Common Issues in the Orchard

Bob Curtis, Moderator

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Research Update

Turn in your **2010 Research Update** ticket at the ABC booth (#143) in the Exhibit Tent for the 2010 Research Update.

Common Issues in the Orchard

Presenters:

Carolyn DeBuse, UC Farm Advisor Solano/Yulo Counties

David Doll, UC Farm Advisor Merced County

Elizabeth Fichtner, UC Farm Advisor Tulare County

Sacramento Valley Perspectives

Carolyn DeBuse, UC Farm Advisor Solano/Yulo Counties

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Sacramento Valley Issues

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Weather related issues

- Late frost
- Cooler wetter spring
- Wind

Soils

- Heavy soils
- Marginal soils

Increasing acreage

- New growers
- New land

Verticillum Wilt

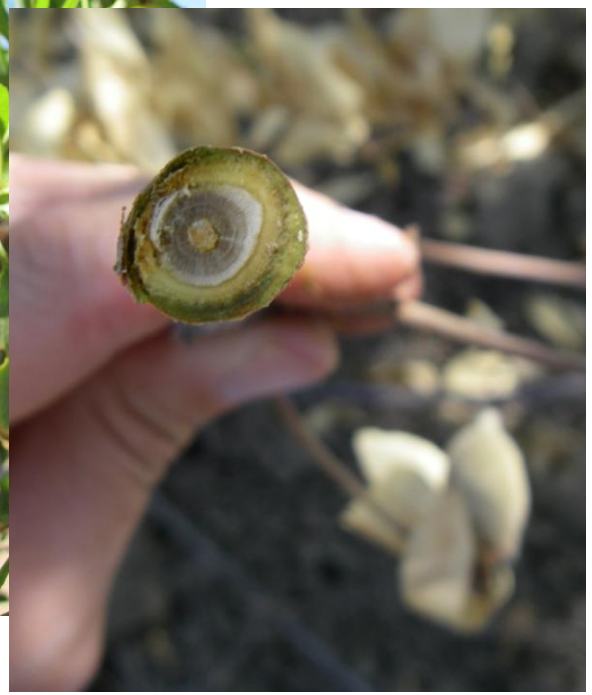
Verticillum Wilt

- **Soil borne fungus**
  - Micro-slcerotia
  - Harbored in the soil for years
- **Many field crops host verticillium**
  - Tomatoes, melons, safflower, cotton and many weeds

Verticillum Wilt

Symptoms

- Flagging and wilt
- Adhering leaves
- Sheppard's hook
- Cut into wood; darkening xylem wood



Verticillum Wilt

Management

- Don’t prune in it out
- As the infection slows in the heat of summer the tree will start to re-grow
- In extreme case the whole tree is affected: replant
- Prune dead wood out in next season

Prevention

- Avoid planting where field crop hosts were grown
- Don’t intercrop
- If a risk: flooding, solarization, fumigation, or growing non-host crop prior to planting almonds

