11. Study of morphological adaptations of animals, found in xeric and aquatic conditions or habitats.

Date : / /

Aim :- Study of two animals each found in xeric (desert) and aquatic conditions (habitats) with respect to their morphological adaptations.

Desert animals show adaptations for conservation of water and to deal with extreme diurnal temperature fluctuations.

1. Camel (*Camelus* spp) :

- It is a xerocoles animal adapted to the desert conditions. It can tolerate wide range of temperature fluctuations.
- It excretes concentrated urine in order to conserve water.
- It accumulates fat in the hump so that heat flows away from the body and inward flow of heat is prevented.
- Camel can even close its nostrils to stop blowing sand from entering nostrils. It is a two-toed ungulate showing presence of hooves instead of claws on the feet. Flat and wide feet help it to walk easily over soft sand.
- It is capable of drinking large volume of water (about 100 liters) in a short time (about10 minutes).
- It has long eye-lashes that protect eye from sand dunes/ strong winds.

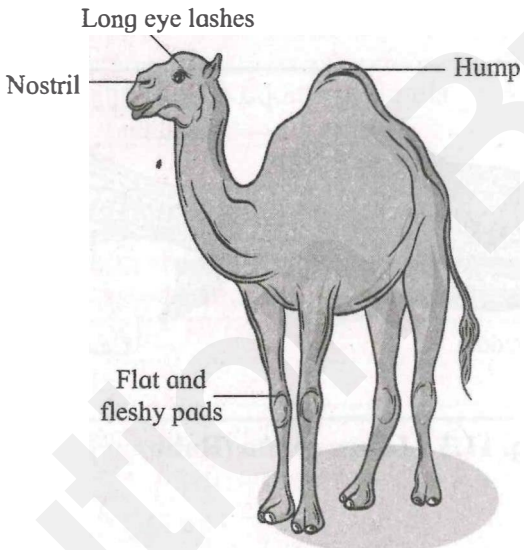

Fig. 11.1 : Camel

2. Kangaroo rat (*Dipodomys* spp):

It is a xerocoles rodent. It is nocturnal in habit to avoid heat of the day and to have humid air inside. It seals its burrow during daytime to prevent the loss of moisture. It obtains metabolic water and has the ability to derive hygroscopic water from dry seeds which it eats. Kangaroo rat neither sweat nor pant to keep itself cool.

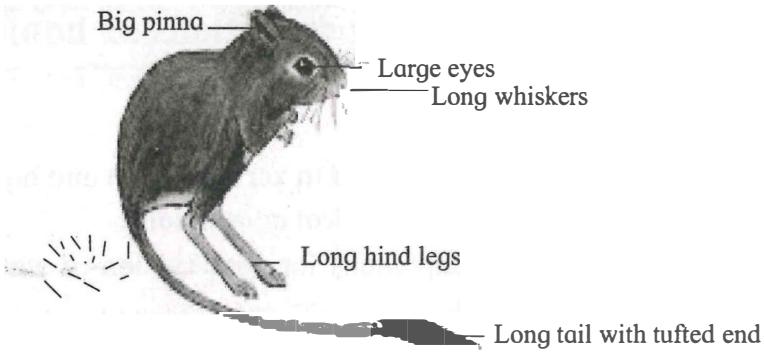

Fig. 11.2 : Kangaroo rat

Adaptations of animals found in aquatic conditions (habitats).

Aquatic animals show special adaptations for aquatic habitats.

1. Fre h water fish Rohu (*Labeo rohita*) :

i. Body is laterally compressed and streamlined in order to minimize resistance of water and thus to reduce friction with water.
ii. It shows presence of gills for respiration which help in exchange of gases in water.
iii. Paired fins help in swimming and caudal fin acts as steering during swinning (i.e. changing direction).
iv. Body is covered by scales to prevent osmotic entry of water into the body.
v. *Labeo* is ammonotelic.

