

1 ☐ How to Avoid Perennial Problems – Diseases and Pests of Perennial Plants

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2 ☐ Fundamentals of Disease & Pest Control

- Prevention or avoidance
 - Most effective use of time and money
- Suppression
 - Reactive type of pest control
 - Can be cost effective
- Eradication
 - Reactive type of pest control
 - Is it possible?
 - May be cost effective if pest/disease population is low

3 ☐ In a Perfect “World”

4 ☐ Pathogens, Pests
and other Problems

2

5 ☐ Pests-what do growers think? (2003 Greenhouse Sustainability Survey, L, Pottorff)

6 ☐ Pathogens -what do growers think? (2003 Greenhouse Sustainability Survey, L, Pottorff)

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7 ☐ Root and Crown rots #1 Disease Problem of Perennials

- Symptoms
 - Root rot - discolored roots, cortex sloughs off.

8 ☐ Diagnosing root and crown problems

- Symptoms are nonspecific
 - Yellowing
 - Wilting
 - Stunting

9 ☐ Observe the root system

- Soft brown mushy roots
 - Sloughing of cortex
- Crown and lower stem rots
 - Canker

10 ☐ The Common Fungi Involved

- ☐ 1 ■ *Rhizoctonia sp.*
■ *Pythium spp.*

- ☐ 2 ■ *Thielaviopsis spp*
■ *Fusarium spp.*

11 ☐ How are these fungi Introduced?

- Soil
- Water
- Contaminated planting stock

12 ☐ Management Strategies

- Prevention
 - Clean planting media
 - If reusing media- Steam it!
 - Incorporate a soil biofungicide
 - Clean stock
 - Inspect incoming material
 - Don't plant too deeply
 - Don't over water!

13 ☐ What Happens If.....?

- ☐ 1 What happens if media is recycled and not steamed?
- ☐ 2 ■ Two “new” soilborne diseases found:
 - *Dematophora* root and crown rot
 - *Sclerotium rolfsii*

14 ☐ *Dematophora* Root Rot

- ☐ 1 ■ a.k.a *Rosellinia necatrix* or white root rot (Ascomycete)
■ Found on Iris in Colorado (bearded iris)
■ Also reported on cotoneaster, holly, viburnum and peony
 - Most information available from California
- ☐ 2

- Rapidly kills plants
- No chemicals found to be effective

15 ☐ *Sclerotium rolfsii* var. *delphinii*

- ☐ 1 ■ Crown rot or Southern Blight
 - Found on *Ajuga* in Colorado

- Also know to occur on 200 different hosts
 - *Hosta*
 - *Aquilegia*
 - *Hemerocallis*
 - *Phlox*
 - And many other perennials and annuals
- Chemical control is known
 - Terraclor (PCNB)
 - Contrast (flutolanil)

16 ☐ What Happens If.....?

- 1 ☐
- Media is steamed
 - no biofungicides are used
 - A “pathogen” is accidentally introduced

17 ☐ Powdery Mildews (will always be a “perennial problem”)

- 1 ☐
- Damage:
 - Yellowing of foliage
 - White fungal growth

- 2 ☐
- Favors dry leaf surface
 - High RH

18 ☐ Powdery Mildews

- 1 ☐
- Some plants are much more susceptible than others

- 2 ☐
- Phlox
 - Monarda
 - Veronica
 - Columbine
 - Zinnia
 - Rose

19 ☐ Powdery mildew management

- Use of resistant varieties?
- Clean up leaf debris (sanitation).
- Improve air circulation
 - selective pruning (out doors)
 - HAF fans and pot spacing (greenhouse)
- Decrease RH
 - Vent and heat at the same time
- Fungicides
 - Potassium bicarbonates, Oils, Sulfur, Neem, Qwel (new fungicide made from *Macleaya sp.*)
 - Heritage, Pipron, Compass, Rubigan, Phyton 27, Strike, Systhane Terraguard

20 ☐ Anthracnose – easily preventable (doesn’t need to be a “perennial problem”)

- What is anthracnose?

- Definition:

- “ A disease that appears as black, sunken, leaf, stem, or fruit lesions and caused by fungi that produce their **asexual** spores in an acervulus”
- *Most fungi have both sexual and asexual forms. The asexual forms are most commonly found in nature. I.e. on the plant.*

21 ☐ Anthracnose

- Acervulus = an erumpent, open, saucer-shaped fruit body, bearing conidiophores and conidia.