Pruning Questions

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Wind damage in young tree

Scaffold failure not root failure

Pruning Questions

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Examples of breakage

1) 4th leaf orchard

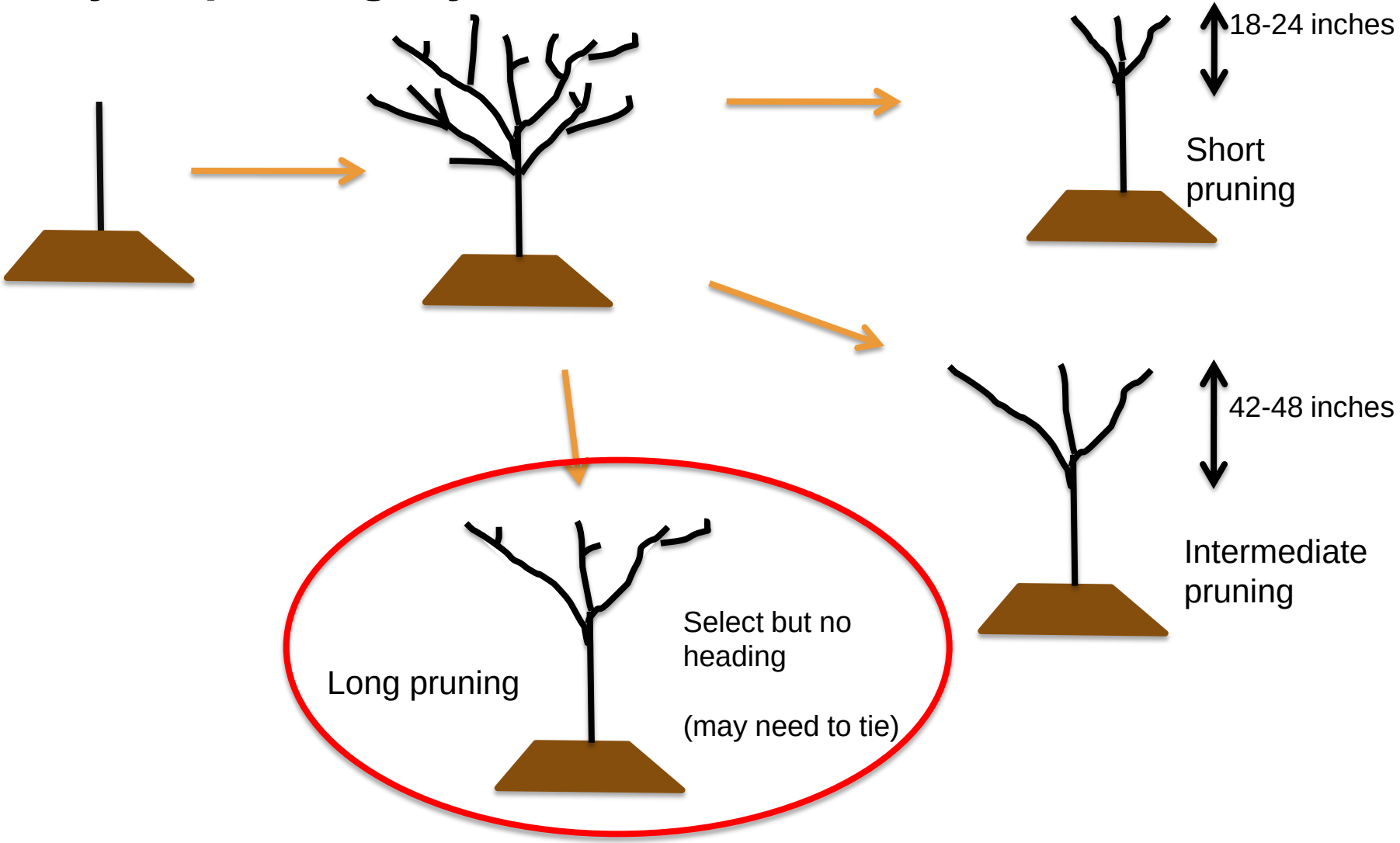
- **Nonpareil, Aldridge, and Carmel**
- **Scaffold breakage- 5% NP; 18% Al; 2% Ca**
- **Whole tree loss - 1% NP; 31% Al; 0% Ca**

2) 2nd leaf orchard

- **Nonpareil, Winters, and Monterey**
- **Scaffold breakage- 10% NP; 5% Wi; 27% Mo**
- **Whole tree loss - 1% NP; 0% Wi; 12% Mo**

