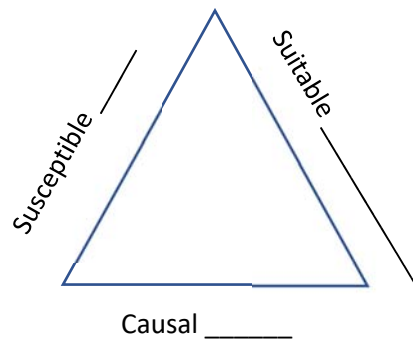


ARBORICULTURE 101 HANDS ON NIGHT - DISEASE OUTLINE – To be used in conjunction with the “Disease Management Guide for Connecticut’s Arborists” prepared by Dr. Sharon Douglas (class handout, large blue book)

1. What is disease? – any condition that \_\_\_\_\_ with normal \_\_\_\_\_ and \_\_\_\_\_.
  - a. All plant parts, seeds, flowers, leaves, stem, branch, trunk, roots can be affected
  
2. Causal agents of disease?
  - a. \_\_\_\_\_: abiotic
    - i. Environmental: flood, drought, winter injury, soil compaction, ozone
    - ii. Cultural: fertilizer burn, herbicide injury, excessive pruning, poor site selection
  - b. \_\_\_\_\_
    - i. Fungi
    - ii. \_\_\_\_\_
    - iii. Virus
    - iv. \_\_\_\_\_
    - v. \_\_\_\_\_
  
3. How does disease occur: three factors need to be present:

Disease Triangle



Disease pyramid: add TIME as a factor as well.

4. Biotic Agents: capable of \_\_\_\_\_ from plant to plant
  - a. Fungi (majority of plant diseases caused by these)
    - i. Lack \_\_\_\_\_
    - ii. Spread by \_\_\_\_\_
    - iii. Penetrate into \_\_\_\_\_, \_\_\_\_\_, wounds.
    - iv. Require free standing \_\_\_\_\_ to infect  
Dispersed by \_\_\_\_\_, water (rain or irrigation), \_\_\_\_\_: shears, pots, soil

- b. \_\_\_\_\_ – single celled organism
  - i. Need wounds to enter plant
  - ii. Spread by splashing water, insects, seed borne, cultural practices:
- c. Phytoplasmas – like bacteria, lack a cell wall, single cell
  - i. Live in phloem only
- d. \_\_\_\_\_ – nucleic acid w/protein coat,
  - i. Unable to \_\_\_\_\_ w/o rna or dna of host cell
  - ii. Get in only via wounds – insect feeding aphid, whitefly, planthopper
  - iii. Spread by nematodes or in infected pollen. Humans: grafting, mechanical transmission pruners
- e. Nematodes – \_\_\_\_\_ : NO SEGMENTS
  - i. \_\_\_\_\_ to pierce cell walls and remove contents
  - ii. Obligate parasites
  - iii. Enter through piercing at root tip, natural openings, foliar nematodes

## 5. Abiotic factors

- a. \_\_\_\_\_: drought and root hair death
- b. \_\_\_\_\_: planting practices, soil attributes, string trimmer injury, pruning
  - i. \_\_\_\_\_ applications

## 6. Disease Cycles

- a. Simple: \_\_\_\_ infection period per year, thus one opportunity for control
  - i. Oak leaf blister – overwinters in buds and bud scales  
  
Ascospores produced in spring as temperatures rise and buds swell, infect buds  
  
Symptoms develop on infected leaves as they grow during the season
- b. Complex: \_\_\_\_\_ infection periods per year: Primary and repeating secondary
  - i. Scab on crabapple – two types of spores produced. Two opportunities for control.

Primary cycle spores overwinter as perithecia on fallen leaves. In spring ascospores from fallen leaves can infect newly emerging leaves, flowers and fruit. Symptoms develop as season progresses. Conidia form in infected tissues. Conidia infect leaves and fruit.

Control of primary cycle in early spring as leaves emerge most effective if they prevent primary infection. Later fungicide sprays will reduce the severity of symptoms by limiting secondary infections.

c. \_\_\_\_\_ cycles: Cedar apple rust requires two different hosts: primary is apple, secondary or alternate host is juniper, including eastern red cedar. Possible management by removing secondary host. Usually NOT POSSIBLE. Spores don't respect property lines.

i. Cedar apple rust overwinters in galls on junipers. In first warm rain of spring gelatinous telial horns develop from galls. These spores produce another spore which can only infect newly emerging apple leaves. During season rusty red spots develop on apple leaves which develop another spore that can only infect apple. Wind or rain dispersed. FUNGICIDES on apple foliage as it emerges in spring and for additional applications if weather remains conducive to disease.

7. Types of Plant Health Problems: symptom is \_\_\_\_\_ to biotic or abiotic infection agent

a. Types of symptoms: blight, canker, chlorosis, dieback, gall, gummosis, leaf blotch, leaf spot, necrosis, stunting, scorch, vascular discoloration, wilt, witches broom

b. SIGN = \_\_\_\_\_ – hyphae of the fungus, spores, etc.

8. Strategies for Managing Plant Health Problems

a. Disease diagnosis: correctly identify host. Biotic or abiotic problem?

i. Check Disease Management Guide – need to know scientific names!

1. Go to Lyon and Sinclair book for pictures and more info

2. What part of plant is affected?

a. Leaf spot

b. Tip blight

c. Stem canker

d. Vascular wilt

e. Root rot

ii. Check weather history, spray history, fertilization history, planting?

b. Management options: cultural: plant & site selection, planting practices, plant care fertility, watering, mulching, winter protection

Sanitation: plant selection, prune & remove infected plants and debris, use clean equipment, scout

Resistance

Biological

Chemical: biorational ie. Potassium bicarbonate, biological ie. Trichoderma, chemical. Protectant vs. systemic. Trade name vs. common name.

READ, UNDERSTAND AND COMPLY with all instructions on the label.