What’s Wrong With Your Plants and Why?

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Abiotic vs. Biotic Problems

- **Abiotic – non-living agent (non-infectious).**
  - Extreme temperatures
  - Excess or deficient water, light or nutrients
  - Soil compaction, soil grade changes
  - Damage from cultural practices: herbicides, fertilizers, pruning, mulching
Abiotic vs. Biotic Problems

- **Biotic** – living agent (infectious).
  - Pathogens - parasitic microorganisms that cause disease (fungi, bacteria, viruses, phytoplasma)
  - Pests – insects, mites, nematodes or mammals feeding on or damaging plants.
Symptom Progression

- Biotic disease – symptoms progress and nearby plants become infected.
- Abiotic disease – generally a lack of symptom progression. Does not spread.
  - Exception – nutritional deficiency symptoms progress slowly.
What's Wrong?

Biotic or Abiotic
Steps in Problem Diagnosis

- **Know the Plant**
- Inspect the Site and Look for Patterns
- Look for Symptoms or Signs
- Examine cultural practices and weather conditions
- Identify Potential Causes
- Consult Resources and Reach Diagnosis
Steps in Problem Diagnosis

Know the Plant

• Identify the species and cultivar affected
• Know what problems commonly affect the species. For example:
  - Red Maple – Phyllosticta Leaf Spot, gloomy scale
  - Flowering Dogwood – Powdery Mildew, spot anthracnose
Steps in Problem Diagnosis

Know the Plant

- What’s normal for specific plant?

Fall Needle Drop on White Pine
Steps in Problem Diagnosis

Know the Plant

- Look at the Whole Plant (foliage, stems, branches, leaves, and roots)
- Note the color, size, and thickness of the foliage
- Check the trunk and branches
- Examine the Roots
Check the Trunk and Branches

- Look for wounds, cankers, exit holes and other clues
Check the Trunk and Branches

- Sapsucker damage to sugar maple
- Don’t mistake sapsucker damage for borer exit holes
Check the Trunk and Branches
But…
Girdling Injury
Deep Planting or Covered Later

- Check for flare at base of trunk
Girdling Roots

- Girdling roots are a common problem with trees that are planted too deep.
Too Much Mulch Over The Root Ball

- Problems caused by too much mulch
  - Keeps trunk tissue wet
  - Can increase rodent damage
  - Mulch can intercept rain and irrigation
  - Can keep poorly drained soils too wet
  - Can encourage surface roots
  - Can encourage development of stem girdling roots
Planted too deep

Old root system has died
Steps in Problem Diagnosis

Inspect the Site and Look For Patterns

• Determine prevalence of problem.
  - Large area, all plants – generally abiotic.
  - Scattered, localized – generally biotic.

• Check for distribution of symptoms.
  - Uniform – generally abiotic.
  - Random – generally biotic.

• Are the symptoms/patterns related to geography? (soil, low spot, etc)

• Is the damage limited to one type of plant?
  - Multiple plant species - often abiotic
  - One species – often biotic
Observation of Field Patterns
Abiotic Problem

- Symptoms distributed in a large area. Damage pattern is uniform.

Gas leak from building
Observation of Patterns
Random vs. Uniform

Leaf Spot (Fungal) - Biotic
Marginal Leaf Scorch - Abiotic
Observation of Field Patterns
Random vs. Uniform

Boxwood Phytophthora Root Rot
Biotic

Oak Nutrient Deficiency - Abiotic
Observation of Field Patterns
Random vs. Uniform

Random Patches
Bermuda spring dead spot - Biotic

Uniform Stripes
Fertilizer application problems - Abiotic
Steps in Problem Diagnosis

- Know the Plant
- Inspect the Site and Look for Patterns
- Look for Symptoms and/or Signs
- Examine Cultural Practices and Weather Conditions
- Identify Potential Causes
- Consult Resources and Reach Diagnosis
Look for Symptoms and/or Signs

- **Symptoms** - plant reactions or alterations of a plant’s appearance due to a disease or disorder.

- **Signs** - actual presence of the pathogen, it’s parts or by-products seen on a diseased host plant.
Symptoms
Signs
Steps in Problem Diagnosis

- Know the Plant
- Inspect the Site and Look for Patterns
- Look for Symptoms and/or Signs
- Examine Cultural Practices and Weather Conditions
- Identify Potential Causes
- Consult Resources and Reach Diagnosis
Steps in Problem Diagnosis

Examine Cultural Practices and Weather Conditions

• Ask questions - Collect as much background information as possible
• When was the problem noticed?
• Was the damage sudden or gradual?
• Has the problem spread?
• How old are affected plants?
• What cultural practices have been performed recently? Herbicide Sprays?
Steps in Problem Diagnosis

- **Identify Potential Causes**
  - Consult Resources and Reach Diagnosis
  - Get Laboratory Assistance
  - Take samples (plant, soil)
  - Don’t forget pictures
Most Common Diseases of 2009 Ornamentals

- **Phytophthora Root and Crown Rot**
  - Boxwood, Juniper, Hydrangea, Leyland Cypress, Pansy, Petunia,
- **Fungal Leaf Spots** (Oak Leaf Blister, Anthracnose, and other leaf spots)
- **Armillaria Root Rot**
  - Oakleaf Hydrangea, Cotoneaster
- **Pythium Root Rot**
  - Pansy and other flowers
- **Powdery Mildew**
  - Dogwood, Crape Myrtle, Rose
- **Botryosphaeria Canker /Dieback**
  - Leyland Cypress, Japanese Maple, Cleyera
- **Bacterial Leaf Spots**
  - Basil, Begonia, Oakleaf Hydrangea, English Ivy
- **Azalea Leaf Gall**
- **Sooty Mold**
  - Various Trees and Shrubs (Hackberry Woolly Aphid)