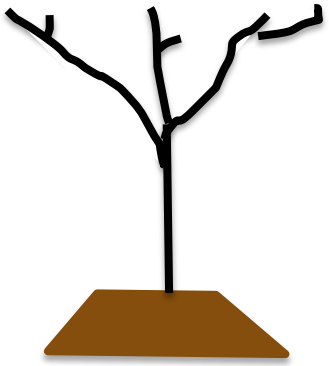
Pruning Questions

First year pruning styles



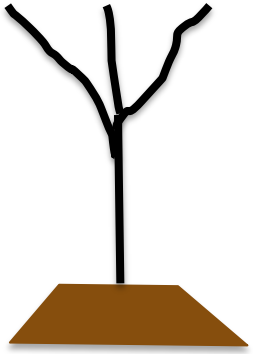
Pruning Questions

Second year pruning styles



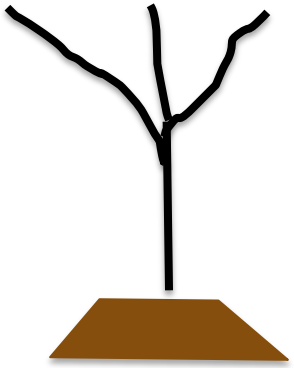
Long pruning

- Thinning cuts
- Or no pruning



Short pruning

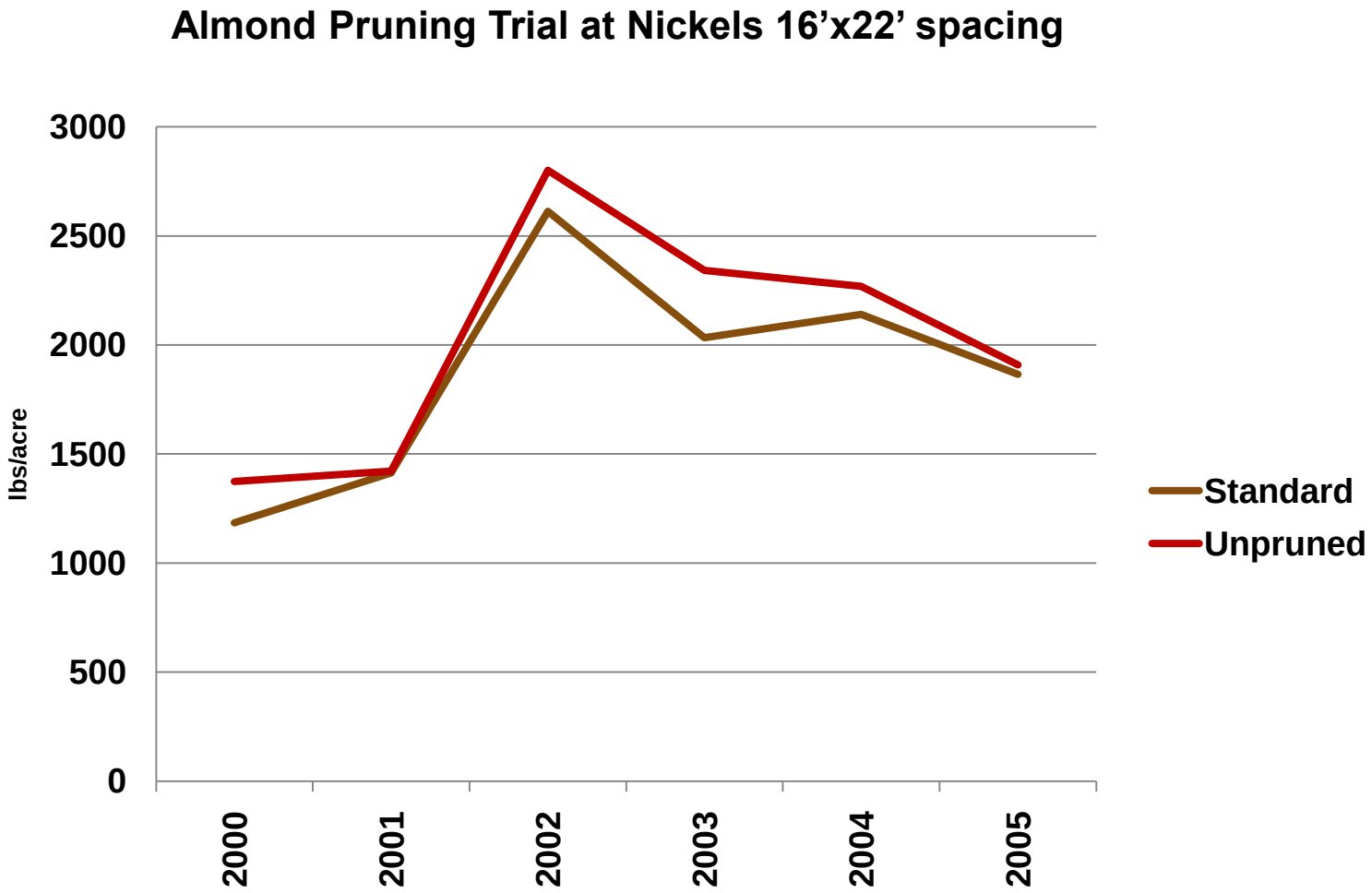
- Select secondary scaffolds
- Some heading cuts
- open center



Intermediate pruning

- Select secondary scaffolds
- Thinning cuts

Pruning Questions



John Edstrom & Bill Kruger

Pruning Questions

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Accumulative Yields lbs/acre

