Common and Invasive Pests of Stonefruits:

Peaches and Nectarines-

Bacteria, Viruses, and Nematodes

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Background

Tree in leaf

Tree in bloom

Flower

Nectarine fruit

Peach fruit

Young fruit

Image citations: peach tree in leaf - Howard F. Schwartz, Colorado State University, www.bugwood.org, #5359260; tree in bloom - Charles Drake, Virginia Polytechnic Institute and State University, www.bugwood.org, #5335075; flower - H.J. Larsen, ww.bugwood.org, #5365442; nectarine fruit - Howard F. Schwartz, Colorado State University, www.bugwood.org, #5359261; peach fruit - Carroll E. Younce, USDA Agricultural Research Service, www.bugwood.org, #1304024; young fruit - University of Georgia Plant Pathology Archive, University of Georgia, www.bugwood.org, 1492186

Bacterial Diseases

- Bacterial spot
- Bacterial canker
- Peach X disease
- European stone fruit yellows

Bacterial Diseases

- Bacterial spot is caused by *Xanthomonas arboricola* pv. *pruni.*
- Also known as:
  - bacteriosis, bacterial leaf spot, bacterial shot hole, bacterial crack, and black spot

Bacterial Diseases

- Bacterial spot symptoms on stems

Image citations:
U. Mazzucchi, Università di Bologna, www.bugwood.org, #0162020

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Bacterial Diseases

- Bacterial spot symptoms on leaves and fruit

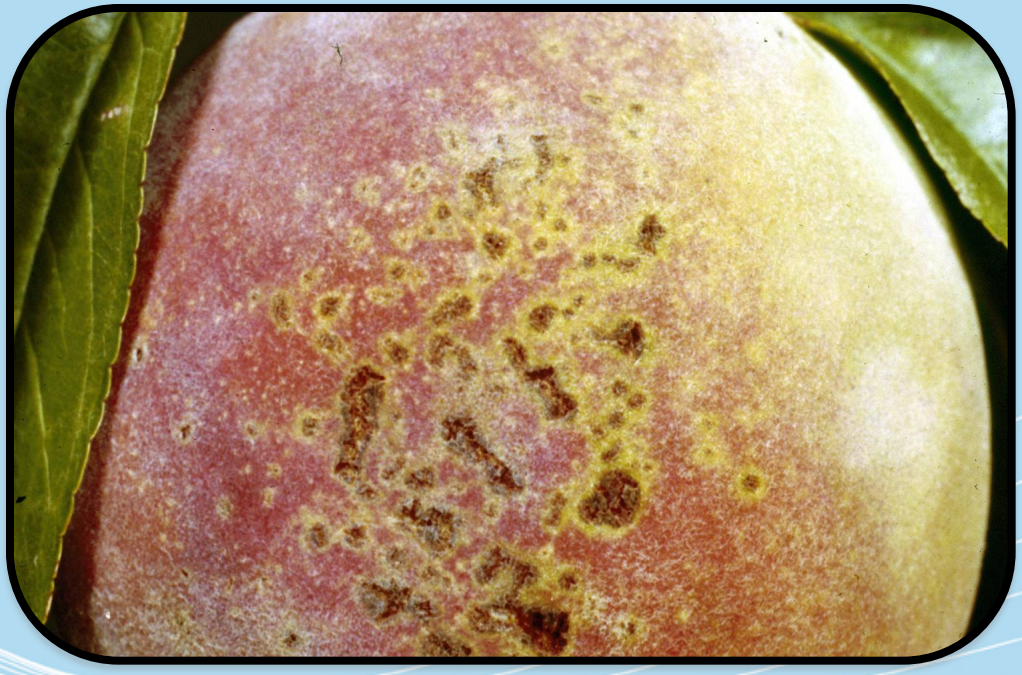

Image citations:
Top left - University of Georgia Plant Pathology Archive, University of Georgia, www.bugwood.org, #1492099
Bottom left - U. Mazzucchi, Università di Bologna, www.bugwood.org, #0162026
Right - Clemson University - USDA Cooperative Extension Slide Series, www.bugwood.org, #1436079

Bacterial Diseases

- Managing bacterial spot: Cultural control
  - Do not plant susceptible cultivars
    - Such as O'Henry and Ryan Sun
  - Apply the correct amount of fertilizer
    - Split applications of fertilizer can also help.
  - Planting ground cover and windbreaks in areas with sandy soils
  - Plant cultivars that are resistant to bacterial spot
    - Be aware that these resistant cultivars may not have the characteristics that are most sought after

Bacterial Diseases

- Managing bacterial spot: Chemical control*
  - Use copper in dormant and early season (before shuck split)
  - At bloom and thereafter:
    - Use oxytetracycline, dodine combined with captan, and chemicals that contain zinc (such as ziram and zinc sulfate)
    - Add oxytet to copper if disease pressure is high.

