

Adaptation of Plants and Animals Found in Xerophytic Conditions

INTRODUCTION

1. Useful inheritable variations or changes in form, function and behaviour which help an organism to adjust well and successfully in its environment are called adaptations.
2. An organism is considered best adapted to an environment when it possesses inherited traits that enhance its survival and ability to reproduce in that environment.
3. The plants and animals have different types of adaptations to cope with different type of stresses.
4. The plants of hot deserts are adapted to survive in dry conditions of soil and high temperature. Such plants are called Xerophytes.

EXPERIMENT 18.1



Objective. Study of two plants and two animals found in xerophytic conditions and comment upon their adaptations/morphological features.

ADAPTATIONS OF PLANTS AND ANIMALS TO XEROPHYTIC CONDITIONS

Capparis decidua (Kair or Teent)

Comments

1. It is a drought enduring non-succulent xerophyte.
2. The leaves do not open completely and remain on the plant for very short period to reduce transpiration.
3. The stipules are modified into slightly curved spines to reduce transpiration and check grazing.
4. The function of photosynthesis is mainly carried out by green stem.

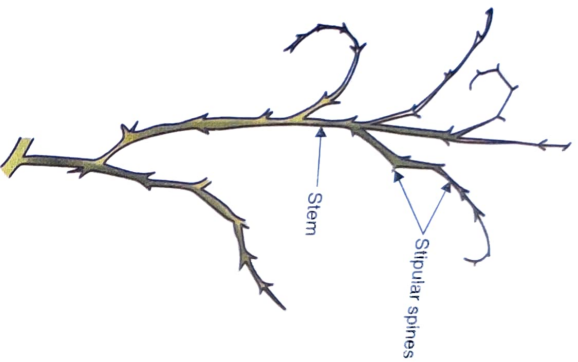


Fig. 18.1. *Capparis decidua*.

Acacia arabica (Babool or Kikar)

Comments

1. It is a drought enduring xerophyte.
2. The older part of the stem are covered over by thick brown corky bark.

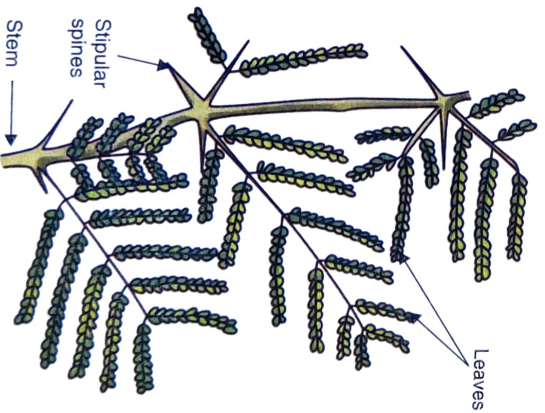


Fig. 18.2. *Acacia arabica*.

3. The leaves are bipinnate to reduce transpiration.
4. The stipules are modified into spines to reduce transpiration and prevent grazing.

3. *Zizyphus nummularia* (Berl)

Comments

1. It is a drought enduring spiny wild shrub that grows in arid areas and waste lands.
2. The leaves are small and leathery. The lower surface of leaves is covered by hair.
3. The stipules are modified into spines.



Fig. 18.3. *Zizyphus nummularia*.

4. *Calotropis procera* (Ak)

Comments

1. It is a drought enduring wild shrub of arid, desert and waste lands.
2. The plant has a light grey colour which makes it possible for the plant to absorb less sunlight.
3. The leaves and young branches are covered by a mealy coating along with hair. The mealy coating acts as insulating covering.
4. The leaves are thick and partially leathery. They do not wilt easily.
5. The plant possesses latex, which help in retaining water.

