Diagnosing Common Tree and Shrub Problems

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Plant/Client Health Care PCHC

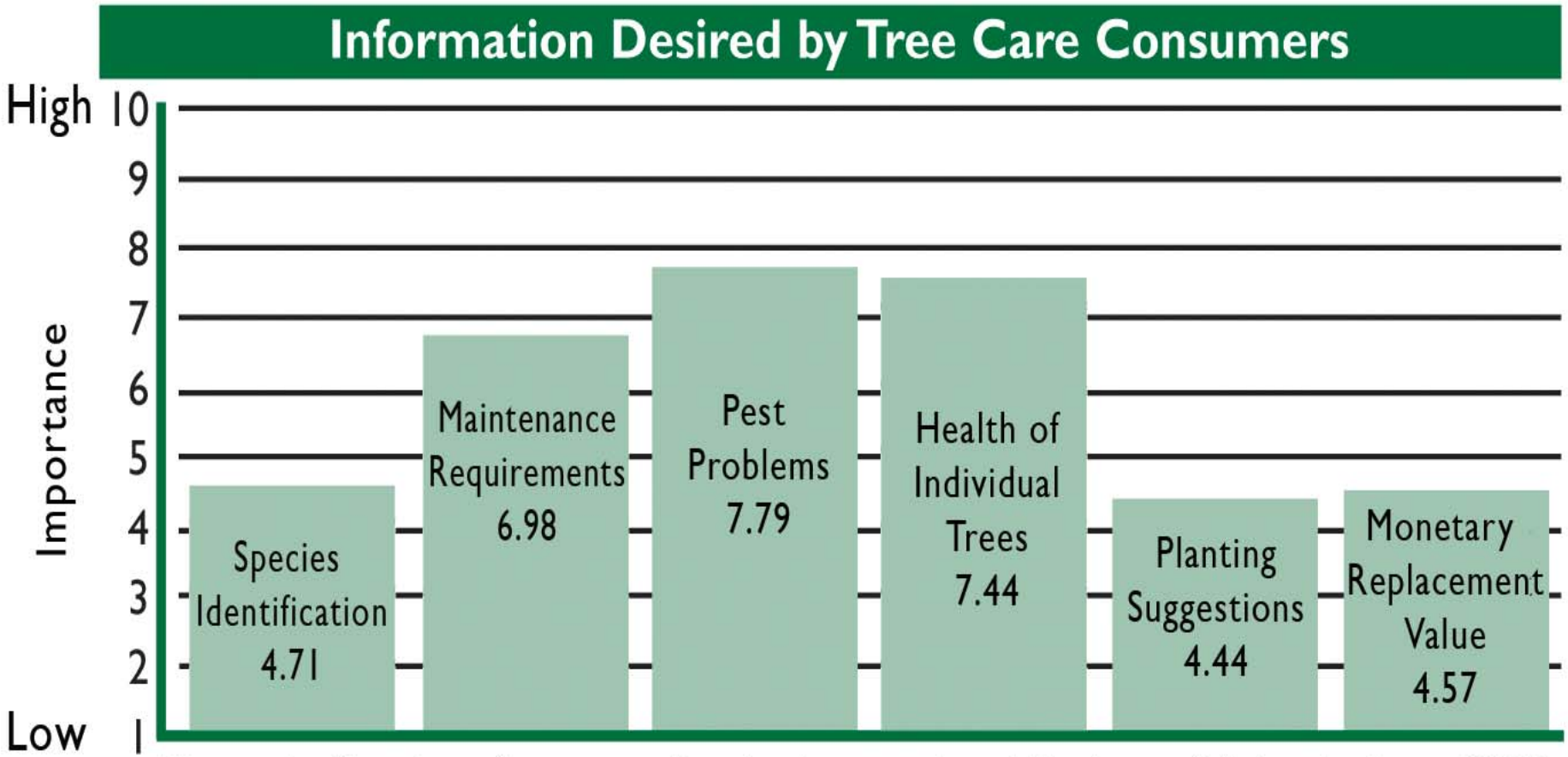


Figure 1. Results of a survey by the International Society of Arboriculture 2002 that identifies the importance to clients of knowing pests and plant health in the landscape. [Source: International Society of Arboriculture.]

Symptoms and Signs

- Symptoms
  - What you see wrong with the plant
  - Deviation from normal
  - Effect of the agent on the plant
  - Seldom identify the problem

Symptoms and Signs

- Signs
  - Evidence of the causal agent
  - Mostly for biotic agents
  - Help to positively identify the cause
  - Use a hand lens