*Be sure to check with your local county agent to find out which chemicals are certified for use in your state, on what crop it is allowed to be used, if it is allowed to be used post-harvest or pre-harvest, and if it should be applied by a licensed applicator.

Bacterial Diseases

- Bacterial canker is caused by *Pseudomonas syringae* pv. *syringae* and *P. syringae* pv. *morsprunorum*.
  - *P. syringae* pv. *syringae* affects peaches and nectarines, as well as other commercially grown stonefruits.
- Also known as bacterial gummosis, sour sap, blossom blast, dieback, spur blight or twig blight.
- Prevalent in cool wet environments
  - northwestern and northeastern United States
  - part of the peach tree short life complex in the southeastern U.S.

Bacterial Diseases

- Bacterial canker symptoms stems

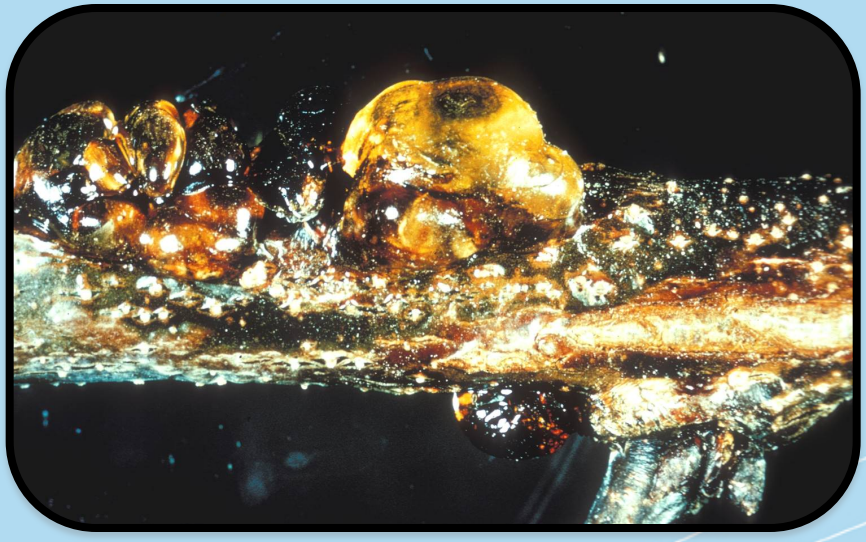

Image citations:
Left - University of Georgia Plant Pathology Archive, University of Georgia, www.bugwood.org, #1492089
Right - University of Georgia Plant Pathology Archive, University of Georgia, www.bugwood.org, #1492081

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Bacterial Diseases

- Managing bacterial canker: Cultural control
  - Reducing stress to the tree helps to reduce the chances of infection
    - Select an appropriate site for planting
    - Select proper rootstock and cultivars for the area in which the plant in grown
    - Reduce nematode induced stress by fumigating the soil
      - If possible
    - Protect the tree from freezing
    - Don’t prune until late winter

Bacterial Diseases

- Managing bacterial canker: Chemical control*
  - Based on copper sprays applied before flowering
    - Remember that peaches and nectarines are very sensitive to copper.
  - Cultural control seems to be better than chemical control for this disease.

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Bacterial Diseases

- Peach X disease is caused by a mycoplasma-like organism (MLO) living in the phloem cells of plants.
- It has not been reported outside of North America
  - found mainly the northeastern U.S.
- Now referred to as X-disease

Bacterial Diseases

- Peach X symptoms on leaves and stem

Image citations:
Left - F. Dosba, INRA, Bordeaux, www.bugwood.org, #0725208; right - R. Bernhard, INRA, Bordeaux, www.bugwood.org, #0725027

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Bacterial Diseases

- Managing peach X disease: Cultural control
  - Managing the vectors
    - Manage for *Colladonus montanus*, *C. geminates*, *Fieberiella florii* in the western states
    - Manage for *Paraphlepsius irroratus* in the eastern and northcentral U.S.
  - Manage overwintering hosts of these vectors
    - Removal of dicot weeds and not planting sugarbeets near peach and nectarine trees for *Colladonus montanus*
    - Removal of bitter cherry and chokecherry from around orchards for *Fieberiella florii*
    - Removal of monocots for *Paraphlepsius irroratus*

