

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



Ceratocystis canker

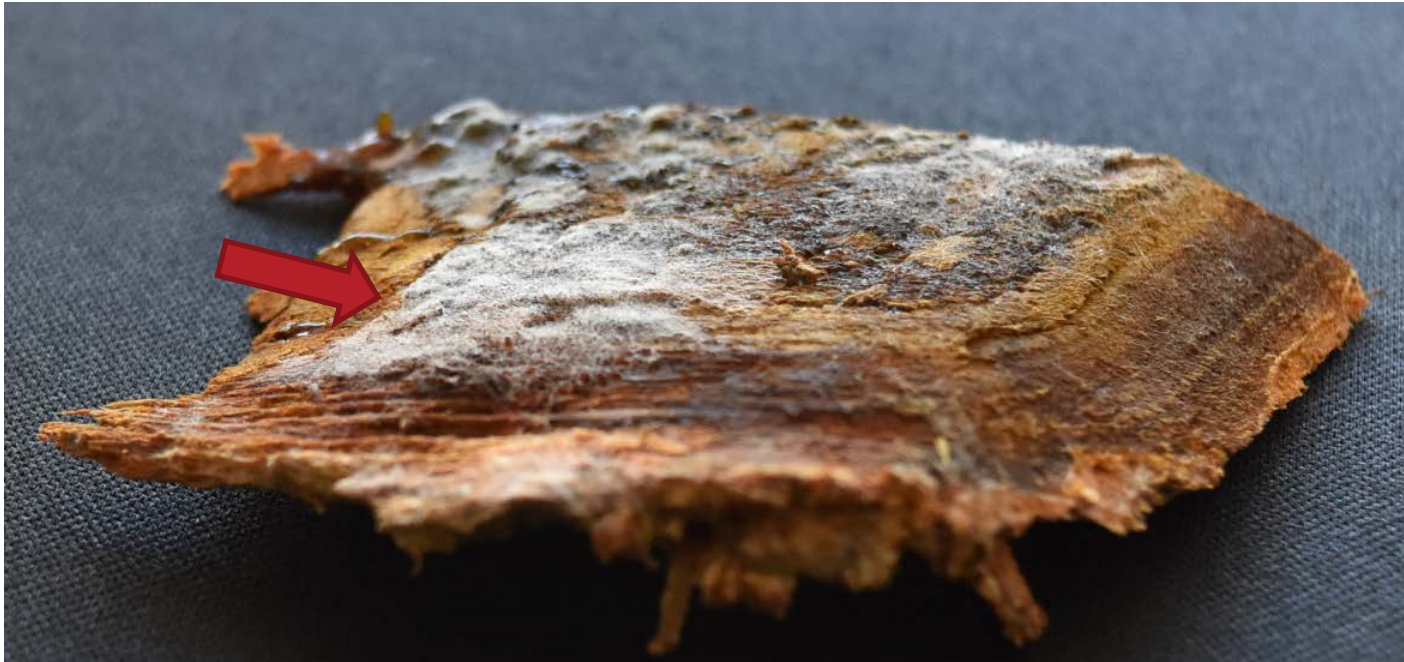


Ceratocystis canker



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



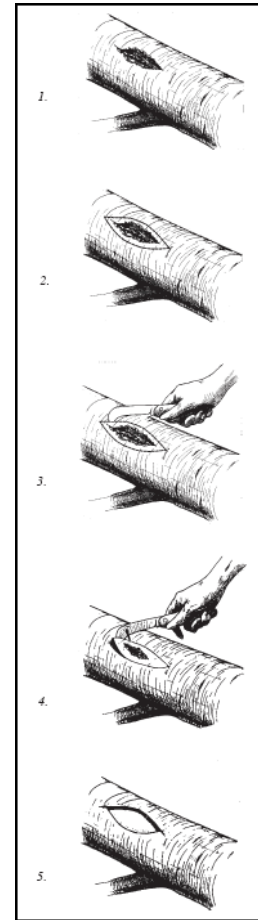
Ceratocystis canker

- 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



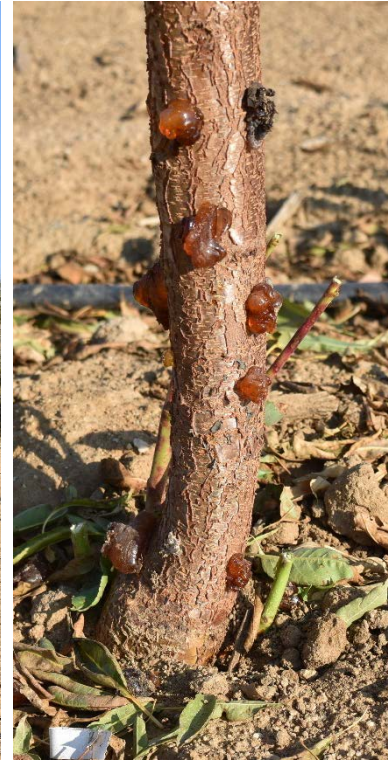
Perennial Phytophthora cankers



