

SEFS 522: Plant Microbiology Seminar Wednesdays 10:30-11:20

Sharon L. Doty, Associate Professor
School of Environmental and Forest Sciences
College of the Environment

Seminar Schedule

- Jan 9: Introduction to the course- Prof. Sharon Doty, UW
- Jan 16: “Fungal endophytes for plant stress tolerance”- Dr. Rodriguez
- Jan 23: “Poplar and willow endophytes: Required partners for life on the rocks?”- Prof. Doty
- Jan 30: Bradyrhizobium and rice- Dr. Nathan Ahlgren, UW Microbiol. Dept.
- Feb 6: Fungal endophytes for disease resistance- Dr. Busby, Univ. of Idaho
- Feb 13: “Endophyte-assisted phytoremediation of pollutants”- Dr. Khan, UW
- Feb 20: "Powdery mildews, denizens of the phylloplane"- Prof. Dean Glawe, WSU
- Feb 27: “White pine blister rust interactions”- Dr. Anna Schoettle, Rocky Mtn Research Station & Colorado State University
- Mar 6: Plant-microbe communications-Dr. Brook Peterson, UW Microbiology Dept.
- Mar 13: “Mycorrhizal diversity in Pacific Northwest forests”-Dr. Erica Cline, UW Tacoma

Grading:

1) Paper on a plant-microbe topic

- 1-2 pages
- Will be distributed to the class
- Any plant-microbe topic of your interest


2) Participation in the seminars

- Attend at least 7 out of the 9 seminars
- Sign-in sheet at each seminar

Short Paper

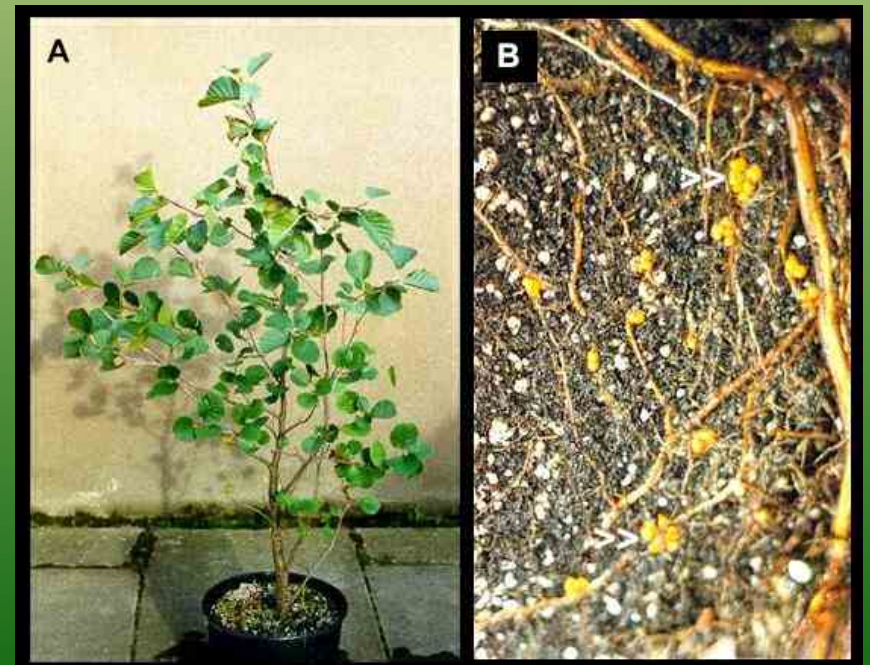
- One short writing assignment
 - On any **plant-microbe interaction** topic (discuss with me first to verify novelty)
 - Can be turned in at any time during the quarter, but before the last lecture
 - 1-2 pages, single-spaced
 - I'll make them available to the class (on Catalyst ShareSpaces)

Suggested Topics for Student Papers


- Your own research if it is on plant microbes
- Nitrogen fixation 
 - Rhizobium and legumes
 - Frankia and some woody plants
- Other beneficial symbioses
 - Endophytes of plants (other than poplar and willow)
 - Cyanobacteria-plant symbiosis
- Bioenergy-related
 - Fungi that degrade lignin
 - Novel microbial strains from plants that make biofuel
- Plant Pathogens (other than powdery mildew or white pine blister rust)
- Plant microbes that produce helpful chemicals (ie. Taxol, antibiotics)