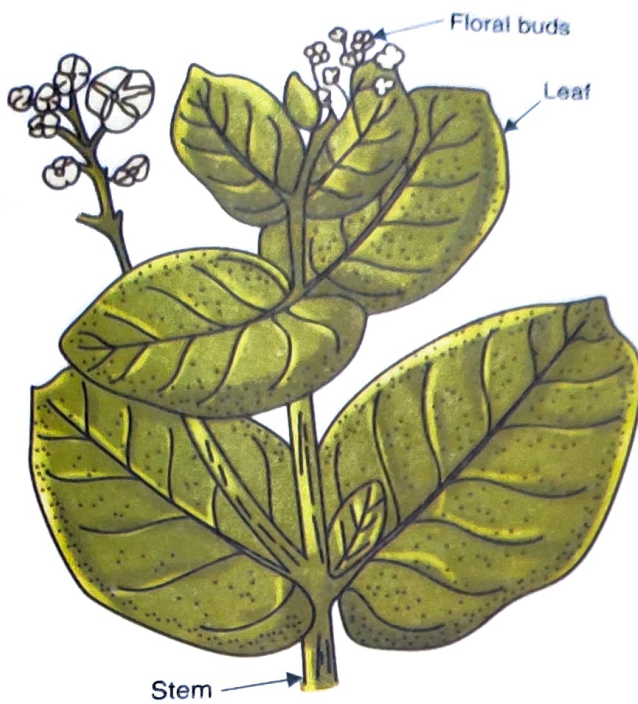


Fig. 18.4. *Calotropis procera*.

Opuntia dillenii (Nagphani)

Comments

1. It is a succulent or drought resisting xerophyte, which grows wild in arid areas.
2. The leaves are caducous. They fall down soon after their formation to reduce transpiration.

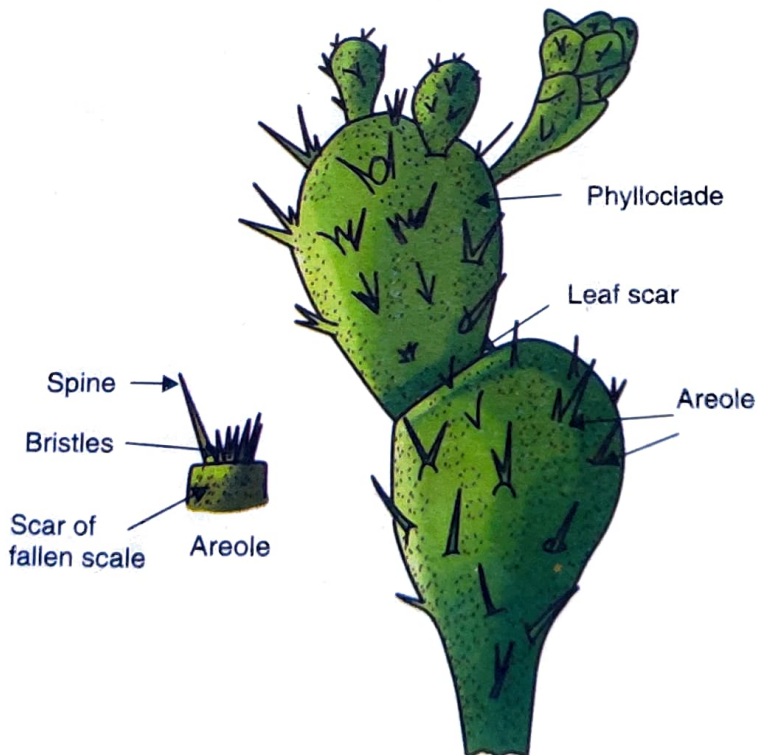


Fig. 18.5. Shoot of *Opuntia* showing phylloclades.

3. The stem is jointed, flattened and green called phylloclades. It is green and takes over the function of photosynthesis.
4. The stem becomes fleshy due to storage of water. The stored water is used throughout the unfavourable periods.
5. The stem possesses abundant mucilage, which helps in retaining water.
6. Phylloclades bear several nodes or areoles. The areoles have one or more spines which represent the leaves of axillary branches.
7. Besides there are a number of bristles to reduce transpiration and prevent grazing.