Symptoms and Signs

- Use a hand lens

Hold Hand lens to Eye

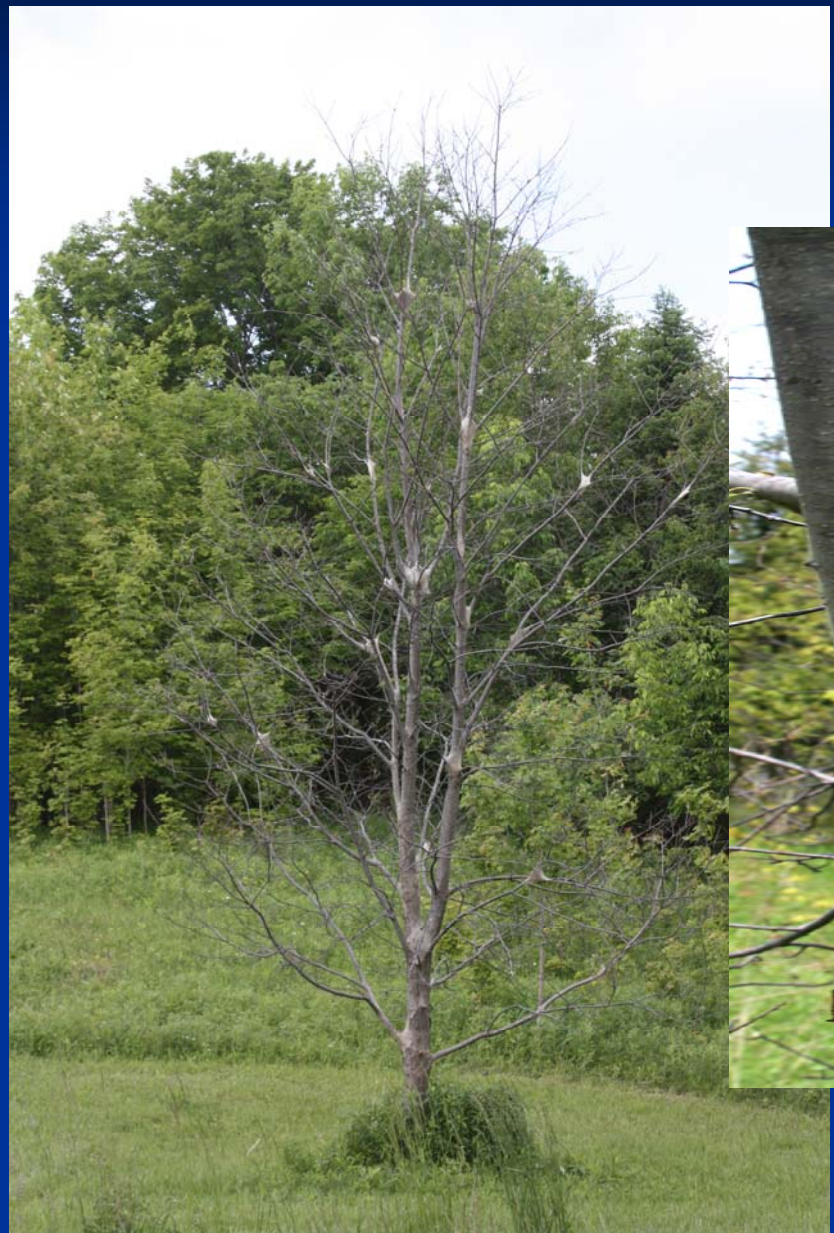
Damage Categories

- Nuisance
  - Damage detracts from use of plant
  - Little or no damage

Damage Categories

- Cosmetic or aesthetic
  - Damage is not seriously harming the health
  - May detract from its appearance or functionality

Cedar-Apple Rust



Damage Categories

- Serious damage
  - Long-term health of the plant is in danger

Bleeding Canker of European Beech

Causes of Tree Problems

1. Biotic agents-Living
   - Insects
   - Pathogens
     - Causing diseases
   - Animals
2. Abiotic agents-Non-Living
3. Declines- biotic and abiotic agents
   - Complexes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Disease Causing Agents or Pathogens

- Fungi
- Bacteria
- Phytoplasmas
- Viruses
- Nematodes

- Sycamore anthracnose

Insects
Biotic Agents

- Most insects are beneficial or neutral
- Beneficial insects require
  - Nectar source all season long
  - Require landscape diversity

Insect Damage
Related to mouth part type

- Piercing sucking

Stippling

Azalea Lace Bugs

- Likes plants in full sun
- Starts on older leaves

Insect Damage
Related to mouth part type

Aphids

Boxwood Psyllid

Worse on American varieties

Insect Damage Symptoms

- Soft Scale Insects and aphids
- Honeydew and sooty mold

Insect Damage
Related to mouth part type

- Chewing
  - Coleoptera
  - Lepidoptera
- Skeletonized
  - Only veins remain

Insect Damage Symptoms

- **Defoliation-leaf loss**
  - Chewing damage
  - Important only at high levels
  - Three consecutive years of defoliation
    - Decline/Mortality

Insect Damage Related to mouth part type

- Boring
  - Chewing mouthparts
    - Beetles
    - Lepidoptera
  - Larvae do most damage
  - Mostly attack stressed plants