	Colusa 1 21 yrs 7′ x 22′	Colusa 2 12 yrs 16′ x 22′	Kern 13 yrs 21′ x 24′	Stanislaus 9 yrs various
Unpruned	**35,000**	**19,000**	**22,300**	**15,467**
Pruned	**34,000**	**19,600**	**20,700**	**14,507**

Pruning Questions

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Wind damage in young tree

Scaffold failure not root failure

Pruning Questions

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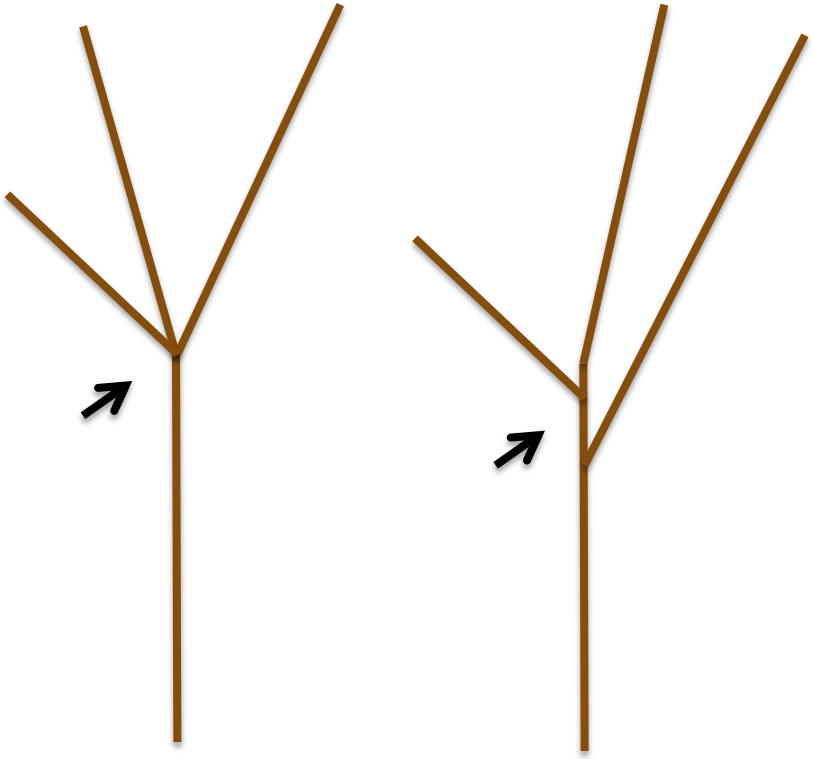
Angle of scaffold and embedded bark



Pruning Questions

All our studies have not tested wind breakage vs. scaffold failure. Observationally many farm advisors agree that short pruning will reduce wind breakage.

<u>Forestry study with hardwood species measuring of wind drag using wind tunnels</u>

1) **Juvenile crowns of three hardwoods**
2) **Placed in wind tunnel and measure wind force**
3) **Pruning vs. unpruned**
4) **Leaves vs. defoliated**
5) **Five wind speeds from 10 mph to 40 mph**
6) **30 second exposure for each speed**

Vollsinger et.al.; Can. J. For. Res. 2005.

Pruning Questions

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Results

- Frontal area decreased as speed picked up
- Pruning reduced frontal area more than mass
- Drag per crown mass was significantly less with pruning
- Drag per branch mass was not significant with pruning
- Leaves significantly added to the drag
- No critical wind speeds were calculated (no breakage)

Vollsinger et.al.; Can. J. For. Res. 2005.

Pruning Questions

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In Conclusion:

Variables to consider when making pruning decisions in the first years:

- **Wind risk?**
- **Variety susceptibility to wind?**
- **Variety growth habits?**
- **Your tolerance to breakage?**
- **Your goals in the first years of the orchard?**
- **How high to head at planting?**
- **Tie or not to tie?**

Thank You

Northern San Joaquin Valley Perspectives

David Doll, UC Farm Advisor Merced County

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Summary of 2009/2010 Farm Calls

Problem Type	Identified Problem	Incidence
Abiotic (non-disease)	Herbicide	12
	Excess Nutrient Uptake	9
	Salt Burn (Tissue Accumulation)	5
	Lack of Water	4
Biotic (disease)	Root	18
	Scaffold	26
	Foliar	9
	Almond Leaf Scorch	3
	Nematodes	10
	Vertebrate Pests	3
Horticultural	General	16
	Lack of Vigor	9
	Replant	13
Unknown		16

Scaffold Issues within Orchards

Scaffold Pathogens:

- Known:
  - Ceratocystis Canker
  - Band Canker
  - Aerial Phytophthora
- "Newly Discovered:"
  - Pruning Wound Associated Cankers
  - Tree Crack Infesting Cankers
    - *Botryosphaeria* sp. and/or *Eutypa* sp.