Perennial Phytophthora cankers



Perennial Phytophthora cankers



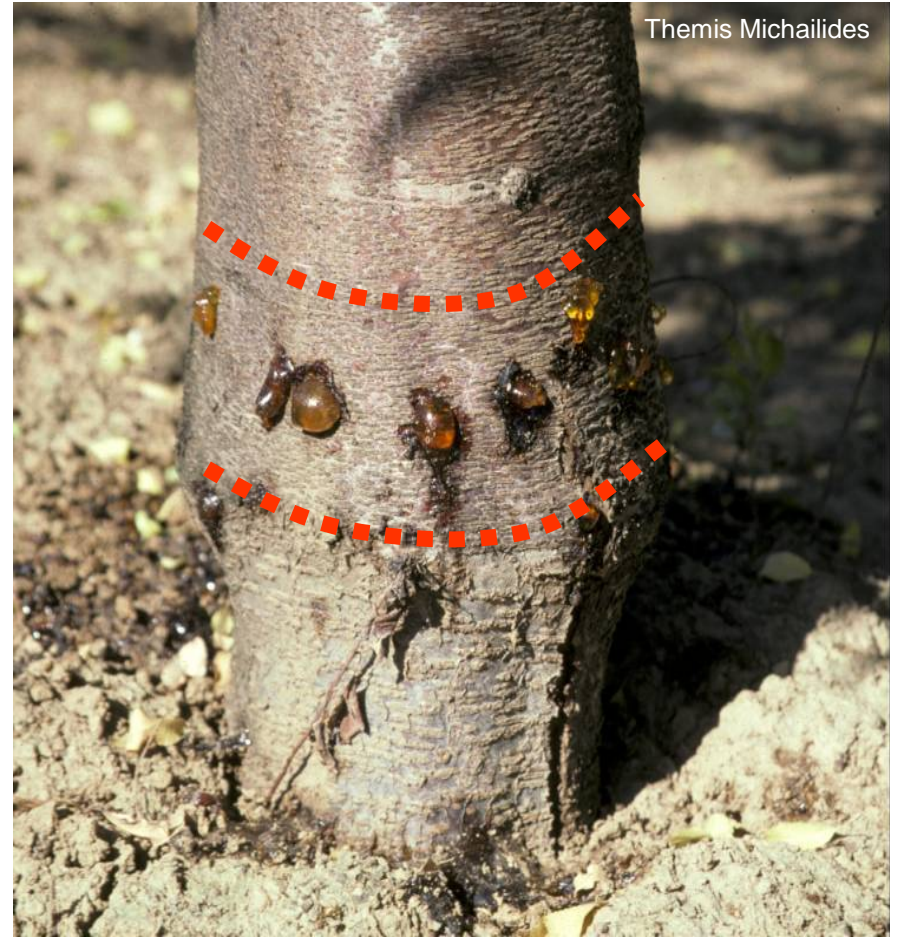
Perennial Phytophthora cankers

- 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

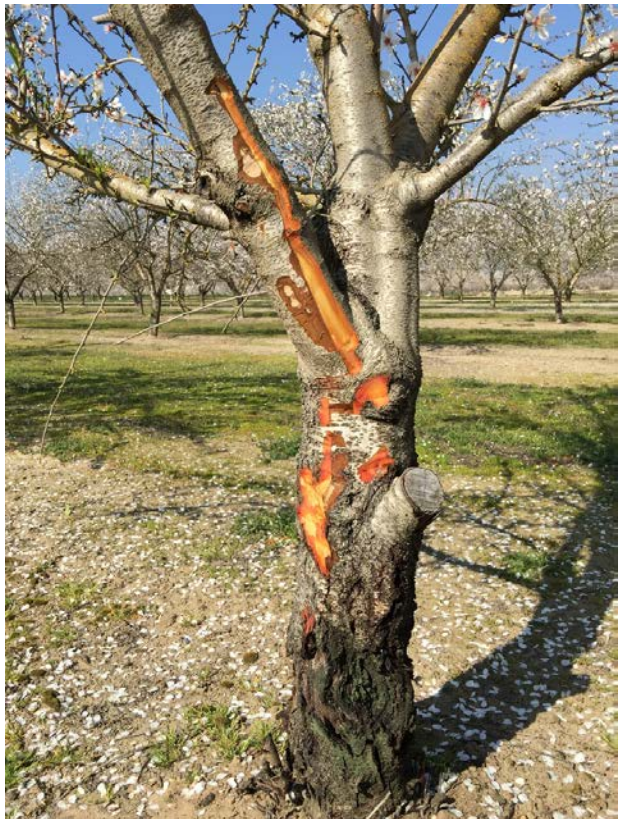


Botryosphaeria cankers

- Caused by *Botryosphaeriaceae* fungi
 - Associated with pruning wounds
 - Associated with scaffold crotch pocket