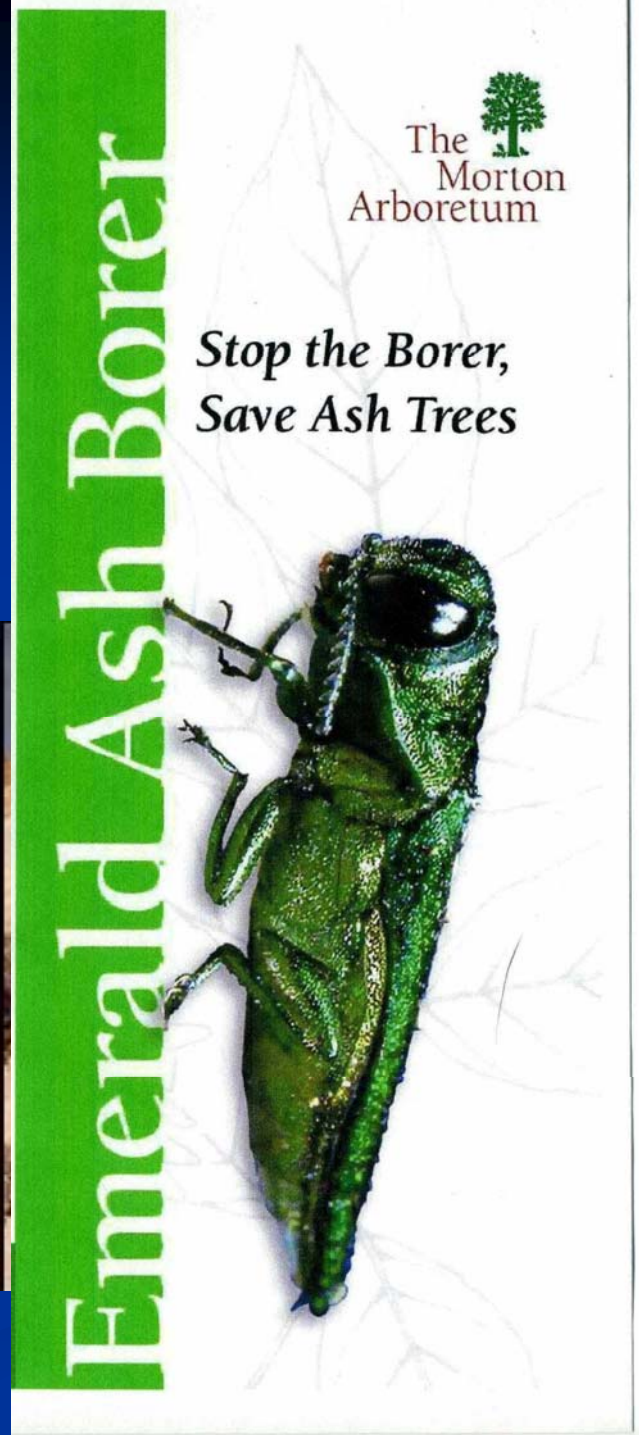
Bronze Birch Borer

2-Lined Chestnut Borer

Introduced Borers

Asian Longhorn Beetle

Attacking Maples, Poplars, Elms and other species



Insect Damage
Related to mouth part type

- Mining
- Holly leaf miner
- Birch leaf miner
- Boxwood leaf miner

Insect Damage Symptoms

- Galls – swelling on leaves or stems
  - Diptera
  - Hymenoptera
  - Eriophyid mites

Oak Stem Galls

Insect Damage Symptoms

- Webbing
  - Lepidoptera

Vectoring

Elm Bark Beetle Vectors (transmits during feeding) DED

Mites
2 Body Parts 8 Legs

- Stippling
- Bronzing

Spider Mites Webbing

Eriophyid Mites

Disease Causing Agents or Pathogens

- Fungi
- Bacteria
- Phytoplasmas
- Viruses
- Nematodes

- Sycamore anthracnose

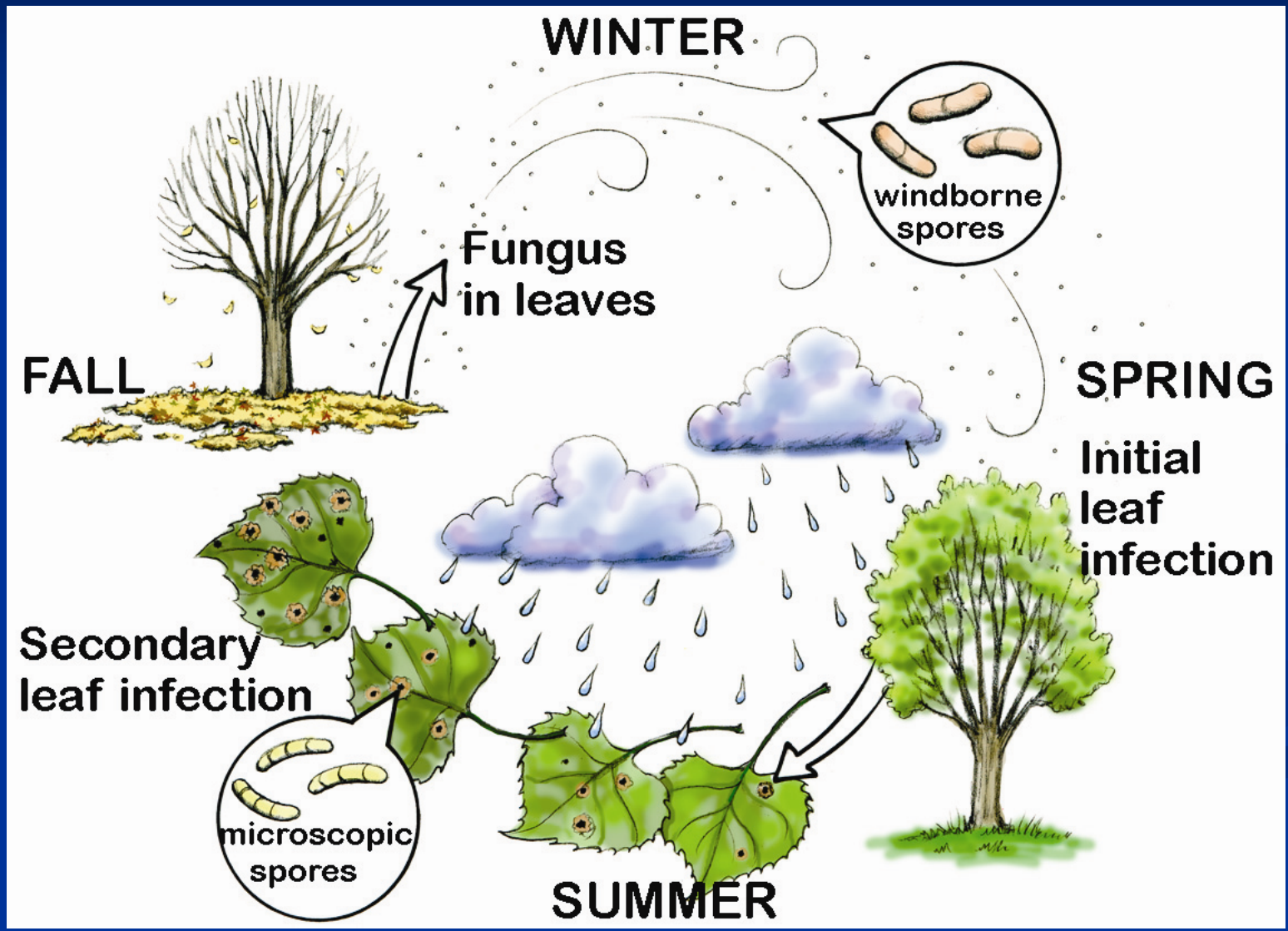
Disease Agents and Symptoms

- Fungi
  - **Cause most tree diseases**

Infectious

Spread from one host to another

Disease Life Cycle



Disease Agents and Symptoms- Fungi

- Anthracnose
  - Fungal disease of leaf and or stem tissues

Anthracnose
Some Attack Woody Tissues

- American sycamore and London planetree

Dogwood Anthracnose

Disease Symptoms- Defoliation or Leaf Loss Cosmetic Damage

Disease Symptoms Fungi

- Apple scab
  - Fungal or bacterial caused circular or irregular spots

- Tar spot

Disease Symptoms-Fungi

- **Powdery Mildew**
  - Fungal disease resulting in white powdery growth on leaves
  - Leaf and shoot distortion

