BIO414 (CRYPTOGAMIC BOTANY II)

WEEK 13

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GENERAL FEATURES OF FERNS

Fern is a member of a group of vascular plants (plants with xylem and phloem) that reproduce via spores and have neither seeds nor flowers.

They differ from mosses by being vascular, i.e., having specialized tissues that conduct water and nutrients and in having life cycles in which the sporophyte is the dominant phase.

Ferns have complex leaves called megaphylls, that are more complex than the microphylls of clubmosses.

Most ferns are leptosporangiate ferns, sometimes referred to as true ferns.

They produce coiled fiddleheads that uncoil and expand into fronds. The group includes about 10,500 known extant species.

Ferns first appear in the fossil record about 360 million years ago in the middle Devonian period, but many of the current families and species did not appear until roughly 145 million years ago in the early Cretaceous, after flowering plants came to dominate many environments.

The fern Osmunda claytoniana is a paramount example of evolutionary stasis; paleontological evidence indicates it has remained unchanged, even at the level of fossilized nuclei and chromosomes, for at least 180 million years.

Ferns are not of major economic importance, but some are used for food, medicine, as biofertilizer, as ornamental plants and for remediating contaminated soil. They have been the subject of research for their ability to remove some chemical pollutants from the atmosphere. Some fern species, such as bracken (Pteridium aquilinum) and water fern (Azolla filiculoides) are significant weeds world wide.

ECOLOGY

Ferns are widespread in their distribution, with the greatest abundance in the tropics, and least in arctic areas. The greatest diversity occurs in tropical rainforests.

The stereotypical image of ferns growing in moist shady woodland nooks is far from a complete picture of the habitats where ferns can be found growing.

Fern species live in a wide variety of habitats, from remote mountain elevations, to dry desert rock faces, to bodies of water or in open fields.

Ferns in general may be thought of as largely being specialists in marginal habitats, often succeeding in places where various

Some ferns are among the world's most serious weed species, including the bracken fern growing in the Scottish highlands, or the mosquito fern (Azolla) growing in tropical lakes, both species forming large aggressively spreading colonies.

There are four particular types of habitats that ferns are found in: moist, shady forests; crevices in rock faces, especially when sheltered from the full sun; acid wetlands including bogs and swamps; and tropical trees, where many species are epiphytes (something like a quarter to a third of all fern species.

Especially the epiphytic ferns have turned out to be hosts of a huge diversity of invertebrates. It is assumed that bird's-nest ferns alone contain up to half the invertebrate biomass within a hectare of rainforest canopy.

Many ferns depend on associations with mycorrhizal fungi.

Uses of Ferns

Ferns are not as important economically as seed plants, but have considerable importance in some societies. Some ferns are used for food, including the fiddleheads of Pteridium aquilinum (bracken), Matteuccia struthiopteris (ostrich fern), and Osmundastrum cinnamomeum (cinnamon fern). Diplazium esculentum is also used in the tropics as food. Tubers from the "para", Ptisana salicina (king fern) are a traditional food in New Zealand and the South Pacific. Fern tubers were used for food 30,000 years ago in Europe. Fern tubers were used by the Guanches to make gofio in the Canary Islands. Ferns are generally not known to be poisonous to humans. icorice fern rhizomes were chewed by the natives of the Pacific Northwest for their flavor.

Ferns of the genus Azolla, commonly known as water fern or mosquito ferns are very small, floating plants that do not resemble ferns.

The mosquito ferns are used as a biological fertilizer in the rice paddies of southeast Asia, taking advantage of their ability to fix nitrogen from the air into compounds that can then be used by other plants.

Ferns have proved resistant to phytophagous insects.

Many ferns are grown in horticulture as landscape plants, for cut foliage and as houseplants, especially the Boston fern (Nephrolepis exaltata) and other members of the genus Nephrolepis.

The bird's nest fern (Asplenium nidus) is also popular, as are the staghorn ferns (Platycerium).

Perennial (also known as hardy) ferns planted in gardens in the northern hemisphere also have a considerable following.

Several ferns, such as bracken and Azolla species are noxious weeds or invasive species.

Further examples include Japanese climbing fern (Lygodium japonicum), sensitive fern (Onoclea sensibilis) and Giant water fern (Salvinia molesta), one of the world's worst aquatic weeds.

The important fossil fuel coal consists of the remains of primitive plants, including ferns.

Folklore Ferns figure in folklore, for example in legends about mythical flowers or seeds. In Slavic folklore, ferns are believed to bloom once a year, during the Ivan Kupala night.

Although alleged to be exceedingly difficult to find, anyone who sees a fern flower is thought to be guaranteed to be happy and rich for the rest of their life. Similarly, Finnish tradition holds that one who finds the seed of a fern in bloom on Midsummer night will, by possession of it, be guided and be able to travel invisibly to the locations where eternally blazing Will o' the wisps called aarnivalkea mark the spot of hidden treasure.

These spots are protected by a spell that prevents anyone but the fern-seed holder from ever knowing their locations. In the USA, ferns are thought to have magical properties such as a dried fern can be thrown into hot coals of a fire to exorcise evil spirits, or smoke from a burning fern is thought to drive away snakes and such creatures

REFERENCES

Url1. https://en.wikipedia.org.

Url2.: https://www.sciencemag.org.