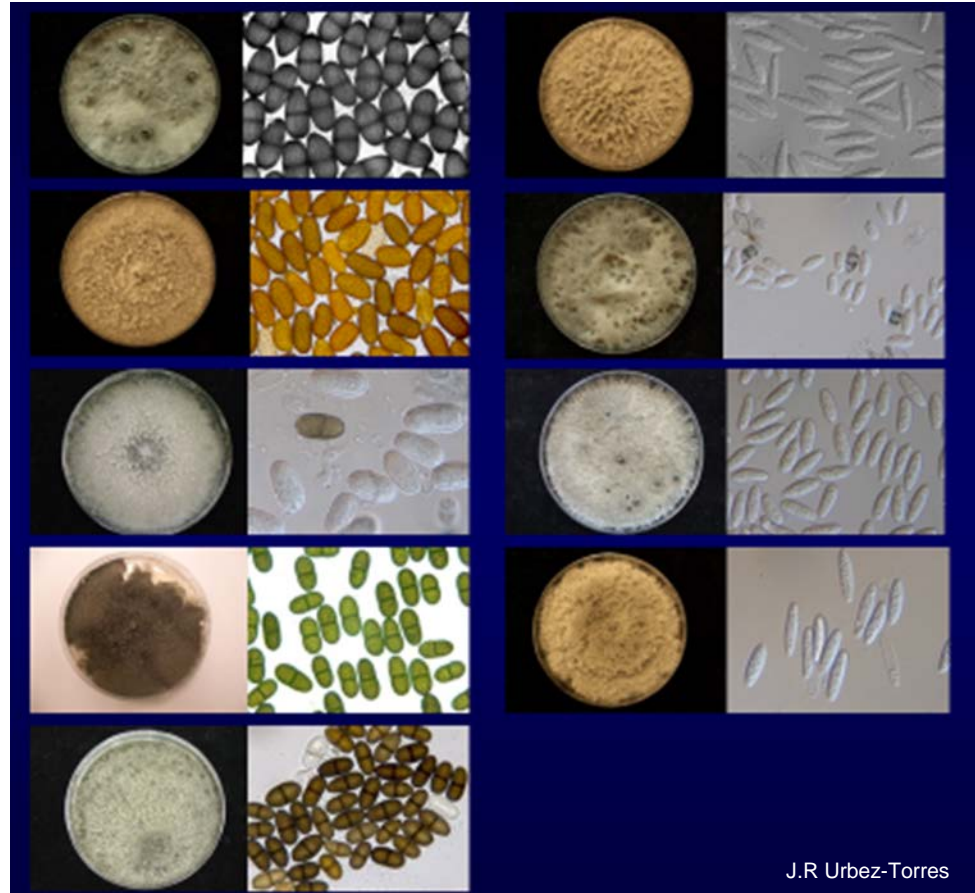
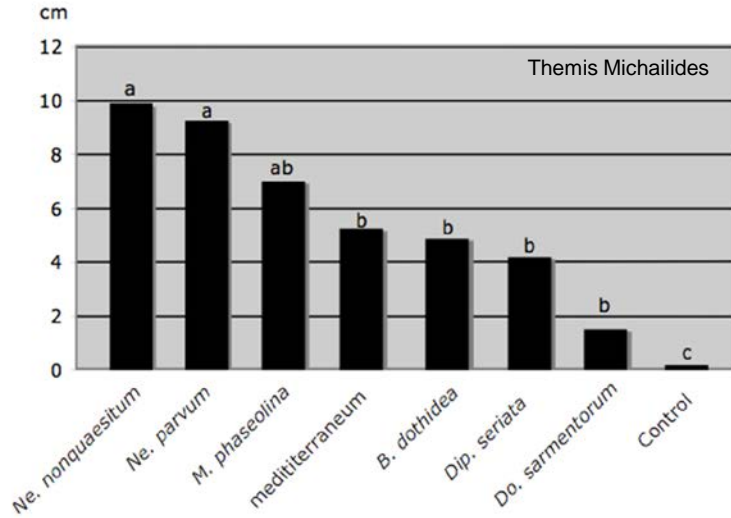


