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Plant Diseases: Identification and Control

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Learning objectives:

Difference between infectious and noninfectious diseases

Concepts embodied by the disease triangle

Generalized life cycle for an aerial fungal pathogen

Principles of disease control

Concepts:

1. Definition of disease

2. Symptoms are related to plant function

Localized infections result in localized symptoms:

i.e. branch cankers

Root or lower trunk problems impact whole plant

3. Signs are different than symptoms

4. Two types of plant disease:

Agents of plant disease:

Infectious agents of disease

1. Fungi

Multicellular, plant-like organisms that lack chlorophyll

10% of all fungi are plant pathogens

Most reproduce via spores

Composed of thread-like hyphae

Infection is direct or via wounds

Account for ~75% of all plant diseases in the PNW

2. Bacteria

Microscopic, single-celled, reproduce by division, multiply rapidly
Insects transmit many bacterial diseases
Infection via wounds or natural openings
Account for ~ 15% of all plant diseases (5% in PNW)

Fungi and bacteria spread by:

3. Viruses

Submicroscopic
Enter through wounds, often created by insects
Can't reproduce on own
Account for ~ 5% of diseases

Spread by:

4. Management of:

Fungi and bacteria:

Viruses

5. Parasitic seed plants

Dodder

Mistletoes

Non-infectious (abiotic) agents of disease

Cold injury – azalea

Cold injury – African violet

Nitrogen deficiency – beans

Salts burn – impatiens

Chemical injury – pepper

BREAK

Principles of Disease Control

Concepts

1. The disease triangle – components:

Host: Genetic resistance, matching plant to site, crop rotation

Environment: Air circulation & soil water drainage, reducing stress

Pathogen: Inspection, sanitation, chemicals

2. Plant disease management

a. Exclusion

i. Quarantine

ii. Pathogen-free material

b. Avoidance

c. Resistance

d. Eradication (sanitation)

e. Chemical and biocontrol (Protection)

Plant disease management strategies:

Understanding the pathogen and how it survives = key to control

Aerial fungal diseases - those that overwinter on leaves, branches, twigs, buds

1. Apple scab

2. Brown rot of cherry and peach

3. Black spot of rose

4. Rose rust

5. Incense-cedar rust

6. Powdery mildews

7. Cankers

8. Sclerotinia (white mold)

Soil-borne fungi

1. Damping-off

2. Phytophthora root rots

3. Verticillium wilt

Bacterial diseases

1. Bacterial blight of lilac

2. Crown gall

Viral diseases

Resource:

PNW Plant Disease Management Handbook on the web:

<http://plant-disease.ippc.orst.edu/index.cfm>