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Diagnosing Horticulture Plant Problems

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Introduction

Diagnosing horticultural plant problems is similar to being a detective. The investigator must collect and evaluate all clues, keep good notes, establish the facts, and synthesize them into a conclusion. Take adequate representative samples and keep collected samples in good condition. Have an open mind and don't assume that the current problem is the same as another similar one. Damage may be more severe when multiple causal agents or stresses are involved. Clues to the problem are either signs or symptoms. Symptoms are the reactions or alterations of a plant as a result of a disease or insect. A sign is the pathogen or pest itself or its products observed on a host (infected/infested) plant. A hand lens or microscope may be necessary to see some signs. There may be patterns of symptoms in a landscape or planting. By categorizing symptoms and signs and then using a key, the investigator can narrow the possible causes. The following key is a general example and contains only a partial listing of potential causes of some symptoms. Follow up by packaging your sample and submitting it to your county Extension office or the UD Plant Diagnostic Clinic along with a completed sample submission form. Some samples require incubation in a moist environment or further testing for accurate diagnosis.

SYMPTOM AND SIGN KEY:

I. ENTIRE PLANT AFFECTED

1. Entire plant showing sudden wilting and subsequent browning of foliage or plant death

- Lightning injury
- Vascular wilts or blights
  - Wilts (Fusarium and Verticillium)
  - Bacterial blight
- Boring insects (usually on a small plant)
- Cold or freeze injury
- Chemical injury (herbicides, fumigants)
- Too much or too little water (establishment of new plant)
- Animal damage (i.e. voles)

2. Plant stripped of leaves or many leaves showing holes or shredding damage

- Hail
- Violent wind, wind-driven rain, wind-driven sand

II. BRANCHES OR PORTIONS OF PLANT AFFECTED

1. Whole branches or sides of plant browning or wilting

- Diseases
  - Fireblight
  - Cankers
  - Wilts
  - Fungal root rot (evergreens, hollies, rhododendrons)
- Chemical injury (look for damage on nearby plants)
- Boring insects (look for evidence of frass, gum, or exit holes)

- Physical damage
  - Animal damage
  - Girdling from wires or material used to brace plant during establishment
  - Pinched or broken stems
  - Undermining or construction damage
  - Poor soil conditions (compacted, poor drainage, etc.)
  - Girdling root

2. Scattered branch tips affected

- Twig borers, tip moth in pine
- Scale insects
  - Armored or hard scale
  - Soft or "lecanium type" scale
- Environmental stress (drought, heat, cold)
- Excessive salt in soil (fertilizer, poor-quality irrigation water, or road salt)
- Poor soil conditions (compacted, poor drainage)
- Fungal or bacterial disease (i.e. fireblight)

III. LEAF OR NEEDLE SYMPTOMS (COLOR)

1. Margins of leaves generally brown throughout the plant

- Physiological leaf scorch (i.e. winter injury)
- Root or stem injury
  - Disease (root rot, canker)
  - Insects
  - Freezing and thawing, or new plant not staked properly
  - Lawnmower or string trimmer damage

2. Leaves with irregular brown blotches or "burned" areas.

- Disease
- Physiological - lack of water reaching leaves
  - Environmental – water imbalance
  - Sunscald
- Insects
- Chemical injury

3. Leaves with interveinal areas browned or off-color

- Nutritional deficiency (nitrogen, manganese, magnesium, zinc)
- Certain blight diseases
- Insects (leafhoppers)
- Chemical injury

4. Leaves with unusual coloration or alternating green and yellow areas

- Virus
- Insects
- Genetic variegation
- Low night temperatures during leaf development
- Chemical injury

5. Leaves stippled (stippling is numerous small discrete areas of discoloration, often a symptom of insect feeding damage)

- White stippling (leafhoppers)
- Yellow stippling
  - Lace bugs (usually associated with brown stains on underside of leaves)
  - Thrips (scratches)
  - Bronzed stippling (air pollution, mites – webbing often present)

6. Leaves or needles on trees small, and off-color and growth is generally poor

- Girdling root
- Water imbalance
- Certain diseases (root rots, wilts)
- Plant set too deep in soil, mulched too deep
- Compacted soil

7. Leaves, needles, and branches covered with a black sooty film (sooty mold - a fungal growth associated with honeydew of sucking insects)

IV. PHYSICAL DAMAGE TO LEAF OR NEEDLE (FEEDING)

- Leaves skeletonized, fed on from one surface (Japanese beetle, rose slug)
- Leaves with translucent winding areas (leaf miner)
- Leaves chewed
  - Bagworms. Dangling cocoon-like objects present
  - Caterpillars. Larvae, frass or droppings present
  - Sawfly larvae
  - Beetles (are usually skeletonizers except at early stage)
- Leaves with holes only
  - Diseases-caused by bacteria (shot hole) or certain fungi
  - Weevils, other beetles, some caterpillars
  - Mechanical damage (hail)
- Leaves curled or distorted
  - Herbicide injury
  - Aphids, psyllids, thrips, white flies, leaf hoppers, leaf rollers
  - Leaf tiers (leaves tied together with strands of silk)
  - Viruses, phytoplasmas, certain fungi

V. CONSPICUOUS ABNORMAL GROWTHS

- Above-ground portion of plant
  - Diseases. Cedar-apple rust, crown gall
  - Insects. Plant forms galls around the insect, can occur on all parts of plant, commonly wasps, midges, aphids, or mites
- Below-ground portion of plant
  - Nematodes (root-knot)
  - Crown gall
  - Herbicide injury may cause shortened, thickened clubby roots.

VI. PHYSICAL DAMAGE TO STEM OR BRANCH

- Borers. Sawdust or frass exuding from damaged area. Beetles, weevils, carpenter worms, Lepidoptera larvae
- Tip moth

VII. DISTORTION OR DAMAGE TO FLOWERS OR BUDS

- Thrips, psyllids
- Fungi (Botrytis, powdery mildew).
- Virus
- Frost or Freeze (blasting)

VIII. DAMAGE TO FRUIT

- Distorted fruit
  - Nutrient deficiency (calcium or boron)
  - Larvae of flies, moths, butterflies, weevils, stink bugs
  - Pollination problem (insect, temperature, chemical injury)
  - Rapid change in soil moisture levels
  - Early-season low temperatures
  - Virus
  - Diseases (scab, brown rot)
- Holes in fruit
  - Insects (larvae or adults)
  - Mechanical damage (soil, wind, hail)
  - Animal damage (vole, deer)

IX. PHYSICAL DAMAGE TO BARK

- Abiotic (mechanical)
  - Lawnmower or string trimmer damage, construction
  - Winter cracking (alternating freezing and thawing esp. on south-facing side)
- Biotic (caused by living organisms).
  - Canker fungi
  - Wood boring insects
  - Ambrosia beetles, engraver beetles
  - Borers, emerald ash borer, pine sawyer, Asian longhorn beetle
  - European Hornets, Carpenter ants
  - Bird damage (woodpecker, sapsucker)

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