Botryosphaeria cankers



Band canker and Botryosphaeria cankers

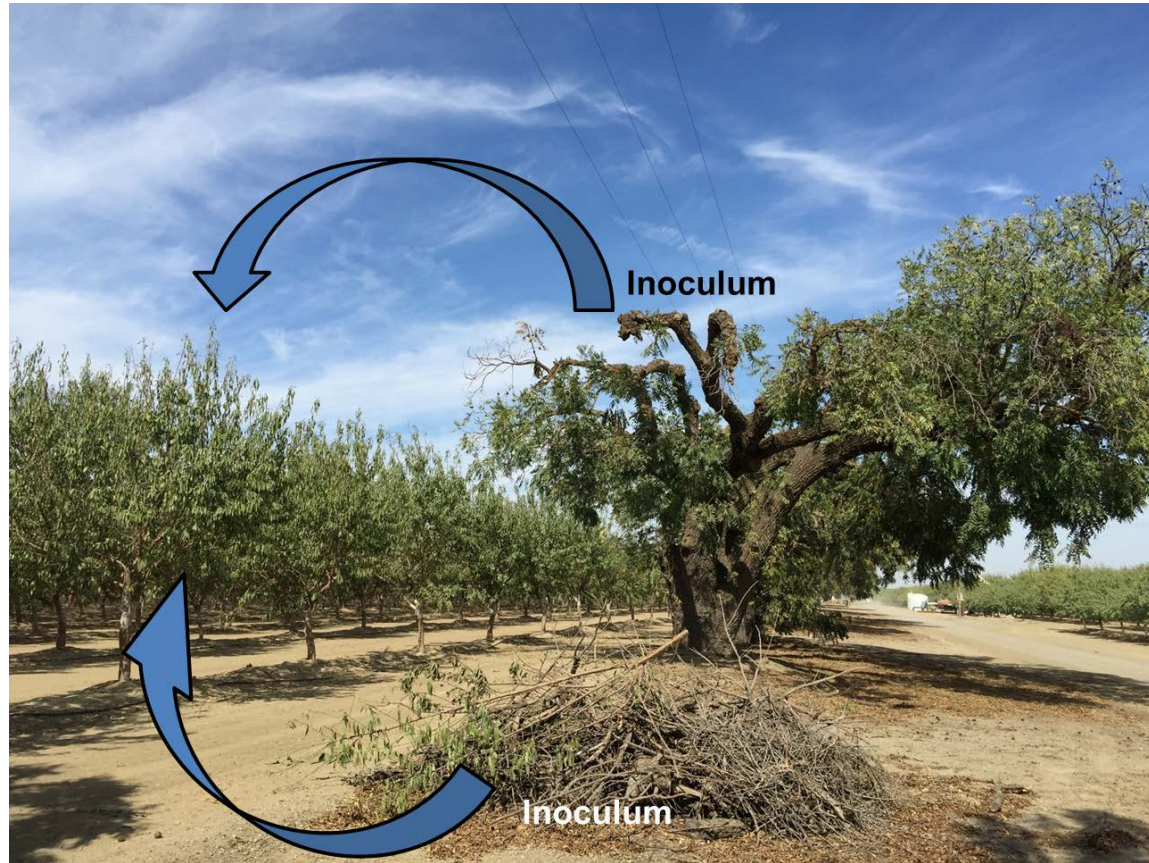
- Disease epidemiology
 - 9 species of Botryosphaeriaceae