6. *Euphorbia royleana* (Danda Thor)

Comments

1. It is a succulent shrubby xerophyte which grows wild in drier areas.
2. The leaves are drought deciduous (i.e., fall off during drought). They persist only during rain or when water is available.
3. The stem is green and shining. It carries out the function of photosynthesis.
4. The stem possesses paired spines to reduce transpiration and grazing by animals.
5. It stores water and possesses white latex. The latex is a device to conserve moisture and seal the places of injury.

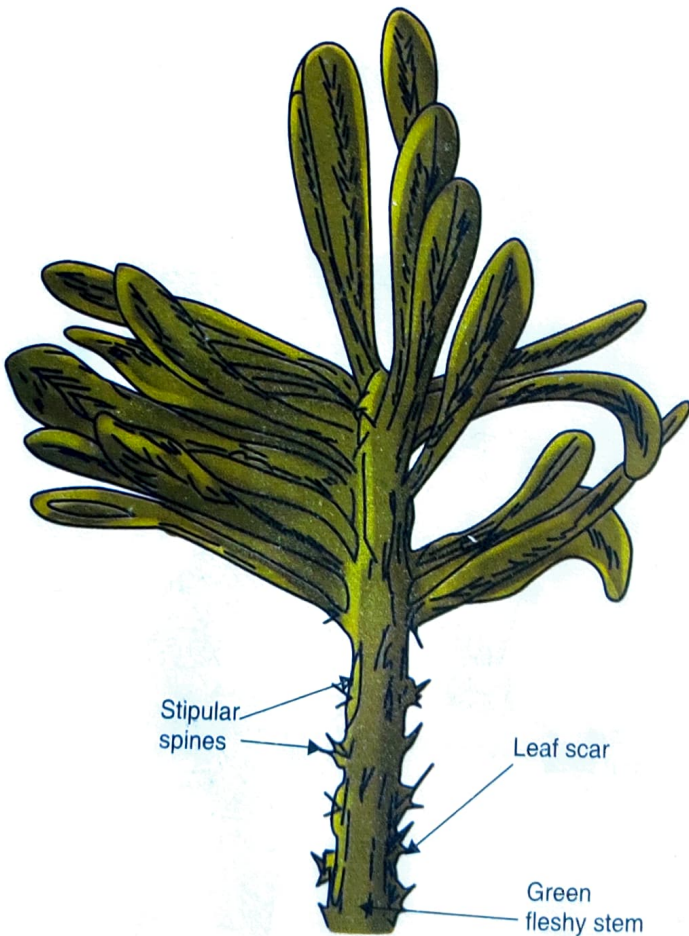


Fig. 18.6. Phylloclade of *Euphorbia royleana* showing a few leaves at the tip.

Core Experiments

7. Kangaroo rat

Comments

1. It is a xerocoles rodent, which avoid heat by adopting nocturnal habits (*i.e.*, active during night).
2. It conserves water by excreting solid urine and can live from birth to death without drinking water.
3. It seals its burrow by day to keep its chamber moist.
4. It obtains water from its own metabolic processes and from hygroscopic water in the soil.

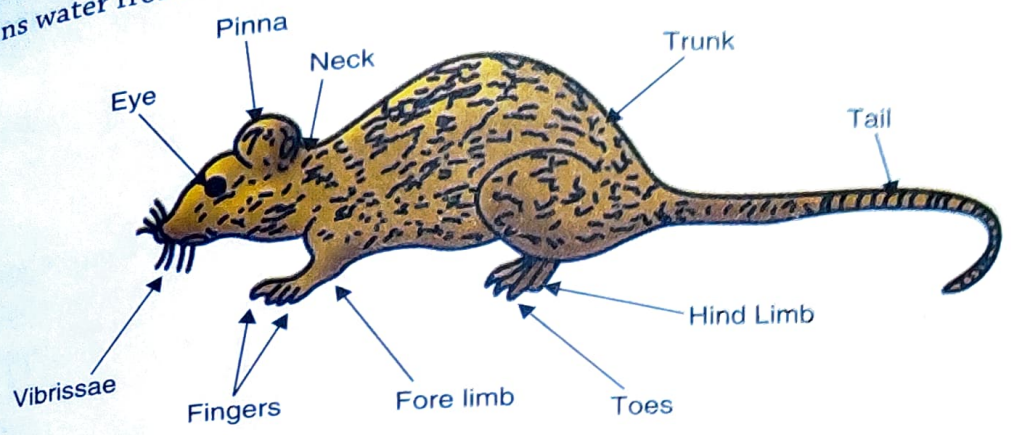


Fig. 18.7. Kangaroo rat.

