



Ministry education and Science of Republic of Kazakhstan
Karaganda State University named after academician Ye.A.
Buketov

Biological and geographical faculty

Botany Department

Course – Botany
Specialty - 5B011300 – «Biology»

Lecture № 18

Division Lycopodiophyta and Equisetophyta

(1 hour)

Lecturer: candidate of biological science, associated
professor

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Plan of lecture:

- 1 Division Lycopodiophyta.
- 2 Division Equisetophyta.
- 3 Peculiarities of reproduction and life circle.

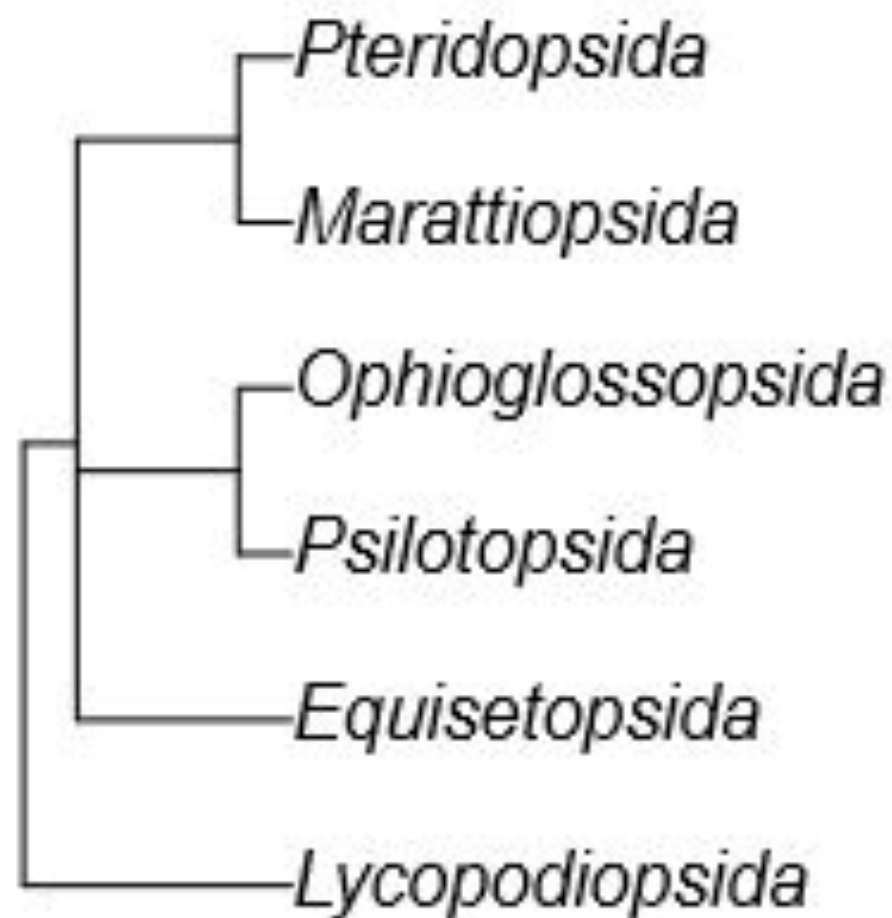
Main literatures:

- 1 Еленевский А.Г., Соловьев М.П., Тихомиров В.Н. Ботаника: систематика высших, или наземных, растений. 2 изд. - М.: Academia, 2001. - 429 с.
- 2 Нестерова С.Г. Лабораторный практикум по систематике растений. - Алматы: Қазақ ун-ті, 2011. - 220 с.
- 3 Родман А.С. Ботаника. – М.: Колос, 2001. - 328 с.

Additional literatures:

- 1 Абдрахманов О.А. Систематика низших растений. – Караганда: Изд-во КарГУ, 2009. - 188 с.
- 2 Билич Г.Л., Крыжановский В.А. Биология. Т. 2: Ботаника. - М.: Оникс 21 век, 2002. - 543 с.
- 3 Ишмуратова М.Ю. Систематика и интродукция растений (курс лекций). - Караганда: РИО Болашак-Баспа, 2015. - 100 с.
- 4 Тусупбекова Г.Т. Основы естествознания. Ч. 1. Ботаника. – Астана: Фолиант, 2013. – 321 с.

