulting from the experience.
- In habituation, the animals stop or ignore the response to an irrelevant stimulus.
- Imprinting is a type of learning behaviour in which animals fix their attention on the first moving object after birth and thereafter follows that object.
- An animal can learn important characteristics of its environment during unrewarded explorations and then use this information later is called latent learning.
- In insight learning, animals use cognitive process, practice or judgement to solve the problem, it is based on trial and error without prior experience.

EXERCISE

1. Encircle the correct choice.

i) The decrease in response to repeated or continuous stimulation is called
(a) Insight (b) Habituation
(c) Maturation (d) Instinct

ii) The cyclic physiological patterns of activities in an organism that are in response to periodic environmental changes is called
(a) Biological Clock (b) Biological rhythms
(c) Circadian rhythms (d) All of Above

iii) A directional movement of an organism toward or away from the particular stimulus is called
(a) Kinesis (b) Taxis
(c) Reflex (d) Fixed Action Pattern

iv) Simplest form of learning, in which the animals learn not to respond or ignore to a repeated, irrelevant stimulus.
(a) Imprinting (b) Kinesis
(c) Habituation (d) Fixed Action Pattern

v) Which one of the following is not an instinct behaviour?
(a) Migration of Salmon Fish (b) Dances of bees
(c) Territorial behaviour in Gorillas (d) Nest building by birds

vi) Wolfgang Kohler in 1920s performed the experiment on the behaviour of
(a) Rats (b) Chimpanzees
(c) Graylag Goose (d) Dog

vii) Workers (honey bee) are
(a) Fertile Females (b) Fertile Male
(c) Sterile Female (d) Sterile Male

viii) Agonistic behaviour is the type of
(a) Innate Behaviour (b) Learning behaviour
(c) Social Behaviour (d) Instinctive behaviour

ix) Migration of Salmon Fish is the example of
(a) Orientation behaviour (b) Learning behaviour
(c) Social Behaviour (d) Instinctive behaviour

x) Skinner box was used for
(a) Classic Conditioning (b) Operant Learning
(c) Latent Learning (d) Insight Learning

2. Write short answer of the following questions:

i) Define stimuli. How organisms respond to different stimuli?
ii) What is reflex? Give three examples of reflexes in vertebrates.
iii) What is the relationship between heredity and behaviour?
iv) Define biological rhythms. How are biological rhythms important to man?
v) What do you know about taxis? Give examples of positive taxis and negative taxis.
vi) What is the difference between innate behaviour and learning behaviour?
vii) How do bees communicate about food sources?
viii) How do old word monkeys defend their territory?

3. Write detailed answers of the following questions

i) Define innate behaviour in term of reflexes shown by vertebrates and invertebrates
ii) Describe the construction of an intricate web by a spider as instinct behaviour.
iii) What is imprinting? Describe the imprinting in young ducks. How is it adaptive?
iv) Describe the agonistic behaviour and relate it with the maintenance of social order in terms of territories and dominance hierarchies.