Diagnosing Plant Problems

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Diagnosing “Bee’s”
- a good detective
- very observant
- a good listener
- open minded until all facts are collected
- aware - multiple causes must be considered

Diagnosing Toolkit

Narrow Down The Possibilities
Know What Questions To Ask
- Accurately identify the plant
- Use Latin name including cultivar
- Common names can cause confusion
  - Evergreen = pine, spruce, juniper, yew, arborvitae
  - Shade tree?
  - Fruit tree?

What has changed recently?
- Trenching
- Pesticides and fertilizers
- Mulch – organic / inorganic
- Standing water
- Construction or grade change
- Soil cultivation
- Pruning
- String trimmers
- Mowers

How Long Has the Plant Been in It’s Current Location?
- Recently planted / transplanted
- Balled and burlapped?
- Container grown?
- Potted?
- Bare Root?
**Recent Culture**
- When was the problem first noticed?
- How quickly did the damage progress?
- What is the age of the plants?
- Is it one or all of the plants?
- How severe is the damage?

**Environmental Conditions or What’s the Weather Been Like?**
- Warm spells followed by frost in the spring
- Dry weather may cause wilting and branch death

**What’s the Weather Been Like?**
- Mild fall weather - may encourage growth that won’t harden off – plants are damaged by sudden freezing temperatures
- Dry fall and winter – may cause sunscald on evergreen trees in winter

**Look for Symptoms**
- Slow growth – Short internodes on branches
- Quick growth
- Dried leaves
- Abnormal growth – Twisted, galls, cankers, blisters,
- Dead plant parts
- Mosaic patterns on leaves…..alternating dark and light green patterns

**Look for Signs**
- Insects present – insect frass, mites & webbing, insect eggs
- Fungal fruiting bodies – Rhizosphaera
- Stigmina
- Powdery Mildew
- Bacterial Ooze (cucumber wilt)
Know the Plant’s Normal Appearance

- Plant species & cultivars have unique characteristics.
- Does the plant’s appearance differ from “normal?”
- Know a healthy plant to recognize an unhealthy plant.

Know the Plant’s Normal Appearance

- Many plants have leaf colors other than green.
- Some cultivars have naturally yellow to pale green leaves.

Know the Plant’s Normal Appearance

- Compare the "normal" appearance of the plant’s
  - Overall size & shape
  - Leaf shape & coloration
  - Bark, stem or trunk texture
- Season of the year

Know the Plant’s Normal Appearance

- Larix laricina
- Larch in the summer

Know the Plant’s Normal Appearance

- Ponderosa Pine – Fall needle drop

Image Citation: William M. Ciesla, Forest Health Management International, Bugwood.org
Define the Problem

- **Living Factors**
  - Insects, mites, rodents, rabbits, deer, humans
  - Diseases – fungi, bacteria, viruses, nematodes)
- **Non-living Factors**
  - Weather - wind, light, moisture, temperature, lightning, ice, hail, rain...
  - Mechanical breakage, cars, construction equipment
  - Chemicals– pesticides, fertilizers, winter de-icers.

Define the Problem

- Examine the entire garden or landscape
- Are other kinds of plants included in the damage?
- Check for:
  - Soil conditions
  - Flooding
  - Drought
  - Herbicide applications
  - Light – too much or too little
  - Mechanical damage

Define the Problem

- Examine the entire plant first
  - leaves, stems, roots, fruit, and flowers
- Then - Look for patterns
- Symptoms easily distinguished
  - Clear patterns? – probably caused by physical, mechanical, chemical

Define the Problem

**Symptoms random?**
Usually pest or disease

Damage Caused by Living Factors

- If insects are present - look for patterns of damage
  - Chewed ragged leaves = grasshopper, beetles, caterpillars, slugs
  - Tunnels between upper and lower leaf surfaces = leaf miners
  - Rolled leaves = leaf rollers

Damage Caused by Living Factors

Japanese Beetle on Roses
Japanese Beetle feed on more than 300 hosts
Damage caused by birds and skunks digging for grubs
Damage Caused by Living Factors

Insects

- Sucking insects – cause stippling, puckering, spotting, yellowing – could be mites, thrips, scale, aphids
- Holes in branches, trunk, stems, = borers or sapsuckers
- Overall decline could be soil born insects

Damage Caused by Living Factors

Mites and Insects

- Spidermites
- Scale Insects

Disease Triangle

- Fungi = stem rots, round leaf spots, concentric rings, discoloration, or wilt

Damage Caused by Living Factors

Diseases

- Tomato Early Blight
  Note the concentric rings

- Tomato Late Blight
Damage Caused by Living Factors

Diseases

- Fruiting structures are sometimes visible

Rhizosphaera Needlecast

Stigmina Needlecast

Damage Caused by Living Factors

Insects and Diseases – Hard to Distinguish

- Fungal fruiting structures are sometimes hard to see

Spruce Bud Scale Insects on Fat Albert spruce

Linula Needle Cast on Meyer Spruce

Damage Caused by Living Factors

Diseases

- Bacteria

Bacterial Spot of tomato

Fireblight of Apple

Damage Caused by Living Factors

Diseases

- Viruses

Tobacco Mosaic on tomato

Tobacco Mosaic on orchid leaves

Damage Caused By Nonliving Factors

De-icer used on street

Cucumber Mosaic Virus

Mosaic pattern on cucumber leaf

Photo: David B. Langston, University of Georgia, www.ipmimages.org
### Damage Caused By Nonliving Factors

**Broken or girdled stems**
- String trimmers
- Mowers
- Car accident

**Freezing** - death of exposed foliage

**Rapid low light to high light or vice versa** = yellowing of leaves, reduced growth, leaf drop or death

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### Damage Caused By Nonliving Factors

**Too little light**
- reduces, delays, or prevents flowering, also results in very lanky, sparse growth

**Excessive heat** = scorch symptoms on leaf tips and inter-veinal areas

**Drought and waterlogging** = similar symptoms on aboveground parts of the plant
- Mainly chlorosis (yellowing leaves)
- Abscission (shedding older leaves)
- Wilt – from lack of moisture
- Waterlogging of root zone = oxygen deficiency, death of roots, and wilt

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### Damage Caused By Nonliving Factors

**Soluble salt injury on fern**

**Iron Deficiency**
- interveinal yellowing

**Oedema on geranium leaf** – too much water

**Elm, Ohio buckeye, basswood, oak...**
Damage Caused By Nonliving Factors

- Improperly applied chemicals = leaf distortion, burn, chlorosis, bleaching, plant death

Questions for Diagnosing Sick Plants

1. What kind of plant are you diagnosing?
2. What does a healthy plant look like?
3. What are common problems for the plant? (Example: What diseases is the plant known to get? Does it always need a lot of sun or shade?)
4. What do you see that looks abnormal? (Example: Is the plant wilting? Is the soil dry?)
5. Is part of the plant sick or the entire plant?
6. What are the signs and symptoms?
7. Are other plants in the same location sick too?
8. What does the site or environment around the plant look like?
9. Who knows about the plants or takes care of the plants?
10. When did the symptoms first appear?
11. What is the horticultural history, what’s been the care?

References

