universität freiburg

FOREST PATHOLOGY

02.06.25 – 27.06.25

at the Chair of Pathology of Trees

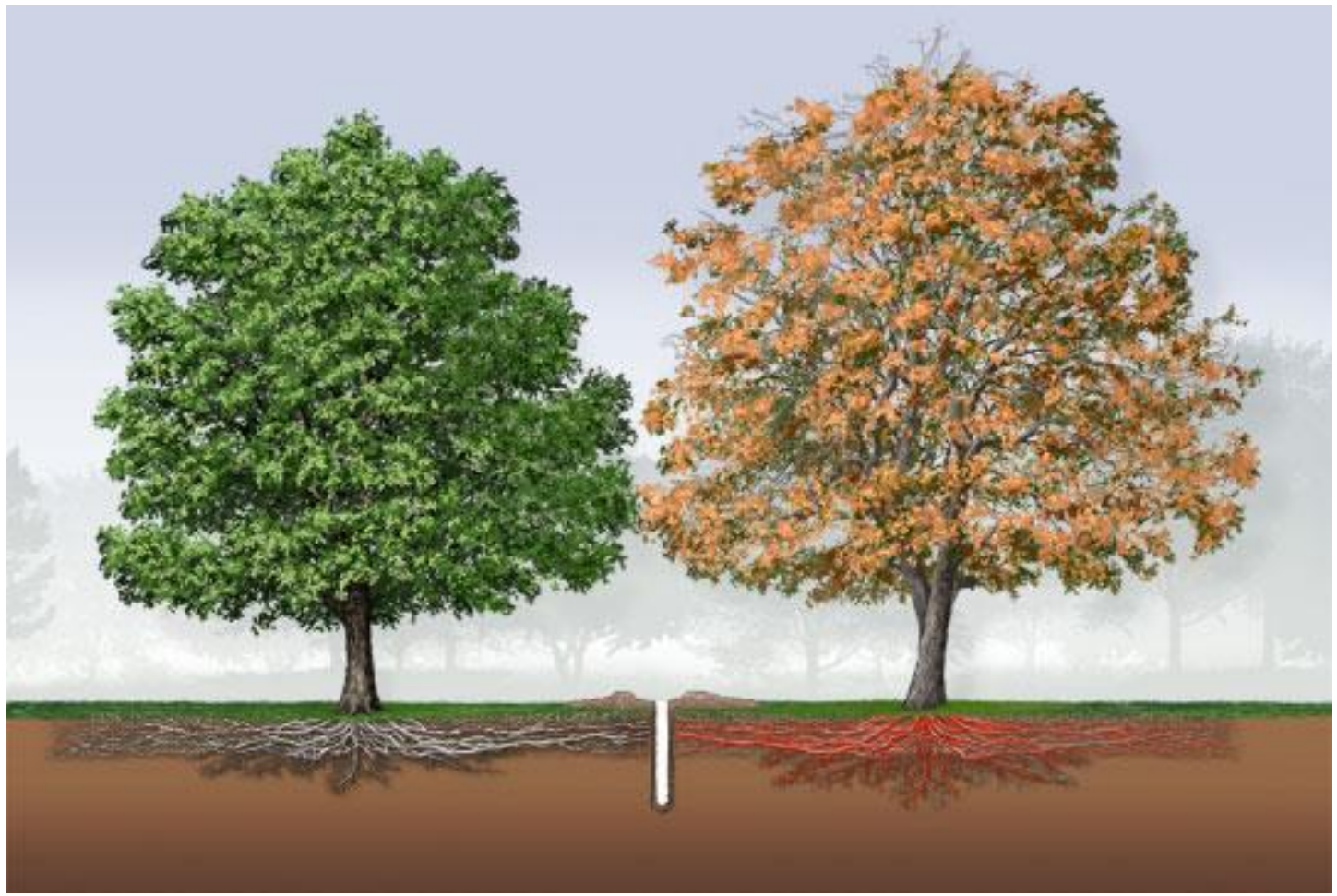
Lecturers: Yasin Korkmaz and Kathrin Blumenstein

