Adapting to terrestrial living

Plant adaptation to terrestrial living Plants have evolved from aquatic life to terrestrial forms; while earlier algae forms could survive only in water and died upon exposure to air, they later evolved into variants that could endure short term water deprivation and exposure to air (Niklas, 253). Further genetic variations led to more and more adaptations that produced the first bona fide plants. One of the first problems terrestrial plants faced was the requirement for mechanical support, since they were no longer supported by water as in aquatic life forms and had to deal with less dense air, which could not support their weight (www. countrysideinfo. co. uk). Adaptations to tackle this problem include animal like skeletons and specialized plant cells and tissues which support the plant. A transition from aquatic to terrestrial life also meant a competitive struggle for sunlight; as a result plants had to be tall, which also necessitated strong stems and an extensive root system to anchor the plants firmly in the ground while they grew upwards towards the sunlight (www. countrysideinfo. co. uk) and this is turn led to the development of trees.

Another requirement for air based living as opposed to aquatic life is the need to conserve water, because a plant may face constraints in obtaining an adequate supply of water from the soil. As a result, they have developed a cuticle or protective layer on the surface of leaves to prevent excessive loss of water by transpiration (www. countrysideinfo. co. uk). At the same time however, plants must also be able to absorb carbon dioxide from the atmosphere to carry on the process of photosynthesis and give out carbon dioxide. This objective had to be achieved without sacrificing the modes for preservation of water through the use of the cuticle.

The adaptations made in plants to specifically cater to this requirement are

stomata on the underside of the leaf, which allow the exchange of gases to take place without excessive loss of water from the surface of the leaf. For example, in drought prone areas, plant leaves are reduced to spines, so that the leaf surface from which loss of water can take place is considerably reduced. Plant species growing in drought ridden areas may demonstrate high levels of stomatal conductance, photosynthesis and photosynthesis during periods when water is available, but enter into periods of dormancy and lose their leaves during a period of intense heat (Lambers et al, 2008)

Plants have evolved from simple unicellular organisms into complex multi cellular ones. A unicellular organism is only required to move materials in and out of one cell, but a multi cellular organism must move material in and out of every cell. This was accomplished through the development of specialized conducting tissues; i. e, the xylem and phloem. Such kinds of specialized conducting cells are also found in multi-cellular algae and bryophytes and the presence of xylem and phloem tissues allows for rapid transfer of water and cell sap throughout all the cells(Niklas, 254).

Many adaptations have also taken place in plants to facilitate reproduction. Some of the adaptations made in plants to facilitate wind pollination for example, include the production of light, small pollen grains in large quantities.(Niklas 293). They may also have feather like stigmata which extend well above the rest of the plant in order to be able to capture pollen that is being borne in upon the wind.

References:

Adaptations to terrestrial living. http://www. countrysideinfo. co. uk/wetland_survey/adaptns2. htm; Lambers, Hans, Pons, Thijs L and Chapin,

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