Bacterial Diseases

- Managing peach X disease: Chemical control*
  - Oxytetracycline which can be injected into the trunk or scaffold
    - Repeated annually only delays the decline of the tree health
    - Can be cost prohibitive
    - Only cost effective for unique tree specimens
  - Controlling the vector populations through insecticides can also help

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Bacterial Diseases

- European stone fruit yellows is caused by *Candidatus* Phytoplasma prunorum
  - vectored by the psyllid *Cacopsylla pruni*
- It has not been reported in North America

Bacterial Diseases

- European stone fruit yellows symptoms on leaves

Image citations:
EPPO - http://photos.eppo.org/index.php/image/829-phyp16-01

Bacterial Diseases

- Managing European stone fruit yellows: Cultural control
  - Managing the vector of the disease - *Cacopsylla pruni*
    - In Europe it has only one generation per year, but that may change if it comes into the U.S.
  - Managing the winter host of the vector
  - Using clean budwood
  - Removal of wild *Prunus* species which may be reservoirs for this disease is also recommended
  - Quarantine area established and destruction of infected trees

Viral Diseases

- Plum pox is a potyvirus.
- The disease it causes is referred to as Sharka.
  - Invasive disease
  - Was detected in Pennsylvania in 1999, declared eradicated in 2009.
  - Detected in Michigan in 2006, declared eradicated in 2006.
  - Detected in New York in 2006, under eradication.

Viral Diseases

- Plum pox symptoms on leaves and fruit

Image citations:
Left - Biologische Bundesanstalt für Land- und Forstwirtschaft Archive, Biologische Bundesanstalt für Land- und Forstwirtschaft, www.bugwood.org, #0660084
Right - European and Mediterranean Plant Protection Organization Archive, www.bugwood.org, #0660072

Viral Diseases

- Managing plum pox virus
  - Prophylactic measures such as quarantine measures, eradication programs, and using certified virus tested planting material
  - Varieties bred for resistance are currently being looked at
  - When detected, the trees will be quarantined and destroyed
    - With a three year moratorium after the last positive sample on replanting

Nematode Pests

- Root knot nematode
- Root lesion nematode

Nematode Pests

- The fruit of peaches and nectarines can be affected directly by the root-knot nematode.
  - *Meloidogyne arenaria*, *M. incognita*, and *M. javanica* are the main ones
- Prevalent in areas with sandy soils

Image citations:
Tesfamariam Mengistu, Department of Entomology and Nematology, University of Florida

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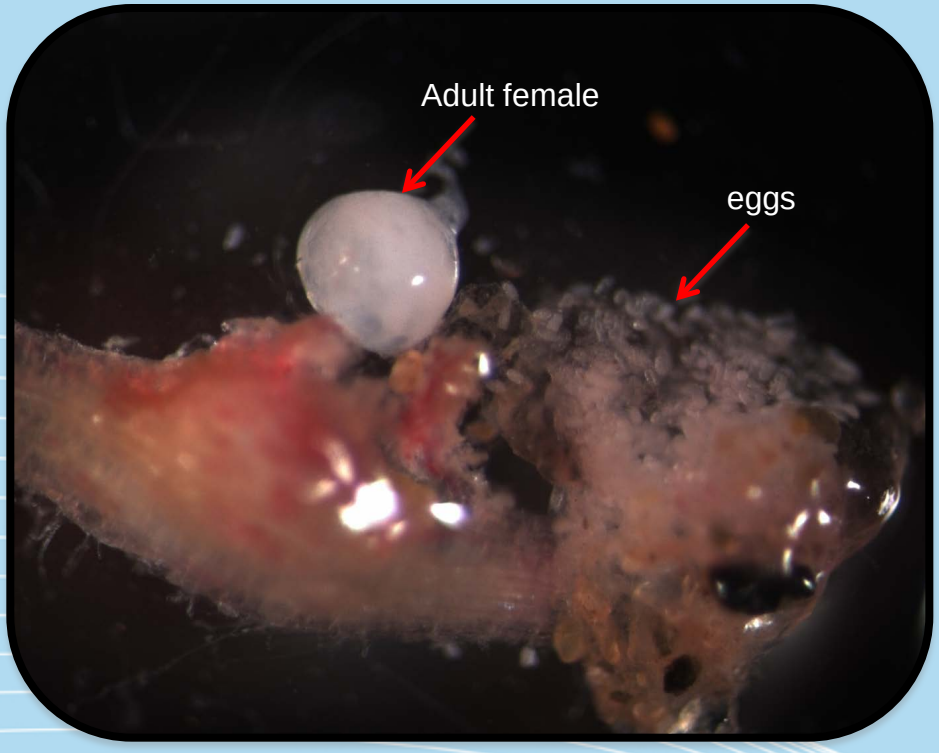
Nematode Pests