Nitrogen fixation in root nodules

- Nitrogen fixation can occur within root nodules
- Rhizobium nodulates specific leguminous plants
 - Lots of literature on this topic
- Frankia nodulates alder and specific other woody plants

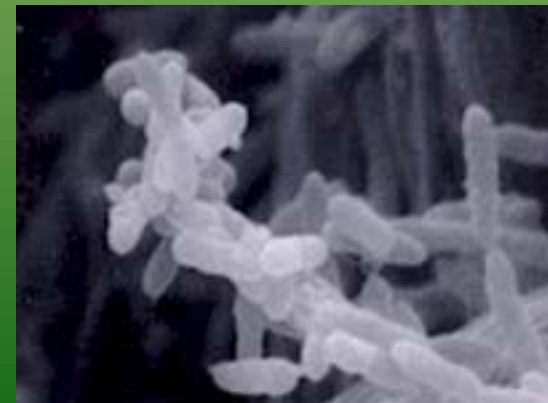
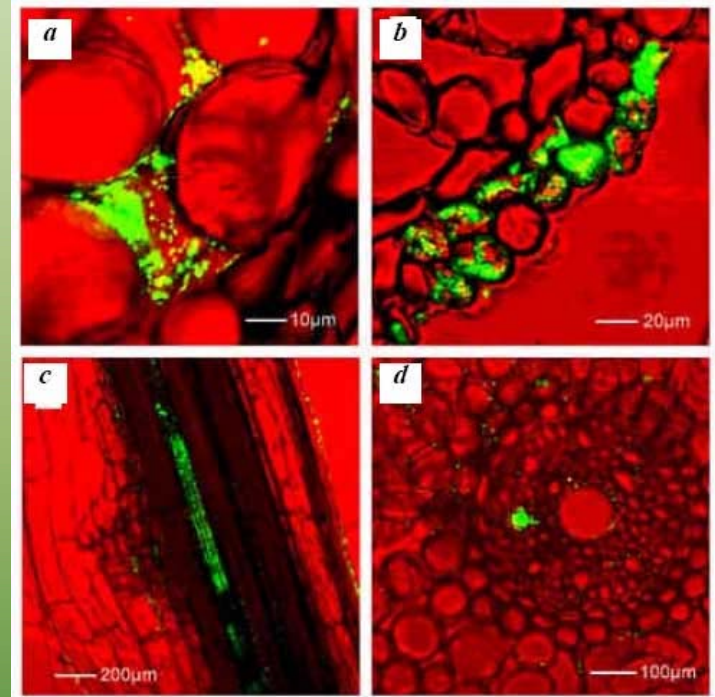


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Endophytes

- Microorganisms that live within plants without causing disease
- Some endophytes can fix nitrogen
- Many can produce plant growth hormones



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Nitrogen-Fixing Cyanobacteria


- Cyanobacteria
 - “Blue-green algae”
 - Often the Ps component of lichen
 - Cyano-Lichen
 - Cyanobacteria grows on some moss (epiphytic)