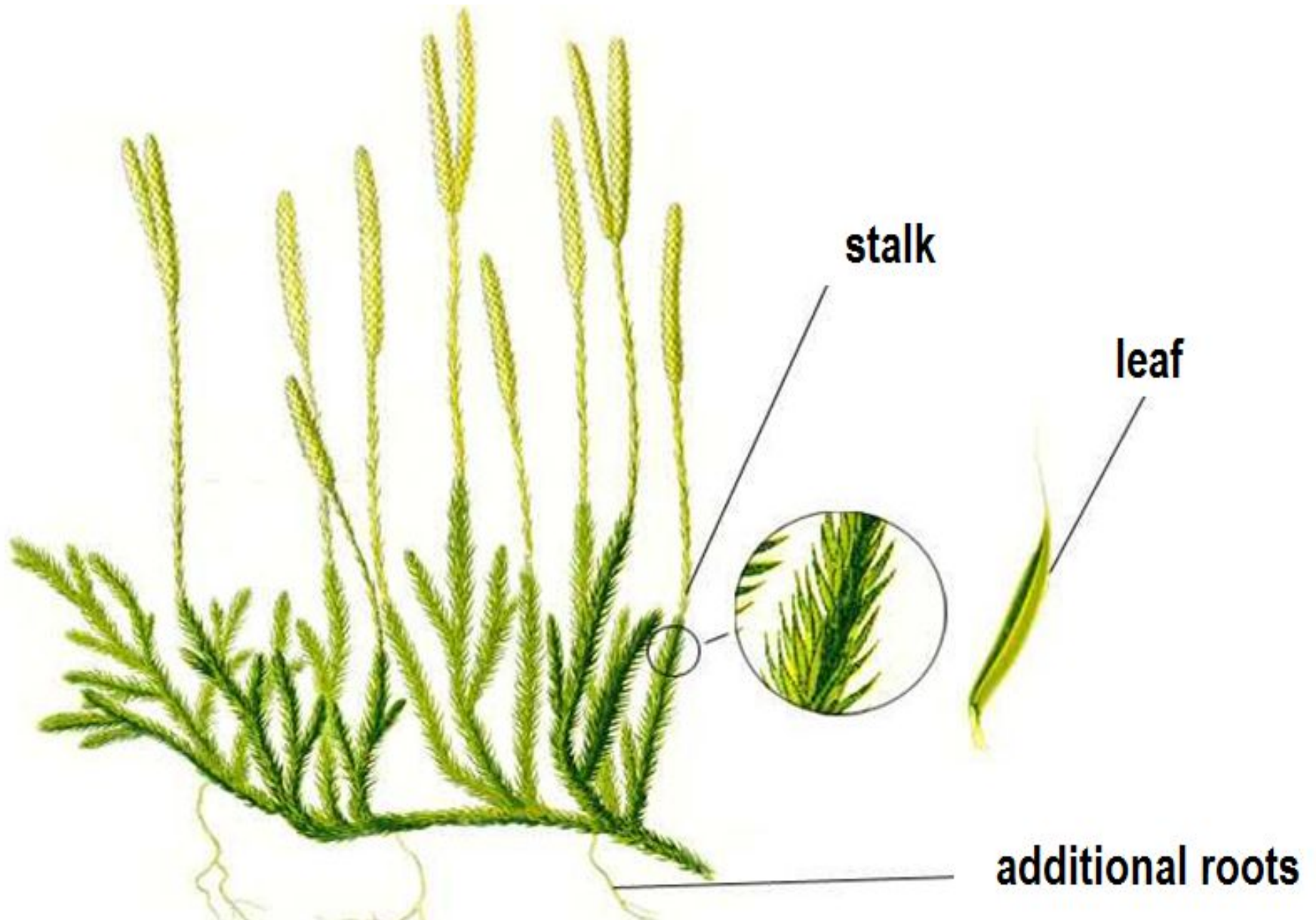
Lycopodiopsida, or lycophytes have at least four genera and more than 1,200 species. Lycophytes belong to microphyllous lineage of pteridophytes. This means that their leaves originated from the emergences of the stem surface, and therefore are more similar to moss leaves than any other leaves of pteridophytes and seed plants. Lycophyte sporangia are associated with leaves and often form strobilus which is a condensation of sporangia-bearing leaves (sporophylls when they are leaf-like or sporangiophores when they are divergent).