Stem, leaf, and needle necroses and symptoms, sampling methods

Lecture 2

Externally visible symptoms

Wilting symptoms → tracheobacteriosis, tracheomycosis



https://texasoakwilt.org/oakwilt/oak-wilt-management

Discoloration → viruses, nutrient deficiency, excess

https://www.lovethegarden.com/uk-en/article/common-leaf-problems

Signs of death → shedding of plant organs, drought, rot

https://www.lovetoknow.com/home/garden/signs-that-tree-is-dying

https://scopeblog.stanford.edu/2015/09/02/you-know-it-when-you-see-it-a-precision-health-approach-to-diagnosing-brain-cancer/tree-tumor/

Tumor/Goiter Formation

•**Characteristics**: Smooth surface and altered fiber flow due to lack of hormonal control.

•**Causes**:

- Phytoplasma
- Bacteria (e.g., *Agrobacterium tumefaciens*)
- Genetic factors
- Unknown factors
- Phytohormone

•**Note**: No concerns regarding traffic safety obligations.

Excretions → bacterial exudates

Damage (stabbing and feeding damage) →, e.g., insects, mites

https://www.martinstree.com/blog/is-tree-infected-by-the-emerald-ash-borer/

Epiphytes and parasites as a symptom of damage →, e.g., mistletoe

https://www.britannica.com/plant/mistletoe

Witch's Broom

- **Symptoms**: Abnormal growths resembling brooms on plants.
- **Causes**:
  - **Larch**: Rickettsia-like organisms.
  - **Birches**: Fungus *Taphrina betulina* (Ascomycete).
  - **Fir**: Rust fungus *Melampsorella caryophyllacearum* (Basidiomycete).

Important disease types

Diseases on Flowers

Bud Rot: Caused by *Seifertia azaleae*.

- **Host**: Commonly affects Rhododendron.
- **Symptoms**: Brown, mushy buds that fail to open; can lead to plant decline if not managed.
- **Conditions**: Thrives in humid environments and poorly drained soils.

Graphocephala fennahi **(Rhododendron Leafhoppers)**:

•**Impact**: These insects feed on the sap of Rhododendron leaves, causing yellowing and potential leaf drop.
•**Symptoms**: Stippling and distortion of leaves, affecting overall plant health.

Leaf and Needle Diseases

- **Leaf Blotch**:
  - **Causes**: *Apiognomonia veneta*, *Guignardia aesculi*
  - **Symptoms**: Dark spots on leaves; can lead to early drop

- **Powdery Mildew**:
  - **Symptoms**: White fungal growth on leaves; stunts growth

- **Needle Diseases**:

  - **Diplodia Tip Blight**:
    - **Cause**: *Diplodia sapinea*
    - **Symptoms**: Browning of new shoots, stunted growth

  - **Swiss Needle Cast**:
    - **Cause**: *Phaeocryptopus gaeumannii*
    - **Symptoms**: Yellowing and premature needle drop

  - **Dothistroma Needle Blight**:
    - **Cause**: *Dothistroma septosporum*
    - **Symptoms**: Yellowing needles with characteristic red bands, followed by needle drop

Rust Diseases

•**Pear Rust (*Gymnosporangium sabinae*)**:

- **Hosts**: Pear (summer) and Juniper (winter)

- **Life Cycle**:
  - Aeciospores form on pear leaves, infecting Juniper
  - Juniper develops horn-like growths (Telia) that release spores, traveling up to four miles in spring

- **Survival**: The fungus requires living hosts and produces resting spores for dormancy

Bark Burn

- **Causes**: Fungi like *Nectria cinnabarina*
- **Symptoms**: Red pustules or lesions on bark; can lead to dieback.
- **Impact**: Weakens trees, increasing susceptibility to other diseases.
- **Conditions**: Common in moist environments and on stressed trees.

Tree Canker

•**Causes**: Fungi such as *Neonectria ditissima* (beech canker) and *Lachnellula wilkommii* (larch canker).

•**Symptoms**: Sunken lesions on the bark, often leading to dieback.

•**Impact**: It can weaken trees, making them vulnerable to pests and other diseases.

Wood Rot

•**Types**:

- **White Rot**: Breaks down lignin, leaving a white, fibrous structure.
- **Brown Rot**: Decomposes cellulose, resulting in a brown, crumbly texture.
- **Soft Rot**: Attack cellulose and lignin, leading to a spongy texture and a dry wood surface that looks cracked.