 - Different level of virulence among Bot. species



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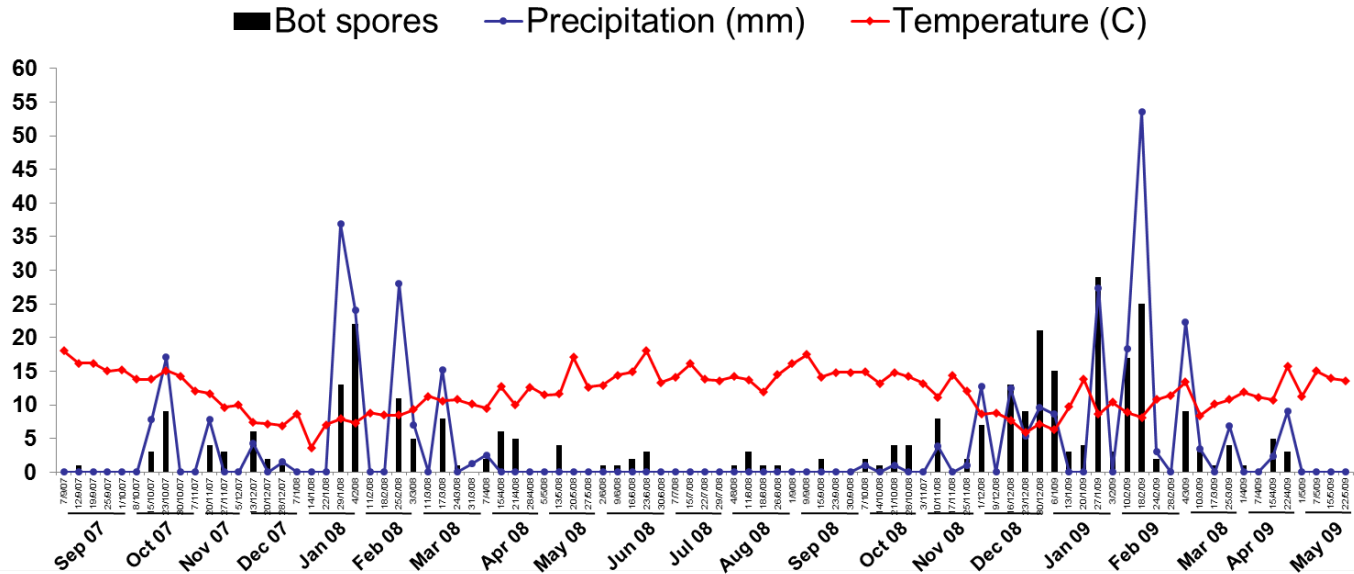
Band canker and Botryosphaeria cankers

