Canker Diseases of Almond

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Speakers

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Trunk and Scaffold canker diseases

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Almond canker diseases
Ceratocystis canker

- Caused by the fungus *Ceratocystis variospora* (syn. *Ceratocystis fimbriata*)
  - Associated with mechanical-harvest injury and pruning wounds
  - Amber gum at the canker margin
  - Cankers are most active during the growing season
  - Bark injuries and pruning wounds are susceptible for up to 14 days
Ceratocystis canker
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Ceratocystis canker

• The fungus develops only in the cambium and xylem tissue of the current year
• Perithecia containing the infectious spores are formed in mycelial mats under the bark of injured trees
Ceratocystis canker

- Sticky spore droplet can be picked up or ingested by insects and moved to fresh wounds
Management of Ceratocystis canker

• Avoid shaker injuries
• Insure orchards are relatively dry 2-3 weeks prior to harvest
• Limit pruning wounds on branches and scaffold
• Surgery in winter when insects are not active and no rain in the forecast
Perennial Phytophthora cankers

• Caused by the fungi *Phytophthora citricola* and *P. cactorum*

  – Associated with scaffold crotch pocket
  – Cankers are fast growing
  – Tree may die over one or two growing season
  – Gum balls occur throughout the disease area
  – Inoculum blown onto trees during harvest
Perennial Phytophthora cankers

Phytophthora crown rot

Aerial Phytophthora

David Doll
Perennial Phytophthora cankers
Perennial Phytophthora cankers
Perennial Phytophthora cankers

• Management
  – The bud union of almond trees should be planted to remain above the soil surface
  – Proper scaffold selection to avoid pockets to form at the tree crotch
  – EU recently decided that all phosphite (phosphonate, phosphorous acid) products are exclusively pesticides
  – This has triggered the need for a Maximum Residue Limit (MRL)
  – The Almond Board of California, along with California Walnut Commission, the Pistachio Research Board and EU trade has successfully obtained an extension on the temporary MRL in the EU
    • Residue data being developed for a proper MRL
  – Check with your PCA or processor if use required
  – Early spring or late fall application of mefenoxam (Ridomil Gold)
Band canker

- Caused by *Botryosphaeriaceae* fungi
- A narrow band of asymmetric cankers with oozing amber sap extend around the circumference of the trunk
- Appear in the spring
Band canker

- The pathogen(s) invade stems through growth cracks
  - Affects 2 to 6-years-old trees
  - Affects vigorously growing cultivars
    - Nonpareil
    - Carmel
    - Padre
    - Butte
  - Orchards receiving large amount of N and water
Botryosphaeria cankers

- Caused by *Botryosphaeriaceae* fungi
  - Associated with pruning wounds
  - Associated with scaffold crotch pocket
Botryosphaeria cankers
Band canker and Botryosphaeria cankers

• Disease epidemiology
  – 9 species of Botryosphaeriaceae
  – Different level of virulence among Bot. species
Band canker and Botryosphaeria cankers

- **Disease epidemiology**
  - Inoculum sources: *Pycnidia* or perithecia on dead wood
    - Almonds (tree stumps)
    - Walnuts
    - Grapevines
    - Olives
    - Pistachio
    - Prunes
    - Willows
    - Oaks
    - Bay Laurel
    - Cottonwoods
Band canker and Botryosphaeria cankers

- Disease epidemiology
  - Spore trapping study in grapevine:

![Graph showing spore counts, precipitation, and temperature over time](image)
Eutypa dieback

- Caused by *Eutypa lata*
  - Associated with scaffold crotch pocket
  - Sacramento and northern San Joaquin valleys
Eutypa dieback

• Caused by *Eutypa lata*
  – Associated with pruning wounds
Eutypa dieback

• Disease epidemiology
  – Inoculum sources: Perithecia on dead wood
Eutypa dieback

• Disease epidemiology
  – Spore trapping study in grapevine:
Wood decay fungi, acid and fertilizer burns
Management of canker diseases

• Appropriate tree training and scaffold selection
  – Prevent disease establishment in the early years
  – Manage tree vigor: more scaffold branches
Management of canker diseases

• Maintenance pruning
  – After harvest, Early fall
Management of canker diseases

• No fungicide spray, don’t prune during rain events
• Prune trees in early fall to avoid rainy weather
• Appropriate tree training and scaffold selection
• Remove dead wood, stumps and dead trees from the orchard
  – Composting, cogeneration
  – Wood chipping
• Avoid wetting the tree trunks with sprinklers
• Protect large pruning wound with Acrylic paint or pruning sealer