Disease Symptoms and Agents

- Rust
- Disease caused by fungi
  - Usually with rusty colored spores

Disease Agents and Symptoms

- Leaf Blotch
  - **Irregular necrosis of shoot tissue**
  - **Necrosis = death**

Disease Agents and Symptoms- Fungi

- Blight
  - General killing of shoot or leaf tissues

Diplodia Tip Blight

- Latent infections-appear during stress

Disease Agents and Symptoms

- Canker
  - Infection of woody tissues
  - Mostly fungal infections

Cytospora Canker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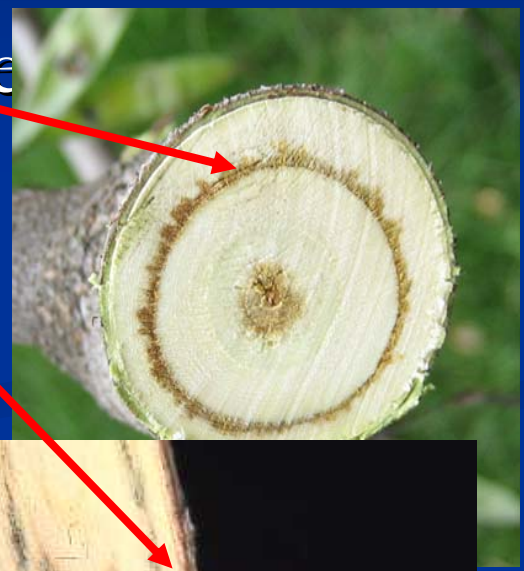
Disease Agents and Symptoms

- Galls
  - Some are caused by fungi or bacteria
  - Most galls are insect related
- Burl

Disease Agents and Symptoms- Fungi

- Wilts –foliage wilts
- (Verticillium, Dutch Elm Disease
  - Vascular discoloration
    - Darkening of xylem tissues

