

Transition to Land Habit (Archegoniate)

* Adaptation of Land Habit :

Bryophytes are the first among plants migrating to the land habit or terrestrial. Some bryophytes are aquatic while others grow well in humid habitats. The necessity of water for sexual reproduction shows their aquatic ancestry. These plants are not well developed with structural framework to support terrestrial life. Therefore, bryophytes remained restricted in their distribution.

Plants with well developed sporophytes require extensive and well developed roots and vascular systems to enable them to survive in land habitats. The following are some structural adaptations which plants adapt as they migrate from aquatic to terrestrial habitats.

1. The plants developed elaborate root system to provide strong anchorage and absorb water from soil to fulfil their water requirements.
2. As plants migrated from aquatic to terrestrial habitats, they developed vascular tissue to transport water and minerals to all parts of the body. Bryophytes which are aquatic or grow in moist soil close to the source of water, do not require

vascular tissue. Mosses which attain a height of only few centimeters, have a conducting strand in their axis which is represented by only few thick walled cells only. Gymnosperms have extensively branched body, sometimes several meters in height, possess well developed vascular systems which maintains continuous supply of water.

3. Plants increased their photosynthetic area to manufacture enough organic material.
4. To reduce water loss by transpiration, leaves developed cuticle, waxy coating or trichomes on the surface leaves and other tender parts.
5. Evolved mechanism of transpiration to keep the body cool during summer.
6. Developed thick walled tissue, such as sclerenchymatous to provide mechanical strength to plants.
7. Developed archegoniums which retains the egg even after fertilization. Archegoniate plants as they moved to the terrestrial habitats retained zygote in the archegonium where it developed into an embryo. This is necessary to protect the embryo from adverse conditions of the terrestrial habitats.

8. Bryophytes and most of the pteridophytes are homosporous. Their gametophytes are exsporic and are exposed to all biotic and abiotic factors of the terrestrial environment. Some pteridophytes and gymnosperms are heterosporous, they produce two types of spores - microspores ~~and~~ which form male gametophytes and megaspores which gives rise to female gametophytes. In heterosporous forms the gametophytes develop within the spore wall, hence have better chances of survival. Retention of gametophytes within the spore wall is thus an adaptation to the land plants.

9. The gymnosperms produce seeds and this is an important step towards adaptations to terrestrial life. It is an advantageous feature since seeds protect the young embryo from desiccation and injury. Seeds also undergo a period of dormancy which allows them to germinate only under favourable conditions. Seeds have sufficient food to sustain the developing young sporophyte.

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