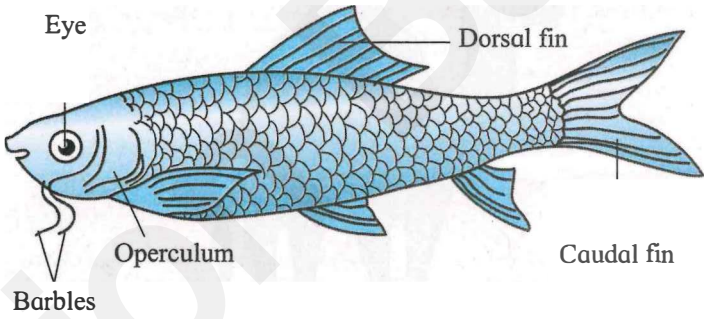

Fig. 11.3 : *Labeo rohita* (Rohu)

2. Dolphin (*Delphinus* spp) :

i. It is a mammal and not a fish.
ii. It has streamlined, smooth and furless body to reduce friction.
iii. It has a backward curving dorsal side and dorsal fin. Snout is beak like.
iv. The position of nostrils near the top of the head, facilitates easy breathing when animal reaches the surface of water for breathing.
v. Flippers in dolphin can control for steering, slowing and going up or down or out of water.

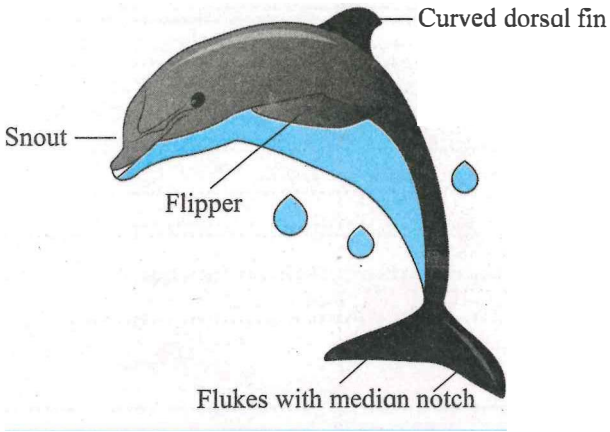

Fig. 11.4 : Dolphin

Questions

1. Enlist morphological adaptations in desert animals.

The desert animals are poikilotherms, i.e., they can match their internal temperature to the external.
They excrete nitrogenous waste in the form of uric acid.
The animals stay in burrows to avoid water loss from the body and excrete highly concentrated urine.
The body temperature of camels increases by 7℃ during the late afternoon that decreases the heat flow from the environment. The fur reduces the heat gain from the environment.
Thus these adaptations help them to conserve water as much as possible and prepare them to live without water if required.

2. Enlist the morphological adaptations in aquatic animals.

They inhale oxygen through their gills or skin. Marine mammals have lungs and have to come to the surface to breathe.
They are cold-blooded, i.e., their body temperature is the same as the surrounding environment.
The collapsible lungs and rib cages help them to withstand very high water pressures.
The aquatic animals at great depths are bioluminescent, i.e., they emit light to attract preys and mates.
They have the property of osmoregulation, i.e., the fish can maintain an internal environment of salt and water.

3. Give functions of :

a. Hump

The humps function the same way—storing fat which can be converted to water and energy when sustenance is not available. These humps give camels their legendary ability to endure long periods of travel without water, even in harsh desert conditions. As their fat is depleted, the humps become floppy and flabby.

b. Gills

Gills are respiratory surfaces used for breathing in water. Gills are present in all amphibian larvae and in some aquatic salamanders. They are typically highly branched structures. The numerous branches increase the available surface area for gas exchange, but owing to this branchiate structure and the absence of skeletal support, gills are strictly aquatic respiratory organs.

c. Flipper

Flippers are used for different types of propulsion(the action of driving or pushing forwards), control, and rotation.

d. Caudal fin

The caudal fin is the primary appendage which is used for locomotion in many fishes. The caudal fin is also known as tail fin or a median fin which is usually homocercal or heterocercal. Generally, it is a vertically expanded structure which is located at the caudal end of the body. The base of the caudal fin is known as caudal peduncle with strong swimming muscles. In general, caudal fin acts like a propeller while the caudal peduncle functions as a motor.

4. Enlist cursorial adaptations in desert animals.

desert animals get away from the sun's heat by digging underground burrows. They have massive hind legs, that allow the Kangaroo Rat to jump nine feet at a time, allowing it to escape fast and sneaky animals.

Remark and Signature of Teacher .....