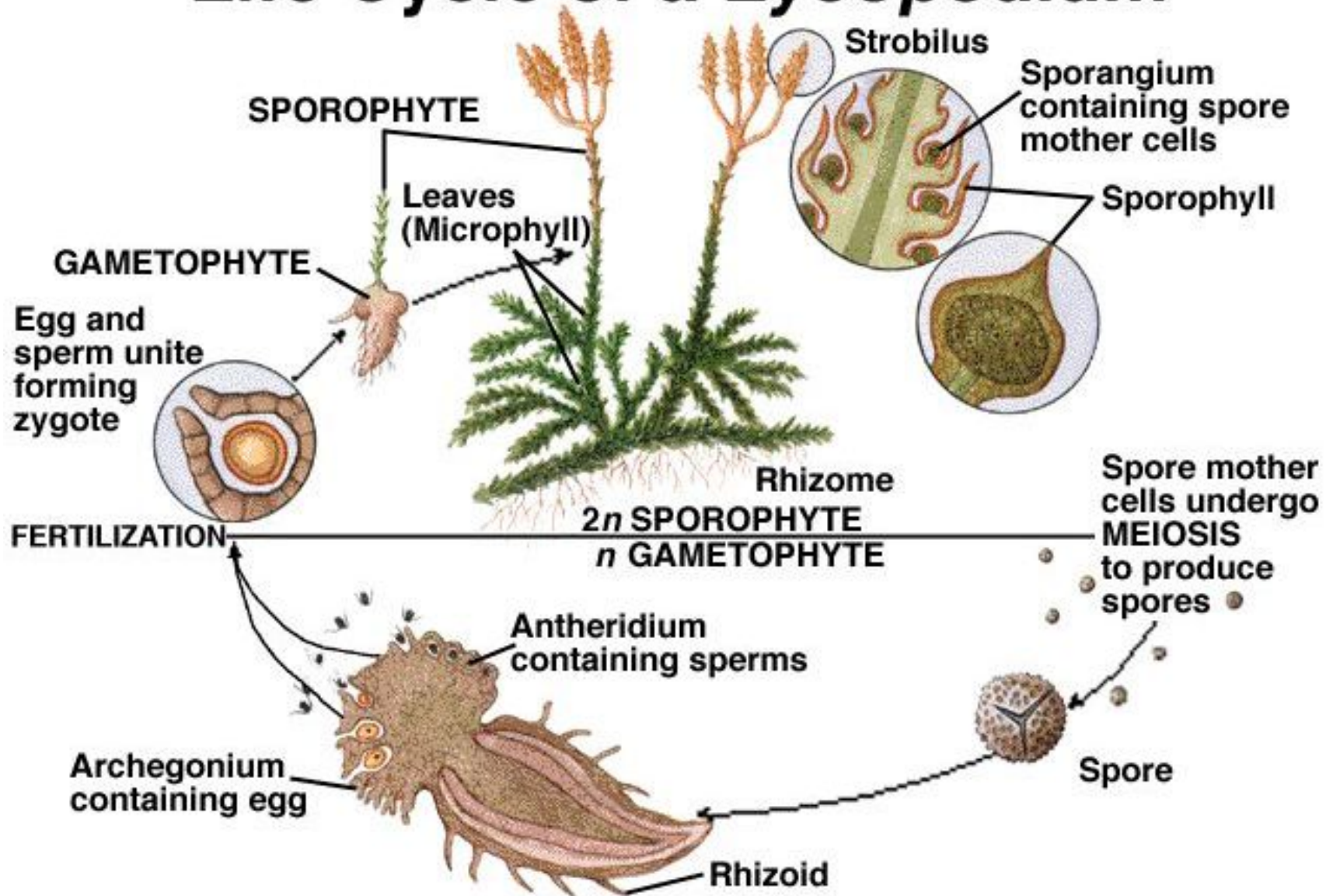
Phylogeny of the six classes of Preridophyta.

Their spermatozoon usually has 2 flagella (like mosses) but are sometimes also multi flagellate (like spermatozoa of other ferns). Lycophytes used to be the dominant plants of Carboniferous tropical swamp forests and their remains became coal. Contemporary lycophytes are much smaller but still thrive in wet and warm places. More basal lycophytes (clubmosses *Huperzia* and *Lycopodium*) have equal spores and underground gametophytes, whereas more advanced *Selaginella* (spikemoss) and *Isoëtes* (quillwort) are both heterosporous (see below) with reduced aboveground gametophytes. Quillwort is a direct descendant of giant Carboniferous lycophyte trees, and despite being an underwater hydrophyte, it still retains the unusual secondary thickening of stem.

Lycopodium (view)