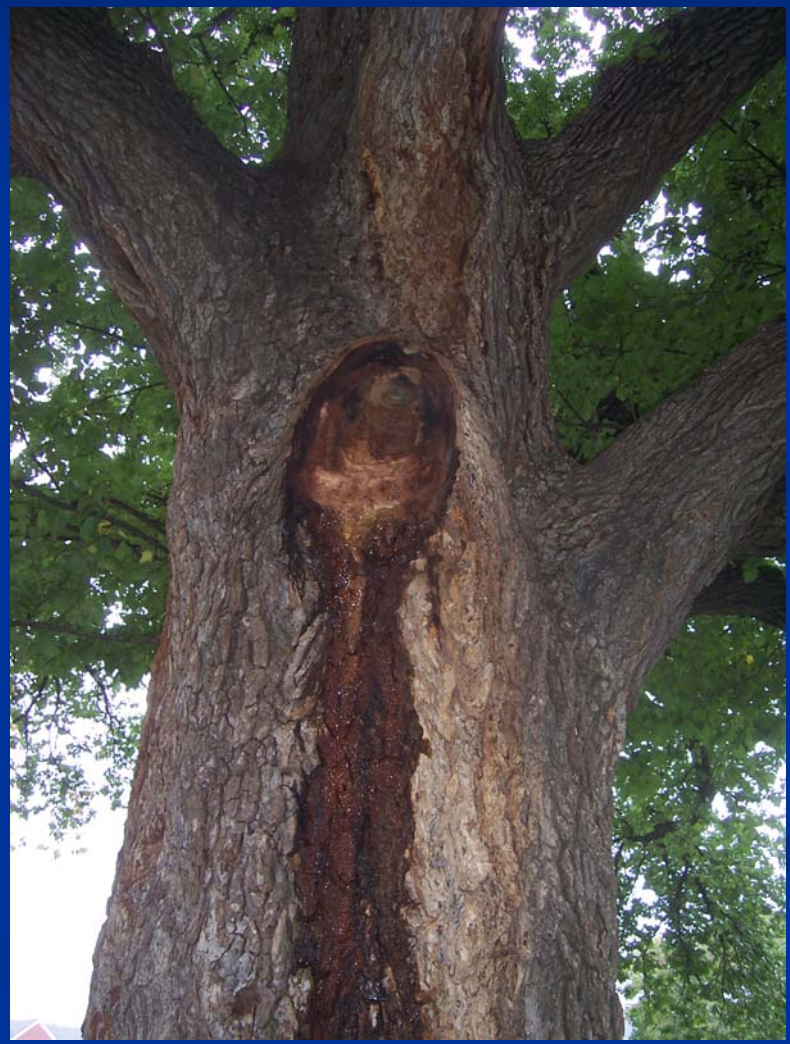


Root Rot-Fungal

- Root Rot
  - **Structural root decay**

Disease Agents-Bacteria

- Slime Flux



Disease Symptoms Blight

- Fire Blight
  - Bacterial disease
  - Rose family hosts

Lilac Shoot Blight

Disease Agents-FXIB

- Bacteria
- Bacterial leaf scorch

Abtioic Disorders
AKA Physiologic Disorders

- Physiologic disorders-disrupting the normal physiologic process in the plant

Abiotic Disorders

Agents are Non-Living

- Winter Injury

- Salt Damage

Abiotic Agents-Weather Events

- Lightning Strikes

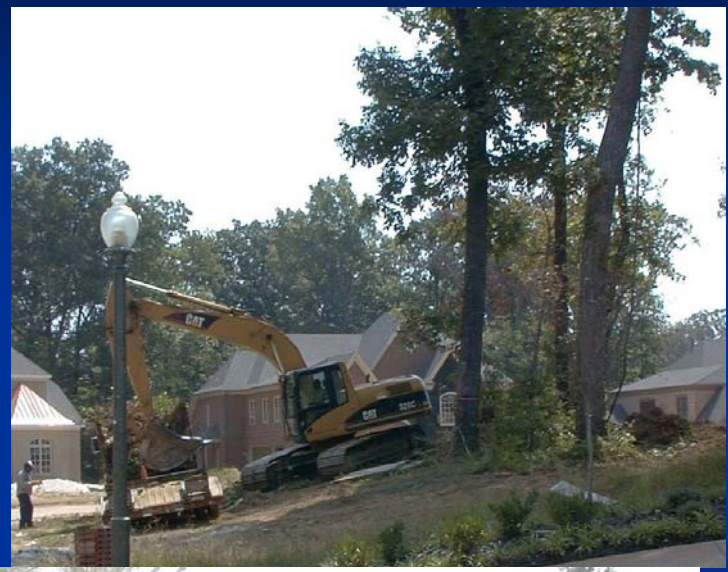
- Frost

Abiotic Agents-Weather

- Drought

Abiotic Agents-Cultural Practices

- Construction Damage



- Deep Planting

Abiotic Agents-Air Pollution

- Ozone is the most common air pollutant causing damage

Abiotic Agents-Nutrient Deficiencies

Declines= Abtioic + Biotic Diseases of Complex Origin

Plant Response

- Mortality Spiral
  - Long-lived
  - Experience many insults

