

Xerophytes

Xerophytes :- plants of dry habitats. They are growing on xeric conditions eg:- Opuntia, Casuarina, Calotropis etc

- * Xerophytes are growing in dry areas as in deserts hence they are known as desert plants
- * In dry habitats, the rainfall is low & drought is long period

Kind of Xerophytes

Xerophytes are divided into three groups. They are

- (1) Drought-escaping plants
- (2) Drought-enduring plants
- (3) Drought-resistant plants

(1) Drought-escaping plants :- Small herbaceous plants which live in the moist soil & complete their life cycle before the advent of drought are called drought-escaping plants

- * They are also known as ephemerals.
- * These plants complete their life cycle within a short duration (6-9 weeks)
- * They survive in the form of seeds with thick seeds or in the form of fruits with thick pericarp, throughout the dry seasons
- * When favourable season comes, the seeds germinate, plants grow & produce flowers & fruits before the start of the dry season
eg:- Asparagus, Solanum, Xanthocarpus... etc

(2) Drought-enduring plants :- plants that tolerate drought due to the presence of small-sized leaves are called DEP

- * These plants grow for a long time. The require small quantity of water for their survival eg :- Echinops etc

(3) Drought resistant plants

- * plants resisting the drought due to the presence of morphological, anatomical & physiological adaptations are called drought resistant plants

- * They are true xerophytes eg :- Bryophyllum, Opuntia, Aloe etc

On the basis of the nature of dry substratum

Xerophytes are divided into the following groups.

- ① psammophytes :- plants growing on sandy soil are called psammophytes eg :- Acalia
- ② lithophytes :- plants growing on dry rocky substratum are called lithophytes eg lichens, Linaria etc
- ③ psychrophytes :- plants growing on cold soil in which available growth water is minimum are called psychrophytes
- ④ Halophytes :- plants which are restricted to saline habitats eg :- Rhizophora, Aicennia etc
- ⑤ Eremophytes plants grow on the waste lands

- * Based on the presence or absence of water storage Organs

- * Xerophytes have been divided into succulent & non-succulent Xerophytes

- * Succulent Xerophytes possess some fleshy water-storage Organs eg :- Aloe, Opuntia

- * The non-succulent Xerophytes do not have any H_2O storage tissue in their body eg Calotropis

- * Xerophytic plants possess some adaptations in their morphological, anatomical & physiological characteristics to tolerate extreme drought

Xerophytic adaptations are meant for

- Absorbing maximum amount of water
- Retaining the water for a long time
- Reducing the water loss from plant body
- Reducing the consumption of water.

Morphological Adaptations

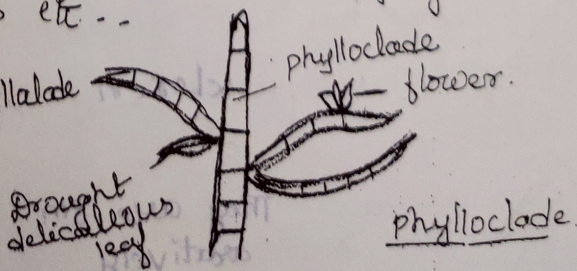
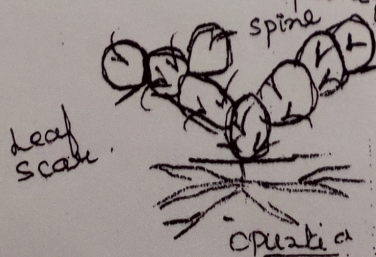
To resist drought xerophytes have special adaptations in their roots, stems & leaves

(1) Root System :-

- * Xerophytes have well-developed & extensively branched long root system
- * Root system is generally longer than their shoot system
- * It helps the plant to absorb water from deep layers of soil
- * The root system of prosopis grows upto 65 feet depth & its lateral roots covers a wide area in the soil.

(2) Stem :- Stem of some Xerophytes are hard & woody

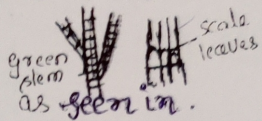
- * They may be covered with wax & silica or dense hairs they prevent H_2O loss from the surface
- * Stem may be modified into thorns as in olea
- * In some succulent xerophytes, stem is fleshy, green & covered with spines ex: opuntia
- * Stem is modified into fleshy, green, flattened, leaf like structure. This kind of stem is called phylloclade or cladode ex: cacti, Asparagus etc..