- Description of root-knot nematode



Adult female and eggs that have been removed from the root

Adult females

Image citations:
Tesfamariam Mengistu, Department of Entomology and Nematology, University of Florida

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Nematode Pests

- Root-knot nematode damage on leaves and roots

Image citations:
Left – Mercy Olmstead, Department of Plant Pathology, University of Florida
Right – Tesfamariam Mengistu, Department of Entomology and Nematology, University of Florida

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Nematode Pests

- Managing root-knot nematode: Cultural and Chemical control*
  - Cultural
    - To reduce nematode levels before planting
      - leave the orchard fallow or plant a non-host species (such as cereal grains)
    - Plant desirable cultivars on resistant rootstock
    - Control weedy species that may be hosts
  - Chemical
    - Metam sodium and 1,3 dichloropropene have been recommended prior to planting
    - Fumigation may or may not be an option

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Nematode Pests

- The fruit of peaches and nectarines can be affected directly by the root-lesion nematode.
  - *Pratylenchus vulnus* found in warmer climates
  - *P. penetrans* found in cooler climates and higher elevations
- Cause more damage in sandy loam areas

Image citations:
Tesfamariam Mengistu, Department of Entomology and Nematology, University of Florida

Nematode Pests

- Description of root-lesion nematode

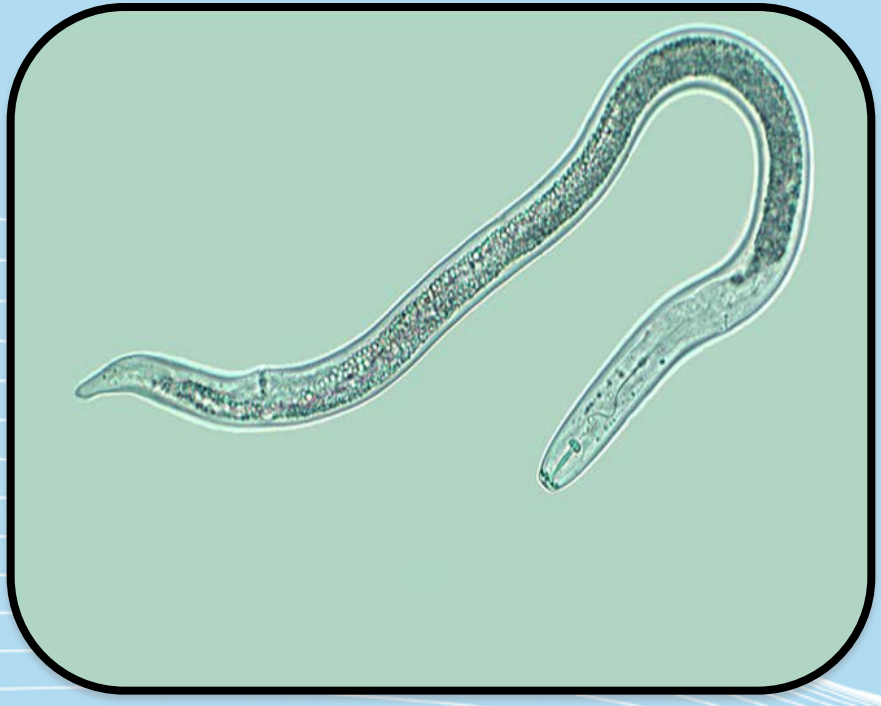

Image citations:
Tesfamariam Mengistu, Department of Entomology and Nematology, University of Florida

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Nematode Pests

- Root-lesion nematode damage to roots

Image citations:
R.J. Reynolds Tobacco Company Slide Set, R.J. Reynolds Tobacco Company, www.bugwood.org, #1402035

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Nematode Pests

- Managing root-lesion nematode: cultural and chemical control*
  - Cultural
    - To reduce nematode levels before planting
      - leave the orchard fallow or plant a non-host species (such as cereal grains)
    - Plant resistant cultivars
    - Control weedy species that may be hosts
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Comparing root galls and mycorrhizae

Root galls

Mycorrhizae

Image citations:
Tesfamariam Mengistu, Department of Entomology and Nematology, University of Florida

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Questions?

- For more information, check out www.protectingusnow.org

- You can also contact:
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