Known Scaffold Cankers

Ceratocystis Canker, *Ceratocystis fimbriata*:

Associated with shaker damage, grows in hot temperatures.

Known Scaffold Cankers

Band Canker, *Botryosphaeria dothidea*:

Grows throughout the summer, infected trees should be removed

Known Scaffold Cankers

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Aerial Phytophthora, *Phytophthora syringe*:

Associated with pruning wounds, grows in cool temperatures.

Known Scaffold Cankers

Prevention

- Avoid tree damage during harvest
- Avoid pruning in the rain
  - Mature blocks early, young blocks late
  - Pull branches from trees with caution
- Avoid wetting the trunks or branches of the trees
- Currently, bark penetrants have not provided a prevention or cure

Scaffold Issues within Orchards

Scaffold Pathogens:

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    - *Botryosphaeria* sp. and/or *Eutypa* sp.

“Newly Discovered” Cankers

Found frequently over the past three years

- Cankers associated with pruning wounds or poor scaffold selection
- Associated with riparian areas
- Isolations indicate wood pathogens that include *Botryosphaeria* and *Eutypa*
- Common in Padre, Fritz, have observed in Nonpareil, Avalon, Aldridge
- Not noticeable at first, but scaffold breakage affects orchard life
- Independent of tree age
- Tends to grow throughout the summer

“Newly Discovered” Cankers

Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

“Newly Discovered” Cankers

Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

Large pruning cuts provide entrance of fungi

“Newly Discovered” Cankers

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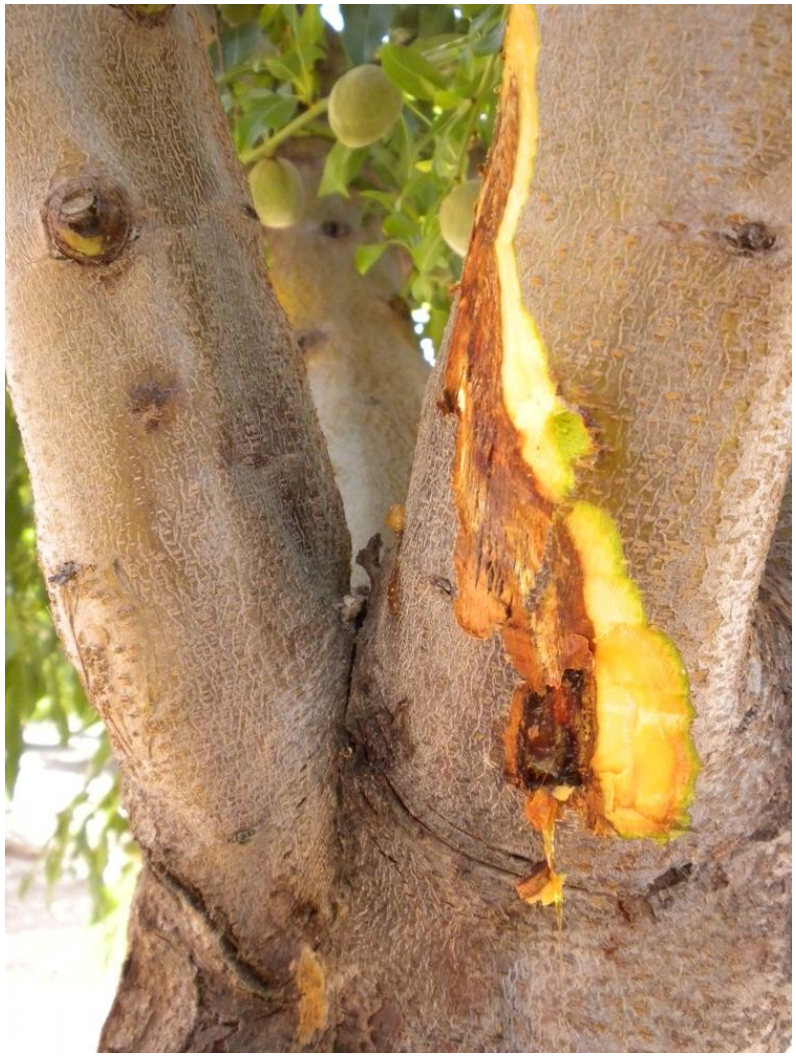
Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:



