Tree Pest and Disease Basics

Diagnosis and Plant Disorders on the Northern Plains

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Identify Symptoms and Signs

Symptom: Wilted Foliage

Sign: Dutch Elm Disease (DED)

Symptoms: Effects of a causal agent on a tree – how a tree responds to a causal agent

Signs: Direct indication of primary or secondary causal agent – something the causal agent ‘left behind’
Identify Symptoms and Signs

Symptom: Stem Breakage

Sign: Decay Conks

Identify Symptoms and Signs
Identify Symptoms and signs

A

B

entomology.wisc.edu
Identify Symptoms and Signs

A

B

C
Identify Symptoms and Signs
Identify Symptoms and signs

A

B

J. Blodgett USFS
Tree Stress

- Stress: Any condition causing a decline in tree health.
- Stress is a significant factor affecting tree health in many parts of ND.
  - Reduced growth
  - Abnormal foliage color/early turn to fall colors
  - Premature leaf drop, etc.
- Stress predisposes trees to more problems.
  - Luckily stress can be reversible…

★ MANAGE IT IF YOU CAN!
Causes of Tree Stress: Acute

- Dormancy issues
- Improper pruning
- Chemical exposure
Causes of Tree Stress: Chronic

- Lack of/too much water over a period of time.
- Soil conditions
  - Nutrient deficiency
  - Compaction
  - Improper planting
  - Competition/allelopathy
Why are diagnostic skills so important? (Trees Cannot Talk)

“We feel GREAT!”

“I don’t feel so good, I think it’s my roots...”
Basic Diagnosis

• The 6 steps to diagnosis

Because diagnosis is:
“a systematic process that involves information gathering, keen observation, and logical analysis.”

Arborists’ Certification Study Guide - ISA
Basic Diagnosis

• And because diagnosis:

“requires a combination of knowledge, experience, keen observation, and deductive reasoning.”
The Steps

1. Accurately identify the plant
What species is it?
The Steps

1. Accurately identify the plant
   - Many pests are host-specific
What species is it?
The Steps

1. Accurately identify the plant
2. Look for a pattern of abnormality
   - Uniform – usually abiotic agents (especially a large area or many species)
The Steps

1. Accurately identify the plant
2. Look for a pattern of abnormality
   - Nonuniform (random) – usually biotic agents
Biotic
The Steps

1. Accurately identify the plant
2. Look for a pattern of abnormality
3. Carefully examine the site
The Steps

1. Accurately identify the plant
2. Look for a pattern of abnormality
3. Carefully examine the site
4. Note leaf color, size, and thickness
The Steps

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** KNOW WHAT’S NORMAL **
Leaf Notes

One symptom can have several possible causes:

- Foliage on one branch dying:
  - Fungal canker
  - Injury
  - Insect damage
  - Winter injury
  - Chemical spray or injury
Leaf Notes

One cause can have several possible symptoms:

- Insects can cause:
  - Leaf spots, blotches, blisters
  - Foliage on one branch dying
  - Wilting or drooping of foliage
  - Leaves with tiny speckling or banding
  - Deformed or misshapen leaves
Silver maple
Iron chlorosis
The Steps

1. Accurately identify the plant
2. Look for a pattern of abnormality
3. Carefully examine the site
4. Note leaf color, size, and thickness
5. Check the trunk and branches
The Steps

1. Accurately identify the plant
2. Look for a pattern of abnormality
3. Carefully examine the site
4. Note leaf color, size, and thickness
5. Check the trunk and branches
6. Examine the roots and root collar
The Steps

1. Accurately identify the plant
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Gathering information: Observations

• Be thorough
• Be systematic
• Use all of your senses
  • Feel things, poke around
  • See things, notice abnormal color
  • Smell things, odd smells
Gathering information: Observations

- Be thorough
- Be systematic
- Use all of your senses
  - Feel things, poke around
  - See things, notice abnormal color
  - Smell things, notice odd smells
  - **Don’t** taste things
    - Not much to be learned from this
    - Tree owner will think you are strange
For a particular tree species, there may be about 15 known diseases
In North Dakota, there may be only 2 or 3 diseases that are common for that species.
Is there reduced needle retention?
Symptoms + Signs = Diagnosis

Pear Slug Sawfly
Resistant Varieties and Cultural Control

- Selecting trees or varieties that are resistant to or tolerant of known insects and diseases.
- Avoid planting trees in sites in which they are ill suited.
Resistant Varieties

- Crabapple resistant to apple scab and rust
- Elm varieties resistant to Dutch Elm Disease
Cultural Controls

- Clean tools prior to and immediately after pruning
- Clean tool between each cut on infected tissue and some highly susceptible plants

Slide: Ben Grossman
Cultural Controls

- Prune during the dormant season when possible
- Identify infected plant material and take necessary precautions to limit its spread
- Use of "wound sealer" not recommended unless oak wilt has been identified in the area and growing season pruning is the only option
Cultural Control

- Right Tree Right Place and Keep Plants Healthy

Pin Oak before treatment (top) and 10 days after treatment (right).

Slide: Ben Grossman
Chemical Controls

- Pesticides:
  - Fungicides – typically applied as protectant to prevent infections
  - Insecticides – kill pests
- Contact vs. Systemic
- Commercial Applicators License
Alternative Pesticides

- Insecticidal Soaps
- Horticultural oils
- Botanicals
- Insect Growth Regulators
- Microbial Extracts