Life Cycle of a *Lycopodium*



Silagenella

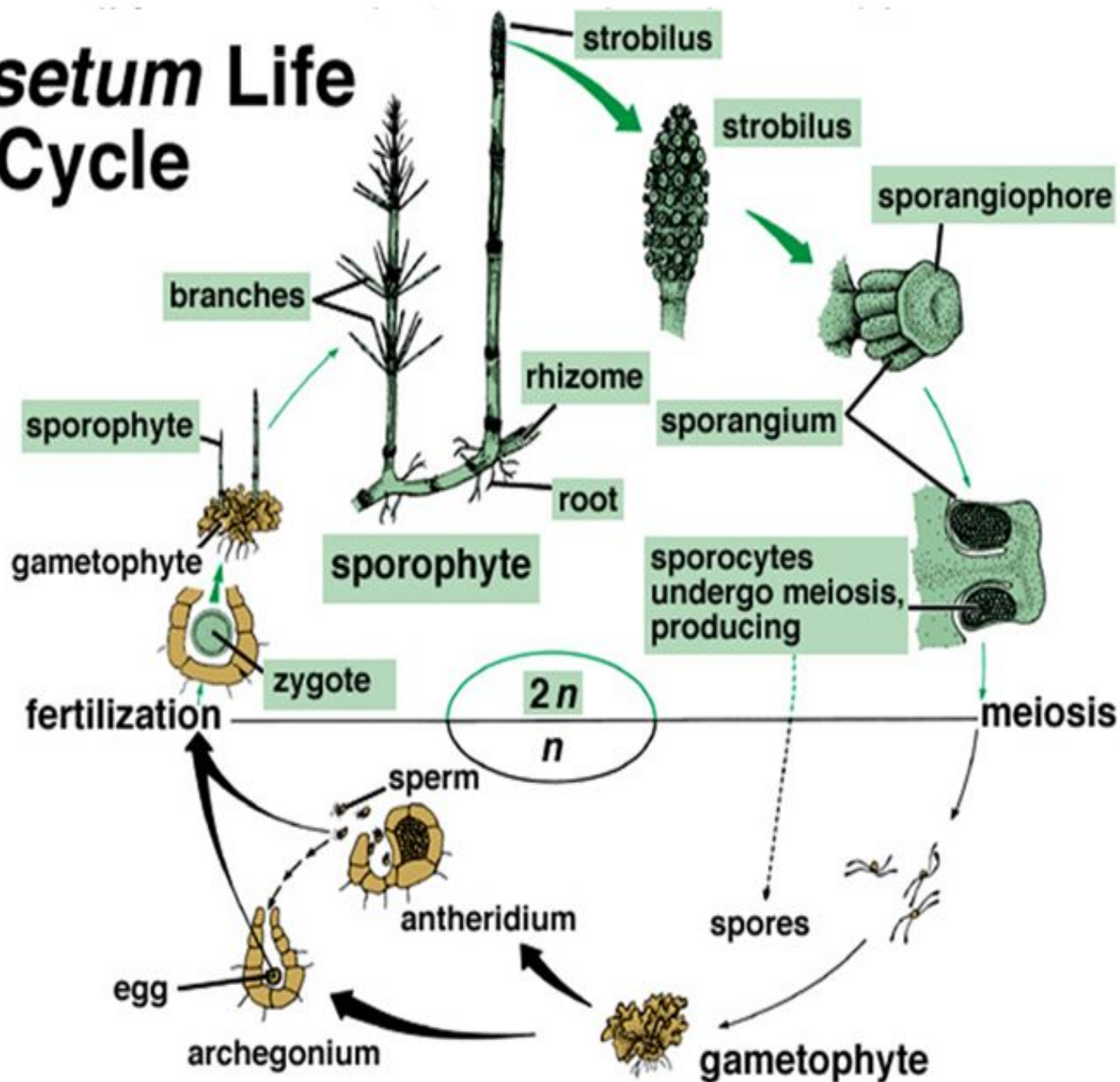


Equisetopsida (horsetails) is a small group with one genus, *Equisetum*, and has about 30 different herbaceous species that typically live in moist habitats. The leaves of these plants are reduced into scales, and the stems are segmented and also photosynthetic; there is also an underground rhizome. The stem epidermis contains silica which makes it have an abrasive surface, and because of this, American pioneers would use this plant to scour pots and pans. This is how it received the nickname “scouring rush.” The stem has multiple canals, this is somehow similar to stems of grasses. The sporangia are associated with hexangular stalked sporangiophores; there are also elaters which are not separate cells but parts of the spore wall. Gametophytes are typically minute and dioecious, but the plants themselves are homosporous: smaller suppressed gametophytes develop only antheridia while larger gametophytes develop only archegonia.

Equisetum arvense



Equisetum Life Cycle



Different species of Equisetum



Control questions:

- 1 Describe life circle of Lycopodium.
- 2 What generation is dominated for Equisetum?
- 3 What is a practical use of Lycopodium and Equisetum?
- 4 What ecology and spreading are characterized for Lycopodium and Equisetum?

Tests questions:

• True or false.

_____ Liverworts because they are shaped like a liver and look glandular were used to treat liver disease in earlier times.

_____ The specimen marked 'A' is a leafy liverwort and the one marked 'B' a thalloid liverwort.

Marchantiophyta- _____

- Sporophytes _____ stomata, but have pores.
- Specialized conducting tissue _____.
- Gametophytes thalloid or leafy.
- Rhizoids _____ celled.
- _____ of all living plants.
- Sporangium with _____ capsule, elaters present in some to disperse spores.
- Most cells contain _____ chloroplasts.
- Habitat- _____, some aquatic, temperate and tropical.
- 6,000 species.
- Examples- Marchantia and _____.