

Botany for Master Gardeners

Part I

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The study of botany has changed!

Then . . .




Botany field trip 1894
Univ. of Chicago

Now . . .




Master Gardeners
identifying trees 2001

Visual tour of the plant world



Visual tour of the plant world




seed plants
ferns, horsetails, liverworts, mosses,
fungi
algae, slime molds

Visual tour of the plant world

Seed plants

1. conifers
2. ginkgo
3. flowering plants

Visual tour of the plant world



Conifers

A conifer is a kind of
"Gymnosperm"

gymnosperm = "naked seed"
(actually it is a naked ovule at the time of
pollination)

conifer = "cone-bearing"

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Ginkgo

A ginkgo tree is also a Gymnosperm but not a conifer

Ginkgo has "naked seeds" but the seeds are not in cones



?

Is "evergreen" the same as "conifer"?

Answer. No--Evergreen means always green and conifer means bearing cones

?

Are all conifers evergreen?

Answer. No--Several conifers lose their leaves, which are often in the form of needles or scales.

Can you name some?



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Flowering plants

Flowering plants are called "Angiosperms"

Angiosperm = "seeds in vessels"

Seeds are not naked but are inside fruits and are enclosed at the time of pollination

?

Are lilies conifers or flowering plants?

Answer: Lilies are flowering plants, their developing seeds are enclosed

?

Is spruce a conifer or a flowering plant?

Answer: A spruce is a conifer because its seeds are in cones

Let's review
with pictures



Douglas fir--flowering
plant or conifer?

?



peony

?



pine

?



monkey-flower

?



false Solomon's seal

?



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Ferns, Horsetails, Liverworts & Friends

This group of ancient plants does not have seeds--instead, they have spores which are carried in specialized structures



Maidenhair fern is one of our natives



Leaves of ferns called "fronds" unfurl such as on this native sword fern



Spore containers called "sori" can look like a disease to the homeowner



Horsetails also have spores--many gardeners complain about them because they are difficult to control



Club mosses & *Selaginella* live on the moist forest floor – you may get an inquiry from a curious gardener



Liverworts usually inhabit moist forest spots but recently one kind has become a pest in container nurseries. You may get inquiries from the public about their potted plants.

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Mosses



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Mosses

Mosses have spores but do not have a "vascular system" - organized cells to distribute nutrients and water--because of this they are low-growing



Mosses are ubiquitous in the Pacific Northwest



Sphagnum moss is used to add organic matter, acidity and increased moisture capacity to soil but its use may deplete natural bogs--substitutes are compost and cocoa fiber

Moss as a problem on roofs?



Help may be on the way--a useful resource: <http://bryophytes.science.oregonstate.edu/mosses.htm> or your PNW books

Moss as a problem on trees?



In most cases, mosses on trees is a healthy part of the environment and do no harm

Moss as a problem in grass?

Moss in grass is caused by poor competition from the grass itself. See <http://bryophytes.science.oregonstate.edu> or the PNW books.



<http://www.dgsgardening.btinternet.co.uk/moss.JPG>



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Fungi

Fungi are ancient organisms not usually classified as plants that have strands of mycelium, no chlorophyll, and fruiting bodies



Fungi are important to us in many ways

Help decay living matter to enrich soil and recycle carbon

Form partnership with plants to increase efficiency of ecosystems

Cause some diseases to ornamental and crop plants



When asked about fungi, most people think of mushrooms



However, the mushroom is only the spore producing part of some kinds of fungi—sort of like the flower on a flowering plant

The main part of mushroom-producing fungi is called "mycelium" collectively known as "mycelia" or sometimes "hyphae"—the mycelium is usually underground

?

Will mushrooms harm a lawn?

Answer. Not usually. If the client is worried, tell them to rake them up and discard them



This cup fungus helps decay forest debris and the mycelia are inside the dead branch



One kind of mushroom, called the yellow houseplant mushroom is known botanically as *Leucocoprinus birnbaumii* or *Lepiota lutea*. See http://botit.botany.wisc.edu/to_ms_fungi/feb2002.html for more information

?