8. Camel

Comments

1. It is a xerocoles animal adapted to the desert conditions.

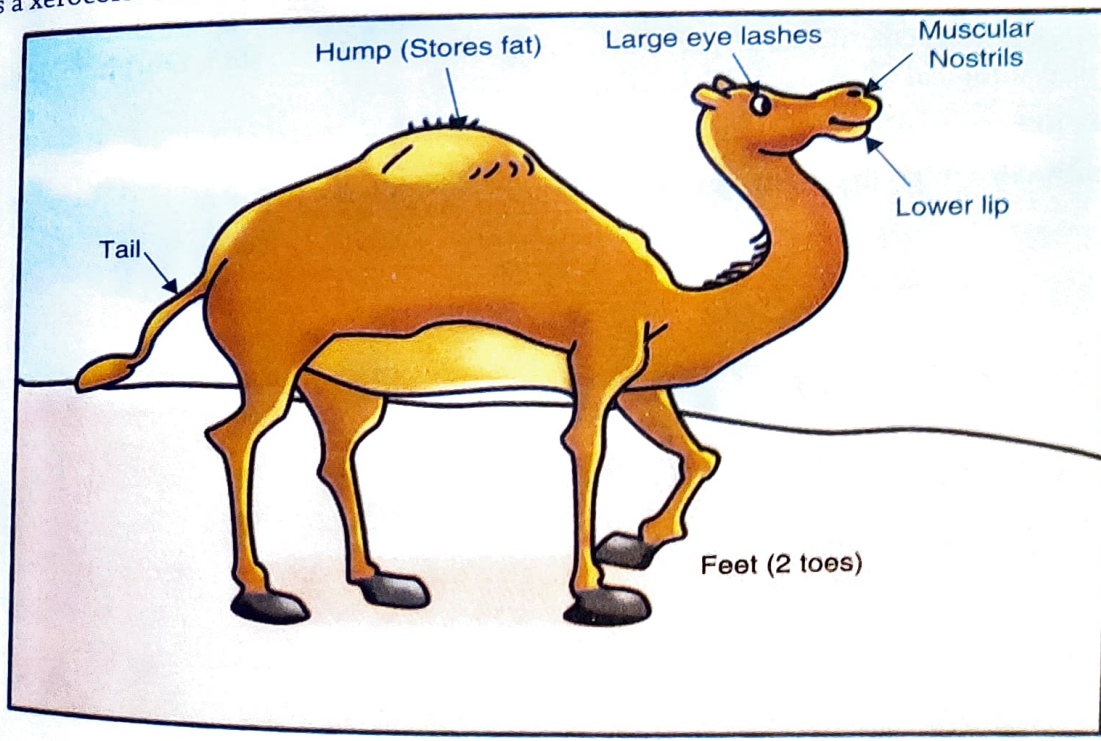


Fig. 18.8. Camel—Adapted to desert conditions.

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2. It is able to tolerate wide range of temperature fluctuations and is able to maintain blood moisture even during hot period.
3. It excretes concentrated urine and can withstand dehydration upto 25% of its body weight.
4. It accumulate its fat in the hump rather than all over the body. This speeds heat flow away from the body and its thick coat prevents the flow of heat inwards to the body.
5. Its feet has two toes each with fleshy pad below which spread the load on sand enable it to move on hot and slippery sand.
6. Its slender snout bears a cleft upper lip, long eye lashes and muscular nostrils which can be closed for protection from wind blown sand.