•**Symptoms**: Discoloration, softening of wood, and structural weakness.

•**Impact**: It can compromise tree health and structural integrity, making wood more susceptible to breaking.

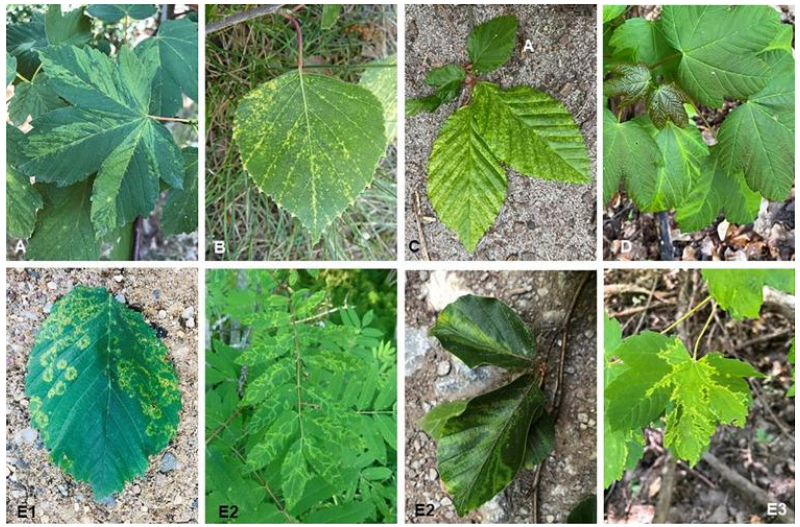
Sampling Methods

https://www.istockphoto.com/de/fotos/nature-scientist-magnifying-glass-research

Leaf Sampling

https://blog-fruit-vegetable-ipm.extension.umn.edu/2020/06/foliar-testing-for-fruit-and-vegetable.html
https://seacoasttreecare.com/blog/beech-leaf-disease-in-new-england
https://www.fasttreeremovalatlanta.com/leaf-spot-disease-identification-treatment
https://gardenerspath.com/how-to/disease-and-pests/common-apple-diseases/
https://purduelandscapereport.org/article/guignardia-leaf-blotch/

Leaf symptoms not to sample



https://en.wikipedia.org/wiki/Erysiphe_alphitoides
https://pnwhandbooks.org/plantdisease/host-disease/oak-quercus-spp-powdery-mildew
https://www.woodlandtrust.org.uk/blog/2020/08/common-tree-symptoms/
https://en.wikipedia.org/wiki/Eriophyes_tiliae
https://blogs.reading.ac.uk/whiteknightsbiodiversity/2011/07/11/plant-galls-on-campus-2/
https://www.sciencedirect.com/science/article/abs/pii/B9780443186943000110

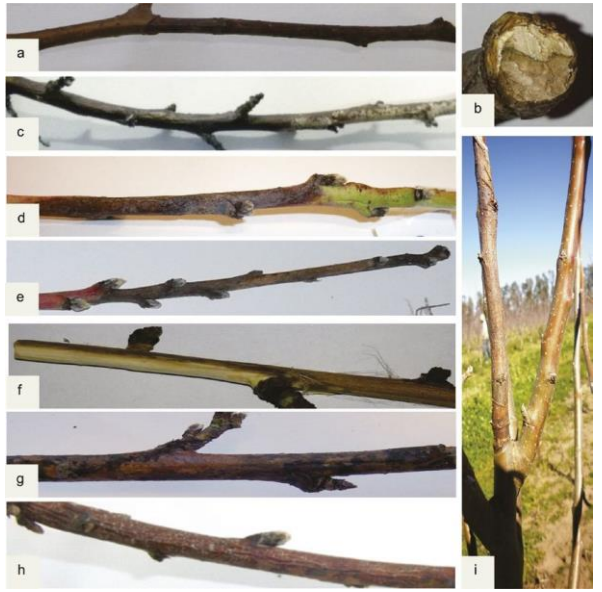
Needle Sampling

https://www.youtube.com/watch?v=__hJS-XsICE
https://mortonarb.org/plant-and-protect/tree-plant-care/plant-care-resources/pine-diseases/
https://www.russelltreeexperts.com/arbor-ed/2019/11/13/rhizosphaera
https://www.researchgate.net/figure/Etiological-signs-and-symptoms-of-Pinus-mugo-needles-A-streaked-necrosis-symptom-type_fig1_353590539
https://www.gardenia.net/disease/needle-rust-disease

