Diagnosing plant problems

Adapt the “systematic process” to gardens

Oriental Arborvitae (Platycladus orientalis): Berckman’s Blight (Seimatosporium berckmanii)
First, identify the plant

1. Growing conditions
2. Biotic problems
3. Resources

Flowering pear (Pyrus sp.)

1. Determine that a “real” problem exists
   - What are the characteristics of the plant?
   - How does it display them through the year?

Japanese Cedar (Cryptomeria japonica) with Incense Cedar (Calocedrus decurrens)

White Pine (Pinus sp.); foliar browning

Dwarf Oregon Grape (Mahonia aquifolium 'Compacta')
2. What is the “population” of the plants?

The “population” refers to the number of plants of the species of interest that are present.

Rhododendron sp.

Tomato (Solanum lycopersicum)

Arborvitae (Thuja occidentalis)

Dwarf Alberta Spruce (Picea glauca 'Conica')

Boxwood (Buxus sempervirens), with Hebe (Hebe sp.)
Azalea cultivars (*Rhododendron* spp.): Powdery mildew (*Erysiphe azaleae*)

3. And...how many of the plants are affected?

Kinnikinnick (*Arctostaphylos uva-ursi*)

Turfgrass: undetermined problem

4. What is the pattern of damage within the population?

Lauristinus (*Viburnum* tinus)

Normal
Uniform pattern = abiotic factors (non-living)

1. Entire population uniformly affected
   - Abnormal
     - Usually the result of non-living, environmental causes
     - Occurs over the entire population of plants, or discrete groups

Periwinkle (Vinca minor)

Uniform pattern = abiotic factors (non-living)

2. Same part of entire population affected
   - Abnormal
     - Arborvitae (Thuja occidentalis)

Foliar browning on Pinus, Rhododendron and Euonymus
Random pattern

- Occurs because of progressive spread of a living organism

- Juniper (Juniperus sp.)
- White Oak (Quercus garryana): Western Oak Looper (Lambdina fiscellaria somniana)
- Turf: Cranefly (Tipula sp.) damage
- Arborvitae (Thuja occidentalis): spider mites
Don’t overanalyze “uniform” versus “random”

Arborvitae (Thuja occidentalis) near La Grande, OR

5. What part or parts of the plant are affected?

Flowering Dogwood (Cornus florida)

Just leaves?

Manzanita (Arctostaphylos x media): Leaf gall aphid (Tamalia coweni)

Red Maple (Acer rubrum): Anthracnose (Kabatiella sp.)

Leaves and fruit?

Apple (Malus sp): Scab (Venturia inaequalis)

Blueberry (Vaccinium corymbosum): Mummyberry (Monilinia vaccini-corymbosi)
Cherry (*Prunus avium*), Coryneum blight (*Wilsonomyces carpophilus*)

Stem-tip dieback?

Atlas Blue Cedar (*Cedrus atlantica*): Needle Blight (*Sirococcus conigenus*)

Individual stems dying back entirely?

Japanese Maple (*Acer palmatum*): Verticillium wilt (*Verticillium dahliae*)

Twig or branch dieback?

Black walnut (*Juglans nigra*): Thousand Cankers Disease (*Geosmithia morbida*)

The whole plant?

Escallonia (*Escallonia sp.*)

The whole plant?

English Walnut (*Juglans regia*)
Red Maple (*Acer rubrum*): Phytophthora Canker (*Phytophthora* sp.)

6. What is the pattern of damage within the plant...

Uniform pattern=abiotic factors (non-living)

Abnormal

Abnormal

Dwarf Alberta Spruce (*Picea glauca* 'Conica'); sunburn

Rhododendron (*Rhododendron* sp.); Nitrogen deficiency
Random pattern = biotic factors (diseases/pests)

Dwarf Alberta Spruce (Picea glauca 'Conica')

Weeping Cherry (Prunus sp.)

Hawthorn (Crataegus laevigata):
Leaf spot (Diplocarpon mespili)

7. What is the pattern on the plant part?

Uniform pattern = abiotic factors (non-living)
Blueberry (Vaccinium corymbosum): drought stress

Tomato (Solanum lycopersicum): blossom-end rot

Random pattern=biotic factors (diseases/pests)

Abnormal

Rhododendron (Rhododendron sp.): Powdery mildew (Erysiphe azaleae)

Beets (Beta vulgaris): Leafminer (Agromyza sp.)

Maple (Acer sp.): Bladegall mite (Idiobus quadripedes)
Pear (*Pyrus communis*): Scab (*Venturia pirina*)

And on conifers….