(3) Leaf :- Leaves :- In some xerophytes leaves are small.

& scale like ex Casuarina & Asparagus

* In some xerophytes, leaves are needle like as seen in Pinus.



* In some plants, the leaf is swollen & fleshy due to the storage of water & mucilage in it such leaves are called succulent leaves.

* In these plants stem is very short.

* The succulent leaf acts as a water storage organ.

eg :- Aloe spinosa

* Some xerophytic leaves are rough & leathery in texture eg Neurium.

* Leaves in some xerophytic plants are covered with dense hairs or trichomes are called trichophyllous plants.

* The trichomes reduce the rate of transpiration from the leaves eg Calotropis procera. This kind of xerophytic adaptation is called trichophylly.

Anatomical adaptations

→ Epidermis is covered with a thick layer of cuticle.

→ In some cases epidermis is coated with silica & wax it prevents water loss from surface.

→ Epidermal hairs are seen.

→ Hypodermis is well developed & is made of several layers of thick walled cells. It protects from heat.

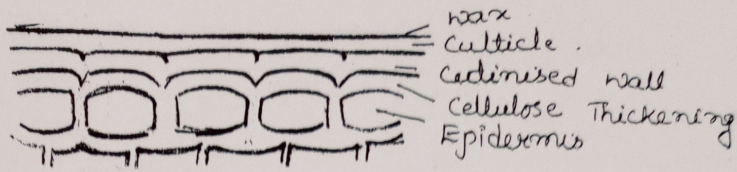
→ Stomata are sunken type is present.

→ Xylem & phloem are well developed.

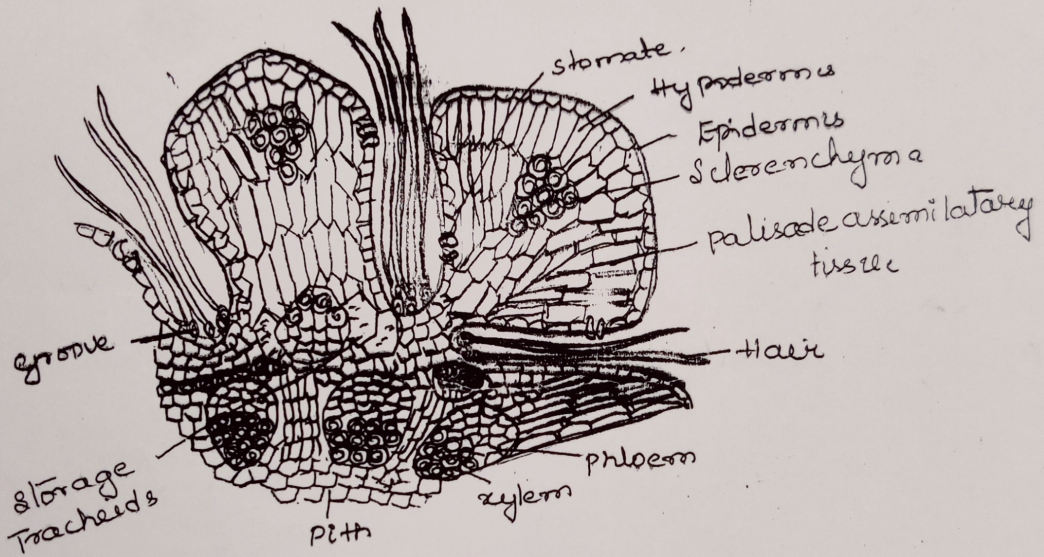
→ Mechanical tissues are sclerenchymatous & well developed.

→ Intercellular spaces :- They are smaller, below the spongy parenchyma is comparatively compact.

In wax :- ex Agave



- * Hairs - The epidermis of many xerophytic leaves and young stems bear hair. In some cases hair or trichomes occur in pits / depressions containing stomata.
 eg :- Nerium leaves, Casuarina stems. They protect the stomata from direct action of wind.



Casuarina T.S stem

- * Anthocyanins, Betacyanins & Tannins - They commonly occur inside the surface cells of leaves & delicate organs. Such cells act as light screen reduce insolation.

- * Stomatal position :- With the exception of some grasses the stomata are restricted to the lower surface of the leaves. They are generally sunken. In some plants they occur in pits / depression of the leaves & stem ex Nerium