- 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:



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Eutypa dieback

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



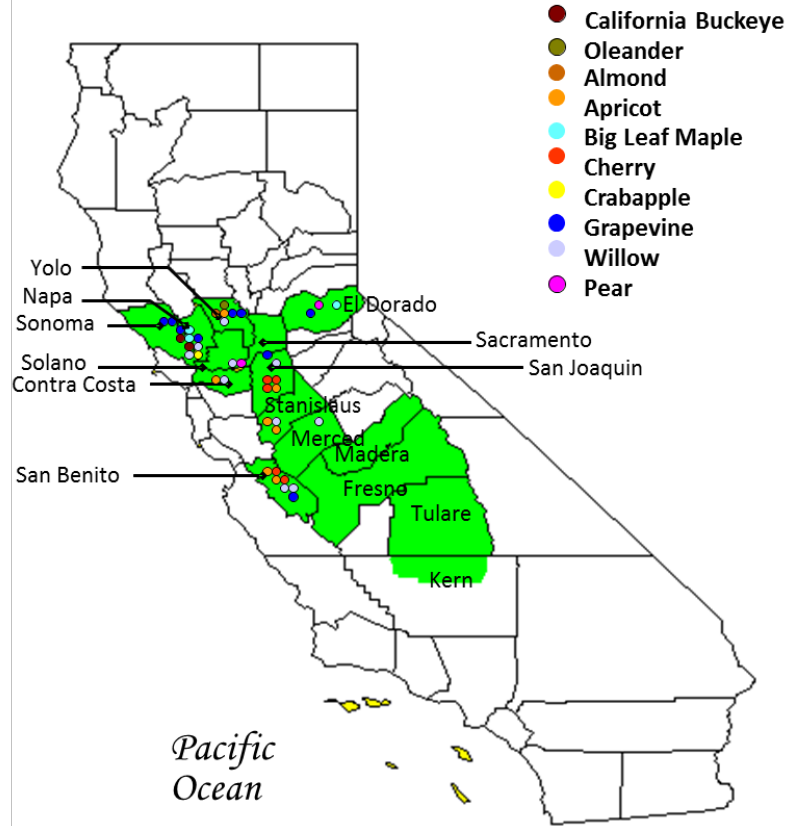
Eutypa dieback

- Caused by *Eutypa lata*
 - Associated with pruning wounds



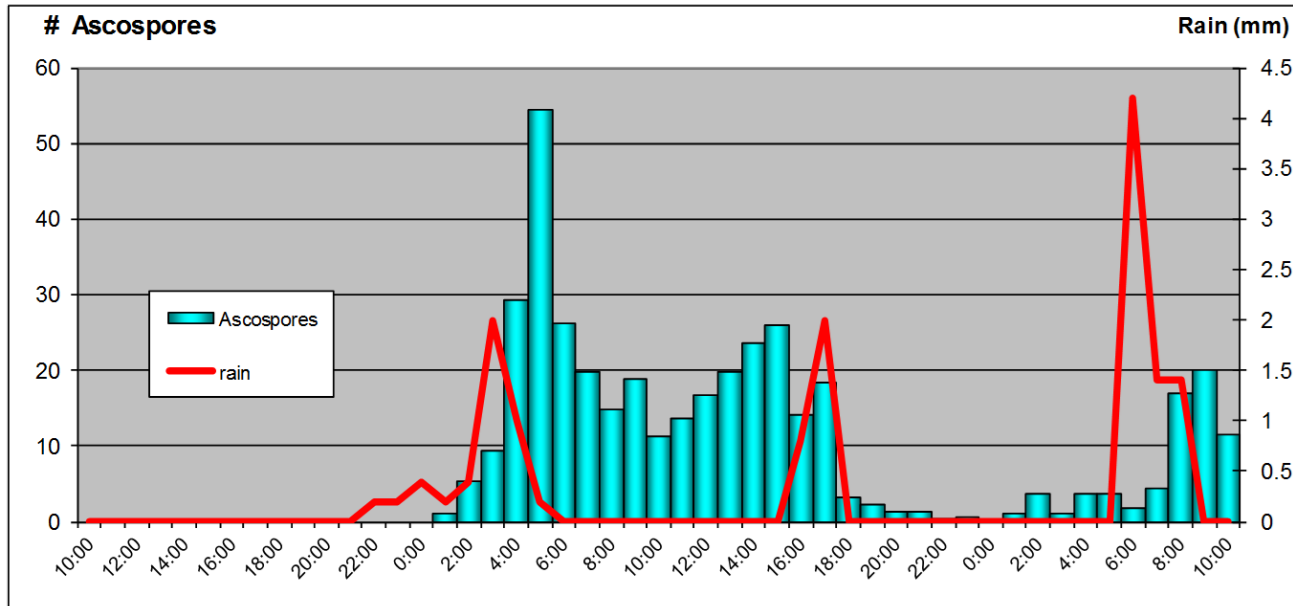
