Good day students and welcome to today's E Learning session.

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Today's session will be for SYBSc students of the botany field

Semester 3.

Paper code is BOC 103.

Titled: Plant,Anatomy and Embryology.

Unit four: Adaptive and protective system.

Module name adaptacion in xerophytes.

Module No. 31

The Outline of today's session will be Xerophytes. Types of xerophytic adaptations. and

adaptation in xerophytes.

The learning outcomes students will be able to learn and attain knowledge of xerophytic adaptation.

On the surface of the earth there are different types of plants.

Plants are distributed in water as well as on land.

Way back in 1909,Warming Categorized plants into different categories depending upon its dependence and its affinity to water.

Today we will be learning about xerophytes.

What are xerophytes or what are xerophytic plants?

Plants growing in dry habitats or in areas of physical dryness are called as xerophytes.

These plants, they adapt themself to dry sandy or rocky areas, having poor water content and extreme atmospheric condition.

Still, these plants survive.

These plants survive as they have the ability to live due to the presence of certain special features that prevent the loss of water.

These plants are xerophytes that adapt to their habitat.

And adaptations of xerophytic plants can be studied under two categories.

Xeromorphic and xero plastic adaptation.

xeromorphic characters Adaptations are genetically fixed and inherited from one generation to the next.

They will appear in the xerophytes irrespective of the condition in which they are present, for example.Halophytic mangroves and many other evergreen trees..

The second type are.Xero plastic characters.

Xero plastic characters are those features that are induced by drought and dry conditions.

They are never inherited.

And under favorable conditions,these characters may disappear.

Xerophytic features again are studied under two categories, morphological adaptation and anatomical

adaptation.

Under morphological adaptation, we study the root,the stem, the leaves, and under anatomical adaptation.we study the epidermis, the cortex,and the stellar region.

So the 1st that we will be studying is about the morphological adaptation. taking into account the roots.

The roots of xerophytes especially in desert plants are shallow and superficial so that they can absorb the water from the surface of the soil. when the availability of water is present.

They also show us the presence of a well developed rooting system in perennial xerophytes. Where the rooting system is made up of roots that grows deep into the soil in search of water. These roots have numerous root hairs.

The stem.

The stem in some are hard and woody.

They may show us a number of adaptations, like in some of the plants, for example,

Opuntia the stem is coated with wax.

In the case of Equisetum, It has deposits of silica.

In some plants, the stem is being modified to form thorns, as in the case of duranta.

In some others.The stem may be covered with dense hair, as seen in calotropis.

In some plants, specially the succulent plants, the stem is being modified into structures called the phylloclades.As seen in opentia.It may be called as the cladode as in asparagus, leaf like structure as in ruscus, and all these adaptations are structures meant for storage of water.

Leaves

The leaves in xerophytes are modified. They can be studied under various headings.

For example,the 1st.is called as sclerophyllous leaves.

Sclerophyllous Leaves are those leaves which are stiff and hard. As seen in Banksia.

They can be trichophyllous where they're covered with hairlike structures as seen on nerium and calotropis.

The leaves may be small scale like structures. They may be reduced, as in the case of asparagus, hence called as microphyllous leaves. They may be soft and fleshy, as seen in Begonia, and can be called as malacophyllous leaves.

In some regions, dry regions,grass rolls up and this is 1 adaptation of a plant.

In some plants, for example euphorbia, it is seen that the leaves fall off as well as in the case of capparis, the leaves may be absent and the stem does the function of photosynthesis.

We have a number of internal adaptations carried out by the plant.

And these adaptation can be studied under the heading of epidermis cortex and the stealer region.

The epidermis is the outermost limiting layer of the plant.

It may be multilayered,as in the case of nerium.

This epidermis may having the presence of a thick cuticle and the cuticle with deposits of cutin, wax and raisins. The epidermis are seen in the case of Equisetum. We may have the presence of ridges and furrows and it is in these furrows that hairlike structures may be present. The stomata are present in sunken pits in the furrowed region. Even the frequency of these tomatta is low.

The next layer is the hypodermal layer. This hypoderma layer may be made up of thick walled cells having reduced intercellular spaces. These Cells they provide mechanical tissue, strength to the stem. Here the leaves are reduced,. Hence the stem is green in color and does the function of photosynthesis.

Inner to that we have the ground tissue and the ground tissue in a number of plants may be made up of water filled cells. This is especially seen in succulent plants. Inner to that a number of adaptation are seen in the case of Pinus. The Xylem and the phloem The vascular bundle. In other words is very well developed in xerophytes, hence the conduction of water from the roots to the different parts of the extreme leaf is possible.

In this way it is seen that xerophytes adapt themselves both anatomically as well as morphologically so that it can survive best in any environmental condition.

The following are the references which have been used.

Thank you.