22 ☐ Symptoms of Anthracnose

- Spot anthracnose of rose (*Sphaceloma sp*)

23 ☐ Symptoms of Anthracnose

- 1
- Anthracnose on Hosta (*Colletotrichum sp*)

24 ☐ Symptoms of Anthracnose

- Anthracnose of phlox (*Colletotrichum sp* or *Gloeosporium sp*)

25 ☐ Symptoms of Anthracnose

- Anthracnose of Lupine

26 ☐ Management of Anthracnose
And other leaf spots

- Remove diseased tissue or plant and debris
- Avoid high relative humidity/increase air movement
- Avoid over watering
- Avoid planting too deeply
- Fungicides

27 ☐

Management of Anthracnose

- Fungicides

- Chlorothalonil (Daconil)
- Thiophanate-methyl (3336)
- Azoxystrobin (Heritage)
- Fenarimol (Rubigan)
- Maneb (vegetables only)

28 ☐ Rusts

- 1) ■ Fungus favored by dry leaf surfaces and high relative humidity
- Spores move in air currents
- But unlike powdery mildew – it does not have to be a perennial problem

29 ☐ Failure to inspect plants/not purchasing clean material

- 1) ■ Day lily rust
 - Removed from APHIS quarantine in May, 2003
 - Had not been found in Colorado prior to lifting of the quarantine
- Found in Colorado in September by CDA
 - Grower unaware

30 ☐ Problem noted on receipt of plants- Confusing symptoms

- 1) ■ Leaf smut of Gaillardia
 - Looks like virus
 - Smut fungus called *Entyloma sp*
 - Produces spores on the inside of leaf tissue
 - Can't see spores – hard to diagnose

31 ☐ Scouting/monitoring and exclusion techniques (Early Detection)

- 1) ■ Prevention and suppression of insect problems/associated virus diseases

32 ☐ Western Flower Thrips

- 1) ■ Wide ornamental host range
- Scarring and deformation of flowers and foliage
- 2) ■ Insecticide resistance
- Vector of Tospoviruses

33 ☐ Thrips management

- 1) ■ Look for damage on monarda, penstemon, asclepias, phlox, iris, lamium, campanula
- Insecticides
 - Conserve (industry standard)
 - Avid
 - Pedestal
- 2) ■ Other insecticides
 - Orthene
 - Azatin (neem)
 - Enstar II
 - Decathlon

34 ☐ Symptoms go undetected

- 1) ■ Tospoviruses
 - Tomato spotted wilt
 - Impatiens necrotic spot
 - Vecteded by Western Flower Thrips
 - 500 + hosts
 - Identification is still the most difficult issue for growers

35 ☐ Other Pests that come in from outside or on transplants:

Two Spotted Spider mites

- 1 ☐ ■ Mites present on leaf undersides
- 2 ☐ ■ Stippling symptom

36 ☐ Two spotted spider mite

- 1 ☐ ■ Largest host range of any spider mite
 - rose, buddleia, lamium, potentilla, monarda, primula, scabiosa, verbena, hemerocallis, columbine.....
- 2 ☐ ■ Webbing produced when infestations are high

37 ☐ Two-spotted spider mite

- 1 ☐ ■ Favored by hot , dry conditions (1 generation in 10 days)
- Overwinter as adult female
- 2 ☐ ■ Management
 - lots of biological controls
 - Water management
 - Resistant to many chemicals (rotate)
 - Ovation
 - Akari
 - Triact 70 (neem oil)
 - Avid
 - Floramite
 - Pylon

38 ☐ Aphids – #1 insect on perennials

39 ☐ Aphids

- 1 ☐ ■ Look for distorted blotchy leaves, cast skins, honey dew and sooty mold.
- Check leaf undersides
- 2 ☐ ■ Vector viruses such as cucumber mosaic virus (CMV)
 - The most common plant virus in the world

40 ☐ Once present...Aphid treatments

- 1 ☐ ■ Marathon (industry standard)
- Endeavor (good when beneficials are present)
- Horticultural oil (soft on beneficials)
- Avid (suppression)
- 2 ☐ ■ Orthene
- Neem
- Insecticidal soap
- Enstar II
- Mesurol
- Triact 70
- Distance

41 ☐ Avoidance tactics for diseases and pests

- Inspect, inspect, inspect
- Clean media, clean planting material
- Clean growing facilities
- Weed control inside and outside greenhouse

42 ☐ Other key avoidance strategies

- Start with high quality planting material
- Always plant material in a well drained medium (not too deeply)
- Use biofungicides
 - Companion, Rhapsody, Plant Shield/Root Shield
- Don't propagate from infested or diseased plants.

43 ☐ adamscountyextension.org

Commercial greenhouse program
presentations

44 ☐ Perennials are “designed” to live many, many years! (*So are pests and diseases*)

Don't allow pests and diseases to become perennial too: in the greenhouse or nursery *you do have control over them.*