Uniform pattern=abiotic factors (non-living)

Grand Fir (*Abies grandis*), Phenoxy herbicide damage

Random pattern=biotic factors (diseases/pests)
Douglas fir (Pseudotsuga menziesii): Needle cast (Rhabdocline spp.)

Douglas fir (Pseudotsuga menziesii): Silver-spotted Tiger Moth (Lophocampa argentata)

8. When did the symptoms appear?

Alstroemeria (Alstroemeria sp.): Frost damage

Photo: Luanne Whitaker

Wilma Goldcrest Cypress (Cupressus macrocarpa 'Wilma Goldcrest'): cold injury

Cherry Laurel (Prunus laurocerasus): Shothole (Thyrostroma carpophilum)
Symptoms appear later in the year

Viburnum tinus - sunburn

Lilac (Syringa vulgaris):
Powdery Mildew (Erysiphe syringae)

Birch (Betula sp.): exposure to phenoxy herbicide

Port Orford Cedar (Chamaecyparis lawsoniana): Phytophthora root rot (Phytophthora spp.)

9. Are the symptoms spreading, improving or constant?

Common Lilac (Syringa vulgaris)
Common Lilac (Syringa vulgaris)

Symptoms stay the same

Rose Berries ‘N’ Cream™

10. Are any signs of a pest present?

Damage from non-living factors will induce symptom development, but there will be no signs of a pest

Rhododendron (Rhododendron sp.): Sunburn

Symptoms: Physical characteristics of a problem expressed by the plant.

Include:

- wilting
- leaf discoloration
- leaf spots
- leaf distortion
- defoliation
- galls
- cankers
- rots/dieback
- “plant decline”

Cucumber (Cucumis sativus): wilt

Holly (Ilex sp.): leaf discoloration
Western Spicebush (Calycanthus occidentalis): leaf spots

Redbud (Cercis canadensis): Leaf distortion due to phenoxy herbicide

European Pear (Pyrus communis): Fruit distortion due to true bug feeding damage

Fraser Photinia (Photinia x fraseri): defoliation by Leaf Spot (Diplocarpon mespili)

Birch (Betula sp.): gall

Forsythia (Forsythia sp.): Stem Gall (Pseudomonas savastanoi)
Oregon White Oak (Quercus garryana): Oregon oak gall wasp (Besbicus mirabilis)

Cherry (Prunus avium): canker (probably Bacterial Canker)

Peach (Prunus persica): dieback and canker

Tomato (Solanum lycopersicum): rot caused by Late Blight (Phytophthora infestans)

Boxwood (Buxus sp.): Plant decline

Signs: evidence of the actual causal agent

Diseases:
- fungal fruiting bodies
- fungal mycelia

Insects:
- the insect itself
- boring holes
- foliage or twig feeding
- sawdust
- frass...

Other...
- rodent mounds/holes
- slug trails

Goldenchain tree (Laburnum x watereri): aphids
Apple (Malus domestica): Crane fly (Tipula sp.)

Sunflower (Helianthus annuus): Sclerotinia wilt (Sclerotinia sclerotiorum)

Apple (Malus domestica): Rust (Gymnosporangium sp.)

Apple (Malus domestica): Leaf roller (species undetermined)

Colorado Blue Spruce (Picea pungens): White Pine weevil (Pissodes strobi)

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Cherry (*Prunus avium*): Black Cherry aphid (*Myzus cerasi*)

Cherry (*Prunus avium*): Azalea Lace Bug (*Stephanitis pyrioides*)

Rhododendron (*Rhododendron* sp.): Azalea Lace Bug (*Stephanitis pyrioides*)

Apple (*Malus domestica*): frass of the Apple-and-thorn skeletonizer (*Chrysotus pariana*)

Viburnum davidii: leaf notching due to root weevils

Hebe (*Hebe* sp.): Meadow spittle bugs (*Philaenus spumarius*)
Hosta

Vole trails and burrows

Some signs cannot be seen without magnification

Red raspberry (*Rubus idaeus*): Raspberry Bushy Dwarf Virus (RBDV)

Cherry (*Prunus* sp.): possible Bacterial canker damage (*Pseudomonas syringae*)

Common Lilac (*Syringa vulgaris*): possible Bacterial canker (*Pseudomonas syringae*)

Websites for home garden problems

Pesticide recommendations for homeowners

- **Plant Disease Control:**
  - PNW Disease Management Handbook
    http://pnwhandbooks.org/plantdisease/

- **Insect Pest Control:**
  - PNW Insect Management Handbook
    https://pnwhandbooks.org/insect