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Morphological and Anatomical Adaptations of Xerophytes:

Adaptations in xerophytes are of two types:

- (i) Xeromorphic adaptations are those which are inherited whether the xerophyte grows in xeric conditions or not. For example, a Cactus has the same feature, whether it is in a desert or in a normal land.
- (ii) Xeroplastic adaptation is the ones that are induced temporarily but disappear when the conditions are favourable.

Xerophytic adaptations may be morphological, anatomical or physiological.

Morphological adaptations of Xerophytes:

Xerophytes exhibit a number of special morphological characters in their organs like root, stem and leaves. These adaptations are following:

Root:

- The root system is well developed, extensive and much branched.
- Roots of perennial xerophytes reach greater depth to absorb water but some xerophytes have shallow root system especially when water is available in the surface layers.
- Root hairs are profuse.

Stem:

- Stems are hard and woody.
- Some stems are covered with dense hairs (Calotropis), coated with wax (Opuntia) or silica (Equisetum).
- Stems in some xerophytes are modified to thorns (Duranta).
- Succulent xerophytes have their stems modified into structures like phylloclades (Opuntia.); cladodes (Asparagus) or leaf like structure (Ruscus). All such structures are usually meant for water storage.

Leaves

- Usually leaves of xerophytes are reduced or modified to various kinds of structures to minimize transpiration. The following types of condition are seen:

(i) Microphyllous when the leaves are small scaly (Casuarina: Asparagus) or needle like (Pinus).

(ii)Trichophyllous when the leaves are covered with hairs (Nerium, Calotropis). (iii) Macrophyllous when the leaves are soft and fleshy (Begonia), Sclerophyllous when the leaves are stiff and hard. (Banksia) Many xerophytes have no leaves (Capparis) or they fall very early (caducous) as in Euphorbia.

- Rolling of leaves is observed in some xerophytes like Ammophile where the stomata are directed inwards.



Fig. 2.13. Phylloclade of *Opuntia*.

Transverse Section Through Leaf of Xerophytic Plant

