Common and Invasive Pests of Stonefruits: Peaches and Nectarines - Bacteria, Viruses, and Nematodes
Background

Tree in leaf

Tree in bloom

Flower

Nectarine fruit

Peach fruit

Young fruit

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](http://www.bugwood.org), #0162020
Bacterial Diseases

• Bacterial spot symptoms on leaves and fruit
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
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 is 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:
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:
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
Viral Diseases

- Plum pox symptoms on leaves and fruit
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
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
Nematode Pests

- Root-knot nematode damage on leaves and roots
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:
Tefamariam Mengistu, Department of Entomology and Nematology, University of Florida
Nematode Pests

• Description of root-lesion nematode
Nematode Pests

- Root-lesion nematode damage to roots

Image citations:
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
Questions?

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

• You can also contact:
  – Amanda Hodges, University of Florida, achodges@ufl.edu
  – Stephanie D. Stocks, University of Florida, sstocks@ufl.edu
Author Credits and Date of Publication

• Stephanie Stocks, M.S., Assistant –In, Extension Scientist, Department of Entomology and Nematology, University of Florida
• Mercy Olmstead, Ph.D., Assistant Professor, Horticultural Sciences Department, University of Florida
• Guido Schnabel, Ph.D., Professor & Plant Pathologist, School of Agricultural, Forest & Environmental Sciences, Clemson University
• Scott Simon, Ph.D., Professor of Plant Pathology, Entomology, Soils and Plant Sciences, Clemson University

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Reviewers Credits

- Amanda Hodges, Ph.D., Associate Extension Scientist, Department of Entomology and Nematology, University of Florida
- Stephen Mclean, DPM, Department of Entomology and Nematology, University of Florida
- Tesfamariam Mekete Mengistu, Ph.D., Entomology and Nematology Department, University of Florida.
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- Extension Disaster Education Network (EDEN)
- National Plant Board (NPB) and State Departments of Agriculture
- National Plant Diagnostic Network (NPDN)
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