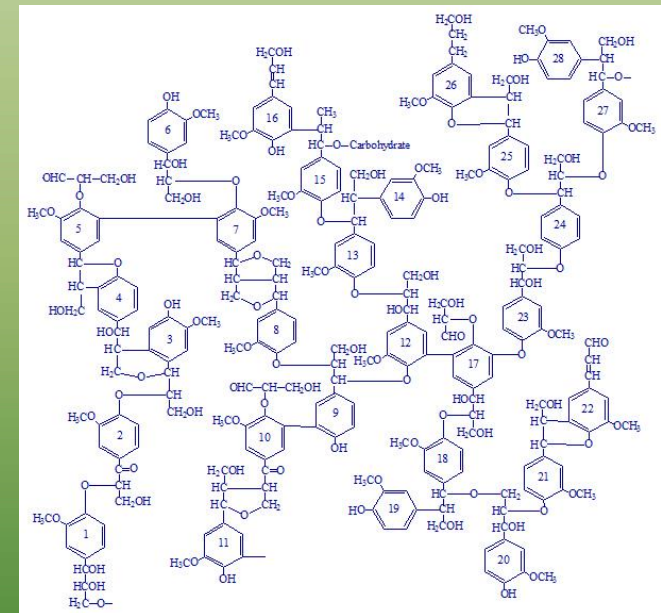
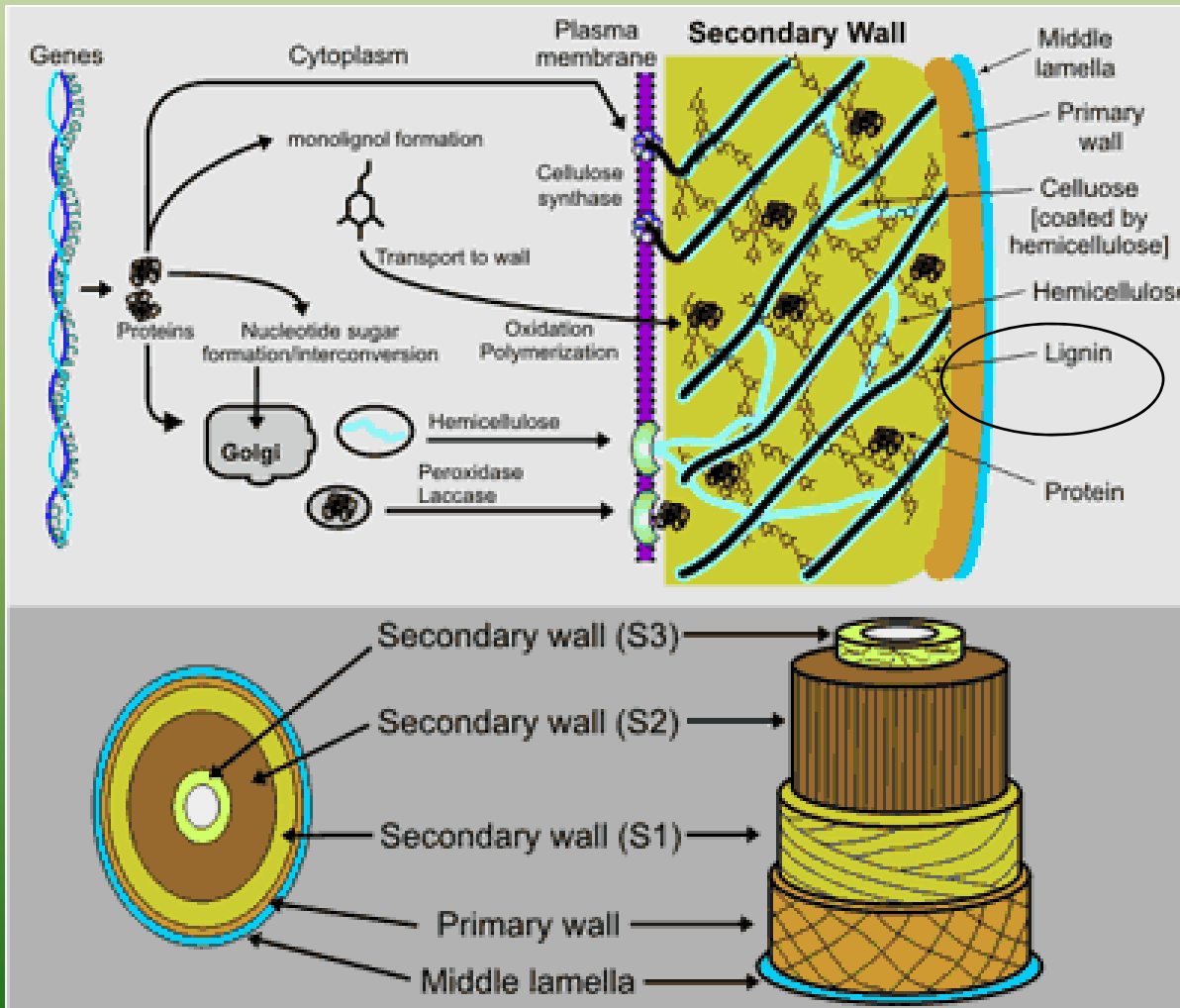
Cyanobacteria