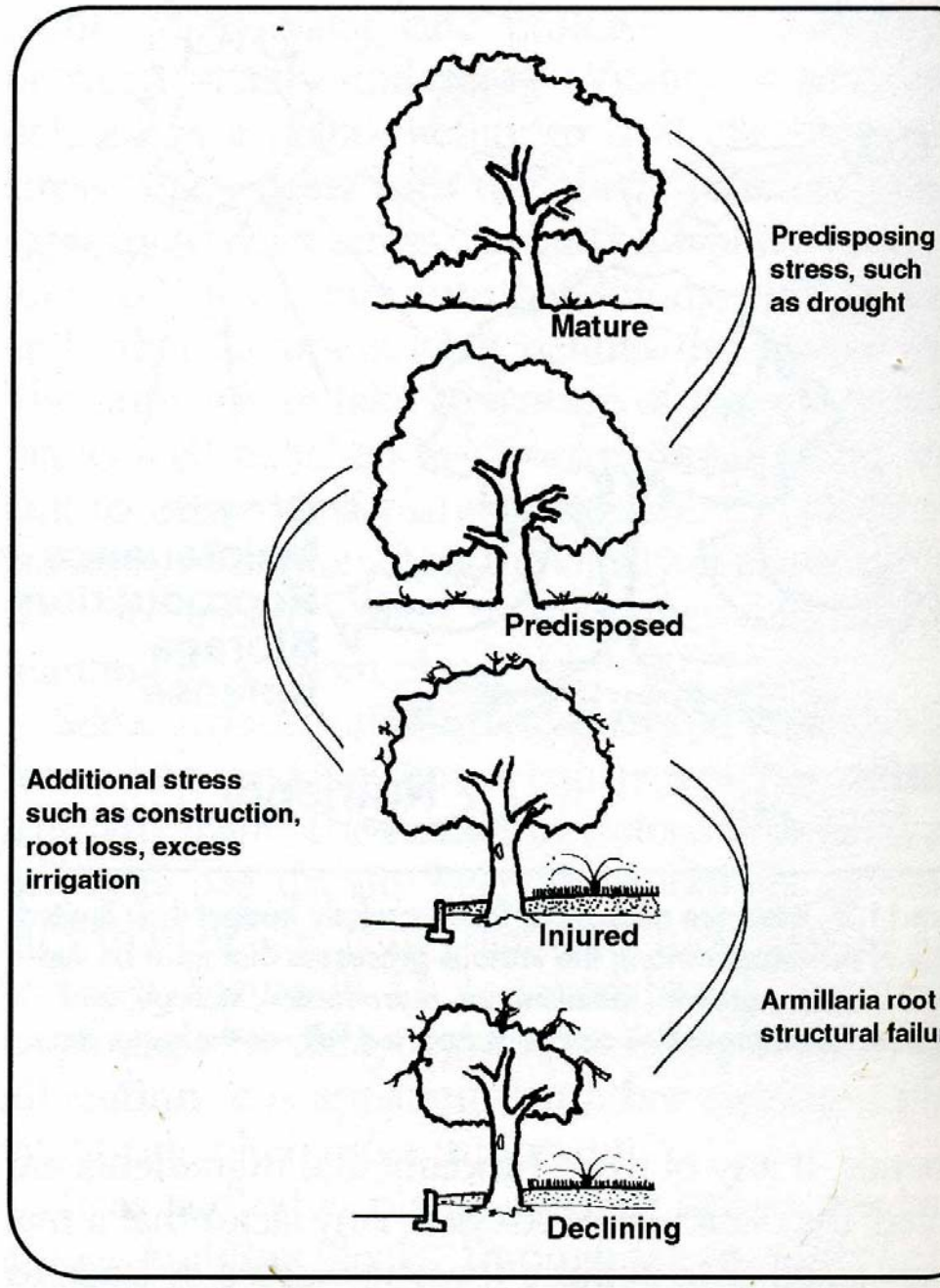


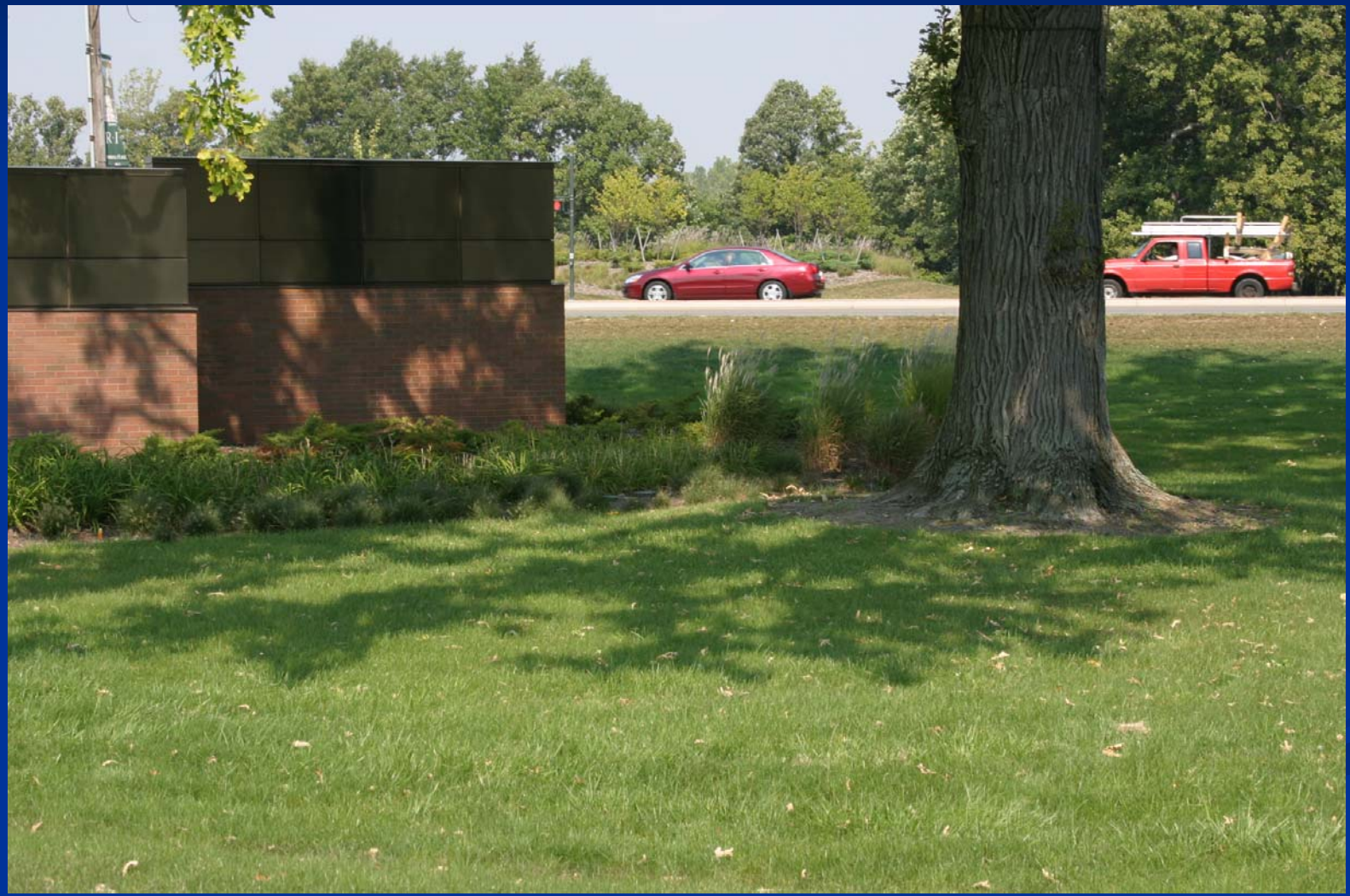
Figure 11.5 The mortality spiral illustrates how stress factors co

Mortality Spiral

- Mature trees are less able to adapt to stress

Predisposing

Injuring



Injured-Secondary Attack

Declining

Declines

- Long-lived nature of progression
- Decline "spirals"
- Secondary pests
- Identification of a pest does not implicate cause

Other "Problems" on Trees
Lichens

- Alga + Fungus

Other-Sapsucker Migratory Bird

Other-Squirrels

The Process of Conducting Plant Health Care

- Monitoring or scouting
  - Observing plant health
  - Identifying pests and stress agents

Diagnostic Procedure

- Identify plant and what is normal for that plant

Diagnostic Procedure

- Look at other plants in area
  - Same and different species

Look at Patterns of Symptoms

- In population

Look at Patterns of Symptoms

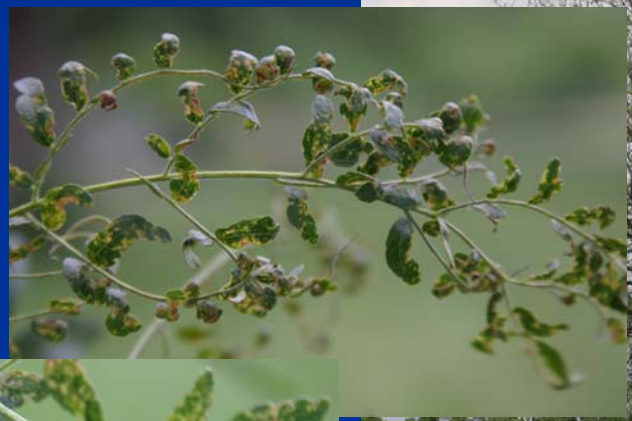
- In population
- On individual plant/organs