Is this a fungus?

Answer. No-Not every plant that lacks chlorophyll is a fungus--this is a woodland flowering plant called "Indian pipe"



Mycorrhizae – a special relationship

Question: What are mycorrhizae?

Answer: Mycorrhizae are symbiotic associations that many soil fungi share with most plants. This is true in wild ecosystems and in gardens

Mycorrhizae – a special relationship

?

What is symbiosis

In symbiosis, two organisms form a partnership whereby both partners gain a competitive advantage

Mycorrhizae – a special relationship



Fungal strands or mycelia “invade” roots to create special structures called mycorrhizae

?

What competitive advantage is there for the fungal partner?

It is able to use nutrients provided by the plant

What about the plant?

The plant gains increased ability to absorb water and minerals from the soil

Visual tour of the plant world

Algae & Slime Molds

These 2 groups vary from single cell to multiple-celled, sometimes but not usually classified as plants



Visual tour of the plant world

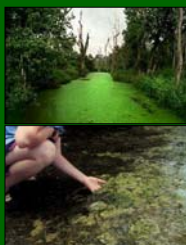
Algae

What are Algae?

A large group of simple to complex organisms, containing chlorophyll—they lack vascular systems and need moist environments to live



You will encounter algae in many places



Streams and waterways



Leaves



Greenhouse floors

?

Are algae harmful in nature?

Answer. Algae are a natural part of ecosystems but too much may be harmful in some circumstances

?

Does algae hurt plants it grows on?

Answer. Usually not, although it can filter out sunlight that the plant would otherwise use and may look unsightly

?

Is algae harmful on sidewalks and other structures?

Answer. Algae is not usually harmful by itself but can be controlled for safety--see the PNW books or ask your Agent

A Visual Tour of the Plant World

Slime Molds

Slime molds are blobs of protoplasm with no cell walls, that digest organic matter, creep around, and organize only to produce spores

Growing on oatmeal



"Dog vomit" slime mold



A variety of fruiting bodies on slime molds



Slime mold on wood chips

In the garden, slime molds grow in moist conditions on posts, wood chips, and in lawns

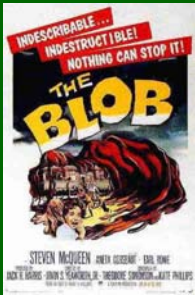


A slime mold from my back yard this spring



Slime mold on turfgrass

<http://www.oznet.ksu.edu/hfr/TURF/slime%20mold%20on%20buffalograss.jpg>



Slime molds:
models for
horror movies?

?

Are slime molds
harmful?

Answer. Not usually. They are decomposers that live on the surface of organic matter—they can be colorful and interesting

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Lichens:
a special
case

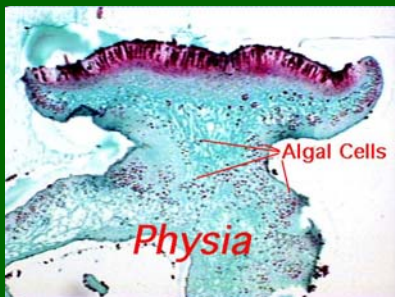


What is a
lichen
anyway?

A lichen is a symbiotic relationship made up of one species of fungus and one of algae. When combined, the lichen resembles neither and functions as a unit
How many kinds can you see on this rock?



Inside a lichen



Lichens grow on many surfaces,
including rocks, and trees



?

Do lichens harm trees and shrubs?



Answer: Not usually. Some lichens "fix" atmospheric nitrogen--check with your local agent or the PNW books



?

Is This a Lichen?

Answer. No. It is a parasite on this pine tree--just because it grows on a tree, it is not necessarily a lichen

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Any questions?



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Time for a fun review activity!