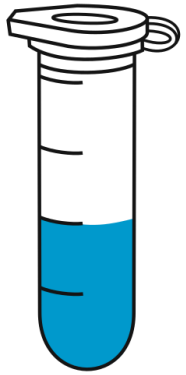
Conifer symptoms not to sample

https://pubs.extension.oregonstate.edu/pnw659/conifer-aphids
https://www.ksre.k-state.edu/news/stories/2022/07/horticulture-scales-on-pine-needles.html
https://blogs.cornell.edu/master-gardeners-cce-oc/2021/04/28/pest-watch-european-pine-sawfly

Twig Sampling

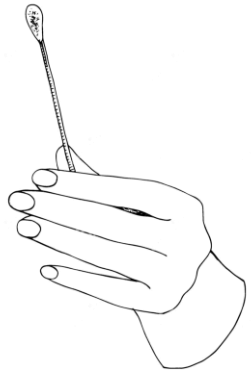


https://www.oregonlive.com/hg/2023/06/easiest-time-to-prune-a-japanese-maple-is-summer-and-winter-ask-extension-expert.html
https://treenewal.com/5-deadly-hardwood-tree-diseases/
https://www.bhg.com/gardening/pests/insects-diseases-weeds/tree-disease-photos/
https://gradeacuts.com/tree-bark-looks-burnt/
https://arborhilltrees.com/blog/lumps-growth-on-trees-what-do-they-mean/
https://www.researchgate.net/figure/Disease-symptoms-observed-on-twigs-and-branches-of-pear-a-b-peach-c-h-and-apple-i_fig1_322643393



1X **TAE** (Tris-acetate-EDTA) Buffer

Preserves nucleic acids
Maintains stable pH
Immediate field use



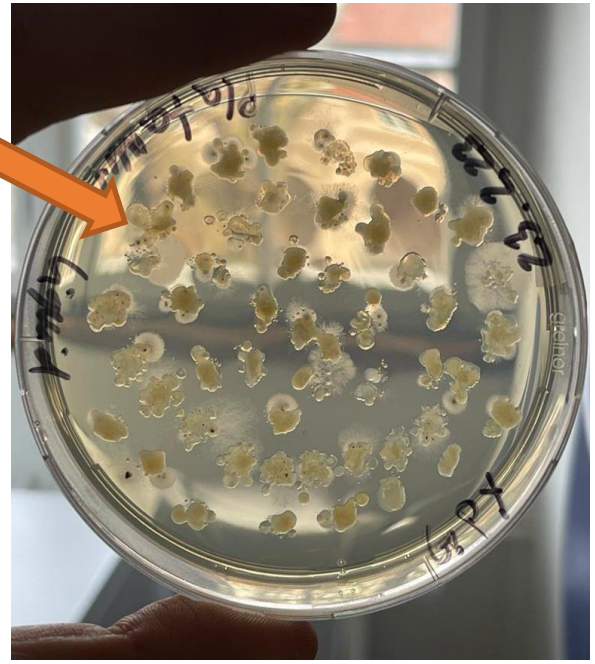
Sterile Cotton Swap

Direct field application on MEA + thiabendazole media

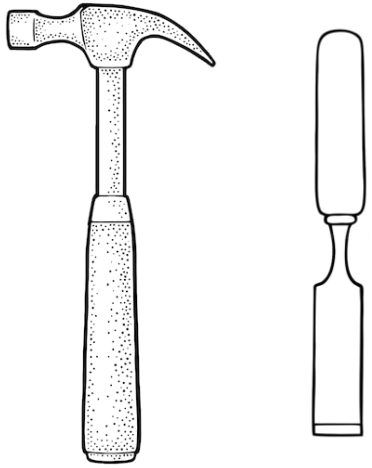
Lab practice with different concentrations