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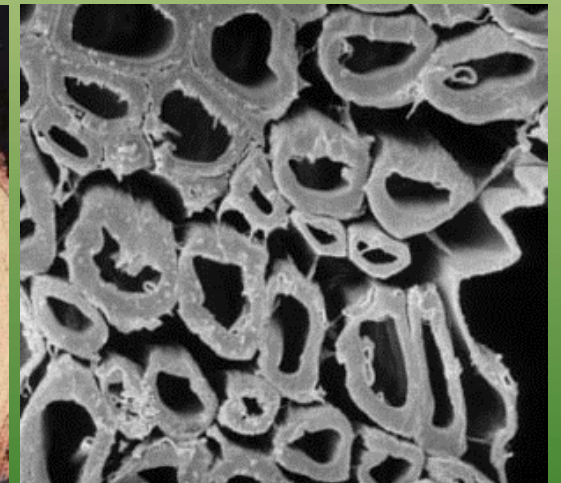
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Lignin in Plant Cell Walls



White rot fungi

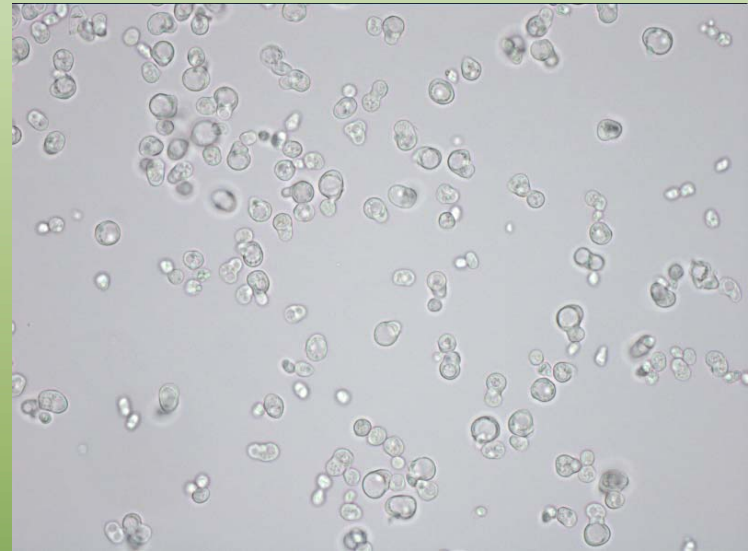
- ❑ Preferentially decays lignin
- ❑ Mostly belong to phylum Basidiomycotina
- ❑ Lignin degradation occurs through enzyme activity



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Some plants contain endophytic yeast



- Ferments plant sugars to ethanol or xylitol
- Resistant to phytochemicals that inhibit other yeast species

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Plant Pathogens

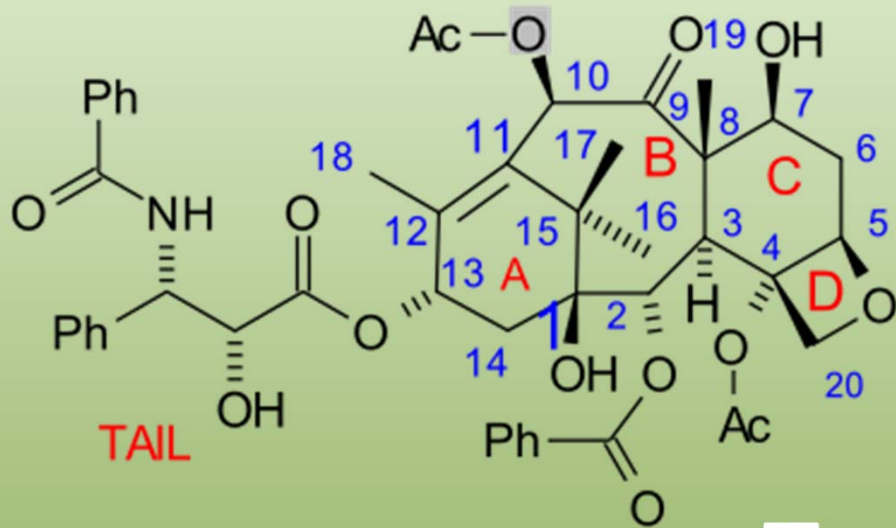


- Devastating diseases
- Plant defense responses
- Biological control of pathogens



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Taxol

Example of an anti-fungal chemical made by plants and by some endophytes!

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