Examine the Site and Gather Information

- 10,000 questions
- Forensics

Note and Document Symptoms

- Start at leaves



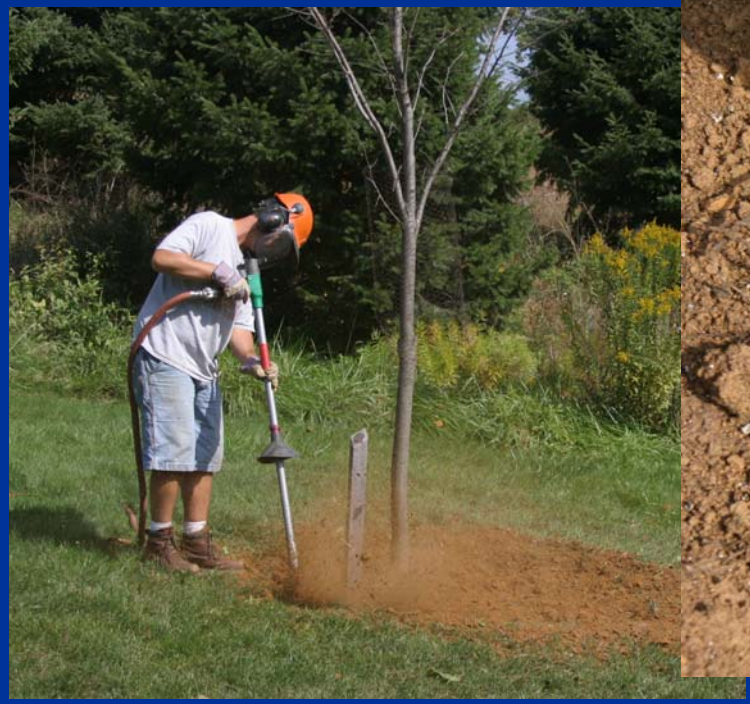
Branches and Trunk
Note and Document Symptoms

Cut windows if needed

Examine Root Collar

Examine Root Collar and Roots

- Root Collar Excavation

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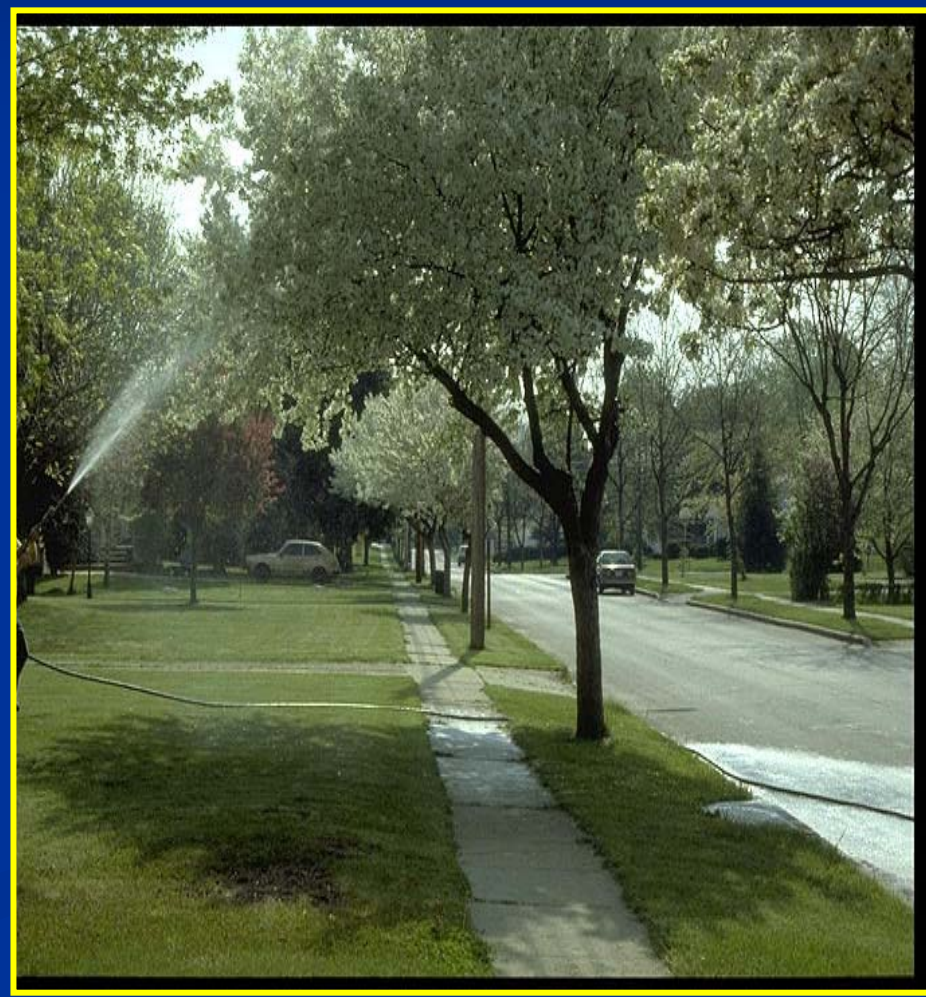
Luley's Law 1