Eutypa dieback

- Disease epidemiology
 - Inoculum sources: Perithecia on dead wood



Eutypa dieback

- Disease epidemiology
 - Spore trapping study in grapevine:

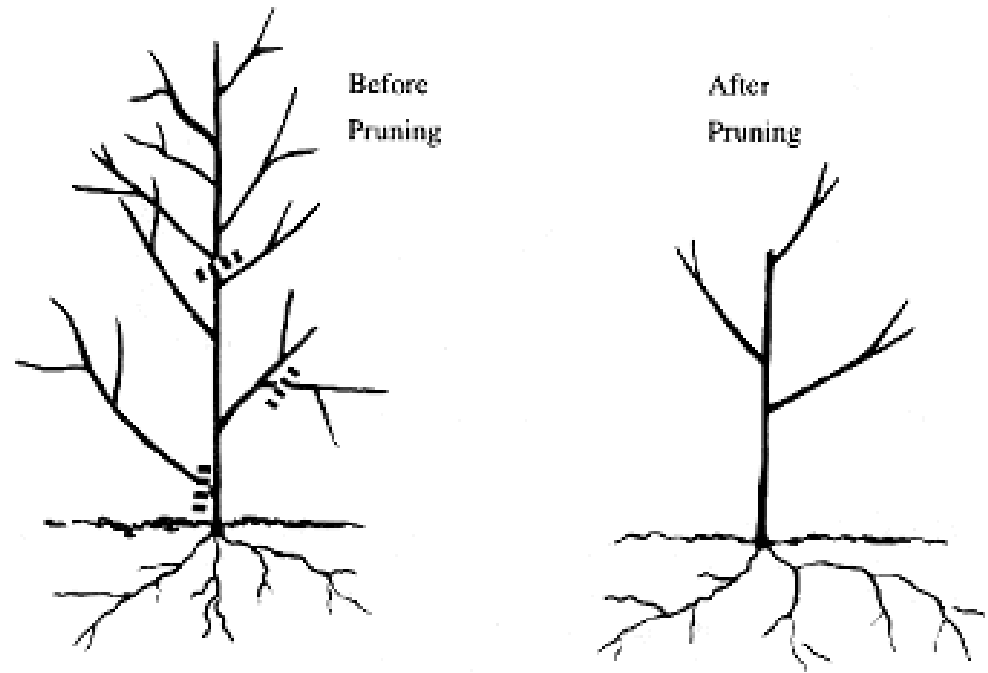


Wood decay fungi, acid and fertilizer burns



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

