Tree Care and Diagnosis

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What Do Trees Need?
Sunlight

Drives photosynthesis, provides energy to the system
Carbon dioxide is a raw ingredient for photosynthesis, oxygen necessary for cellular respiration.
Sunlight

Air

Water

Raw ingredient for photosynthesis, carries nutrients from root system to the rest of the tree
Necessary in varying amounts for growth, regulation, defense, and reproduction.
If a tree cannot access these components, the tree will decline and eventually die.
How Do Trees Die?
Paul Manion’s spiral of tree decline
Abiotic vs Biotic

Abiotic:
- Environmental
- Often human-caused
- Often chronic, unreported, and undiagnosed
- Responsible for most urban tree decline

Biotic:
- Pathogens, insects, mammals, birds
- Easier to diagnose
- More frequently reported
- Often secondary or opportunistic
Disease Triangle
Challenges in Diagnosis
What are some limits to our knowledge?

- Evidence is inaccessible
  (under the soil, within the trunk, high in the canopy)
What are some limits to our knowledge?

• Evidence is inaccessible
• Visible symptoms are not specific
  (Relatively few ways for a tree to signal trouble)
What are some limits to our knowledge?

- Evidence is inaccessible
- Visible symptoms are not specific
- Limited resources for diagnosis (insufficient time or budget)
What are some limits to our knowledge?

- Evidence is inaccessible
- Visible symptoms are not specific
- Limited resources for diagnosis
- **Inadequate context or site history**
  (new owners, lack of attention, lack of documentation)
What are some limits to our knowledge?

- Evidence is inaccessible
- Visible symptoms are not specific
- Limited resources for diagnosis
- Inadequate context or site history
- Lack of scientific research
What are some limits to our knowledge?

- Evidence is inaccessible
- Visible symptoms are not specific
- Limited resources for diagnosis
- Inadequate context or site history
- Lack of scientific research
- **Our own assumptions and expertise**

"In the beginner's mind there are many possibilities, but in the expert's there are few.“ – Shunryu Suzuki
“Why is my tree turning yellow?”
So then…

...how do we diagnose?
1. Know Your Trees

• Correctly identify the species
• Know the typical growth and foliage characteristics for common species in your area
• Familiarize yourself with common problems
2. Ask the Right Questions

• “When did you notice the problem?”
• “How closely do you monitor your trees?”
• “Tell me about any construction activity or other soil disturbance within the last five years.”
• Open ended questions provide an opportunity for additional or unexpected information.
3. Inspect the Tree and Site

- Look for soil disturbance, evidence of concrete work or repair, damage or discoloration on other vegetation.
- Look for patterns of symptoms...
  - within individual leaves
  - on single branches
  - within the canopy of a single tree
  - across multiple trees on a site
  - and across time, where possible
4. Research

• Seek out photos or documentation of the condition of the tree and site over time. Client may be able to provide these. Google Street View is also a resource.

• Additional research into unfamiliar pests or pathogens may be necessary.
4. Diagnose and Report

- Declining trees are rarely suffering from a single problem
- Understand likely causal relationships among symptoms
- Communicate diagnosis as well as any uncertainty about the diagnosis to the client
  - Be ready to recommend for or against treatment
    - Understand client’s goals and concerns
Oak galls on live oak, top left
Tar spot on live oak, right
Oak wilt-symptomatic leaves on live oak, bottom left
Questions?

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