- Run the other way
- Look at what people are doing and don't do that

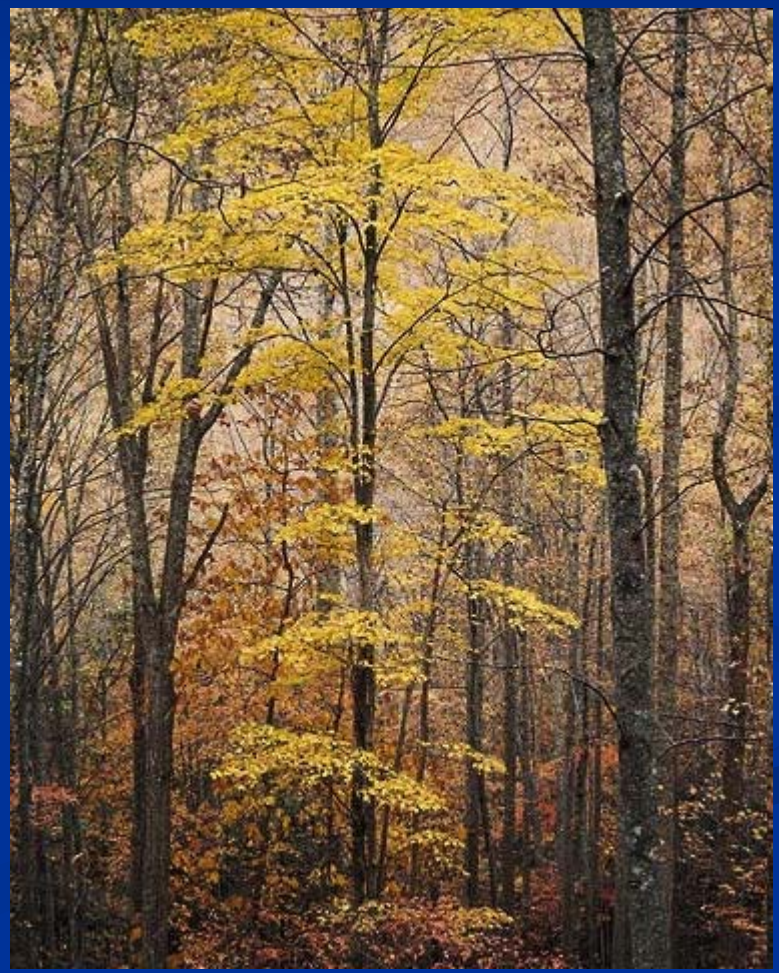
Cover Sprays and Blanket Treatments to 1980's

- Are we still doing this today
- Are we still using broad spectrum insecticides?
  - Sevin
  - Talstar
- Turf
  - Dylox
  - Herbicides?

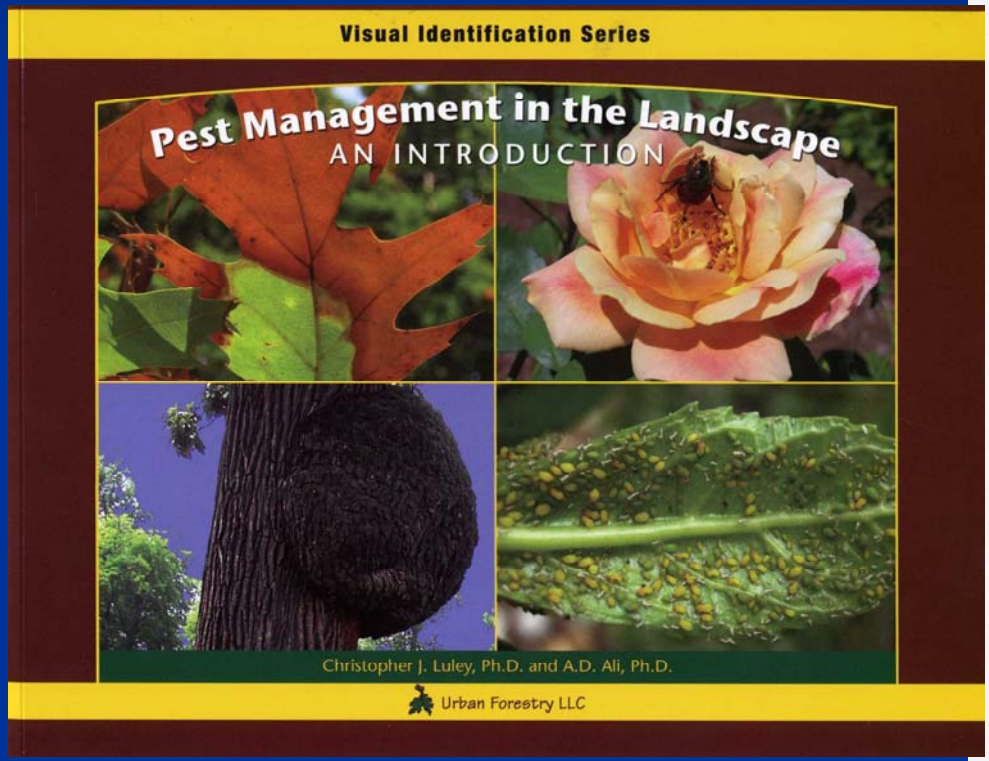


Plant Health Care Definition and Philosophy

- Better
  - Look at trees in their natural environment!



Record Information
Make Consult References



CORNELL UNIVERSITY **Sample Submission** Plant Pathology DEPARTMENT

Mail to: Plant Disease Diagnostic Clinic, 334 Plant Science Bldg, Ithaca, NY 14853 ph:(607) 255-7850
Please enclose a check for $25.00 ($40.00 for Turf, Virus, or Nematode;$55.00 for Turf w/Nematode)

Referring Agent (e.g. Cooperative Extension Agent, Consultant, Arborist...)

Organization/Business:
Agent/Consultant
Address
City
Phone
Fax

Home or business location where sample was taken

Commercial Grower ☐ ☐ Homeowner
Name/ Business
Person to contact
Address
City State
phone fax
email
County

Describe Nature and extent of problem: collection date

Scientific Name (if known)

Host Common Name

Disease Symptoms: wilting, yellowing, galls, dieback, rot, marginal burns, leaf/needle drop, leaf spots, streak, mosaic, blight

Affected Parts : stems, roots, leaves, flowers, fruit

Soil Type: sandy, loam, potting mix, clay, mulch

Distribution: entire field, edge of field, random, high areas, low areas, wet areas, dry areas, sunny area, shaded area, next to drive, feet away

Planting: field, nursery, yard, orchard, greenhouse, forest, indoor, hydroponic

Drainage good, fair, poor

When did problem first occur?
Is it getting worse?
How long did you own the plant?
Age of plant?
When last transplanted ?
How often watered?

Cropping History

Acres or number affected. % loss

Chemicals/Fertilizers
(give rate and time of application)

Date Received at the Diagnostic Lab.

Make Diagnosis

- Final Step
- Takes time
- May take years
- Be Conservative