Plane tree after pruning
Freiburg, Bertoldstraße

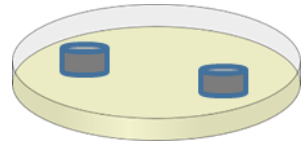
Oozing liquid with sterile cotton swap on MEA



Fungal and bacterial isolates start growing



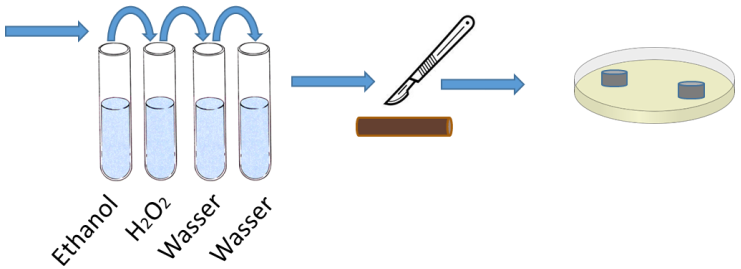
Hammer and Chisel



Direct field application on MEA + thiabendazole media

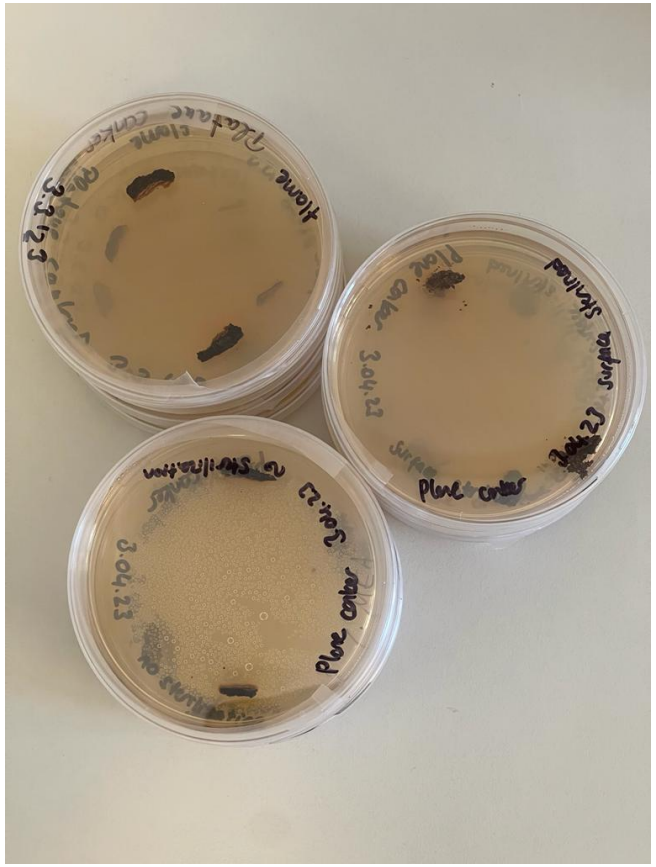
70% Ethanol, lighter, and paper towel

Surface sterilization with flame

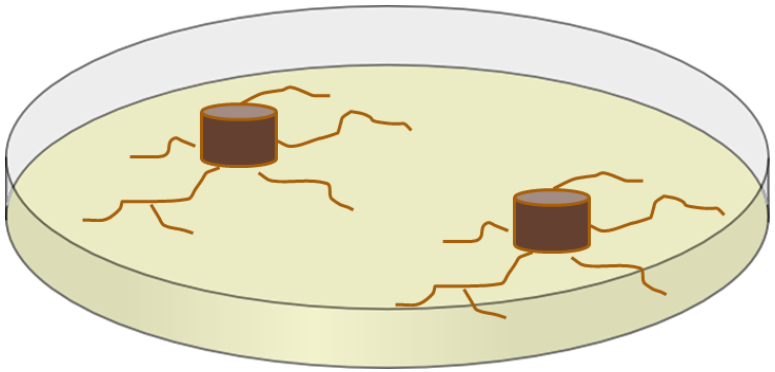


Surface sterilization by washing

Lab application, surface sterilization, and plating



Symptomatic wood chips on MEA



Mycelium grows out in 3 days or a week