“Newly Discovered” Cankers

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Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

Weakening of scaffolds from fungal infection

“Newly Discovered” Cankers

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Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

Pathogens infect the xylem tissue

“Newly Discovered” Cankers

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Prevention:

- Wounds take over 2 weeks to heal
- Avoid pruning when rain is forecasted
  - Prune early/late
- Better scaffold selection
  - Multiple scaffolds will be problematic
- The smaller the cuts the better
- Re-think pushing the tree hard the first few years if planting Padre, Fritz

Summer scaffold selection for first leaf trees?

Southern San Joaquin Valley Perspectives

Elizabeth Fichtner, UC Farm Advisor Tulare County

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Coyote

Canis latrans

(barking dog)

- Range expansion since human encroachment
- Travel 12 miles from den
- Live up to 10 years
- Coydogs: hybrid coyote and domestic dog; threat to livestock.

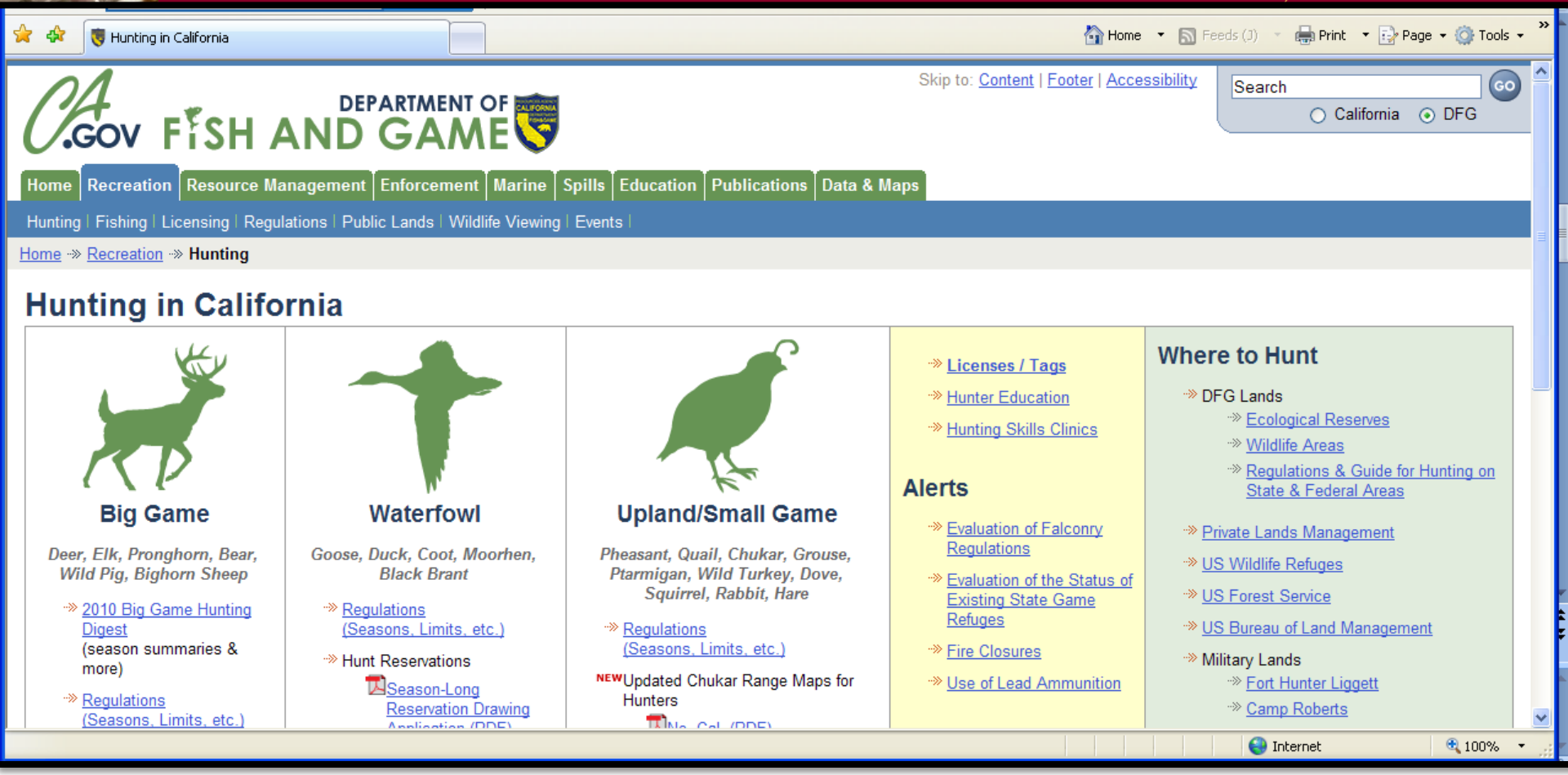
Coyote

Orchard Pest

- Irrigation line damage
- Not “thirst” issue
- “Intrigued” by sound
- Food safety

Photo: Roger Baldwin, Vertebrate Advisor, UCCE

Coyote



CA /of Fish and Game Website: "regulations for hunting non-game animals"

County Ag Commissioner's Office: Trapping programs


UC Statewide IPM Project
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Hull Rot

Fungi Responsible for Hull Rot

Rhizopus stolonifer

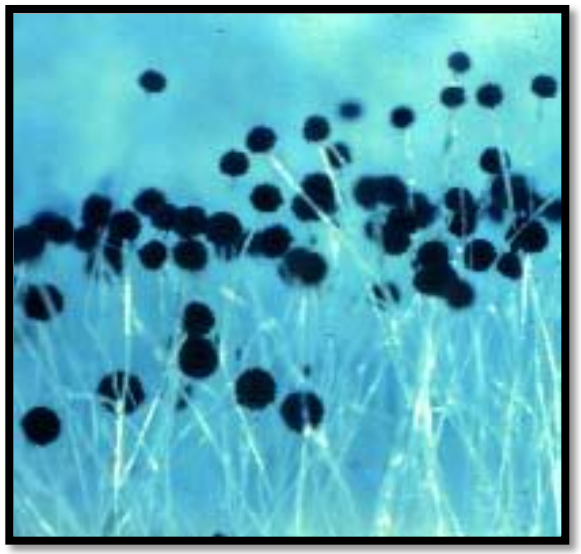
- More common in southern SJV
- Black spores, inside hull

Monilinia fructicola

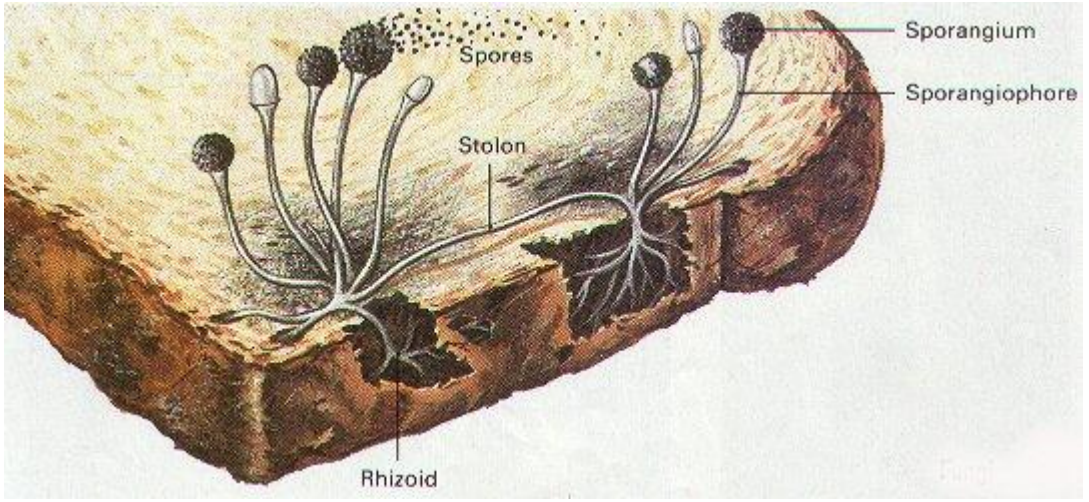
- More common in Sac Valley
- Tan spores, inside or outside hull

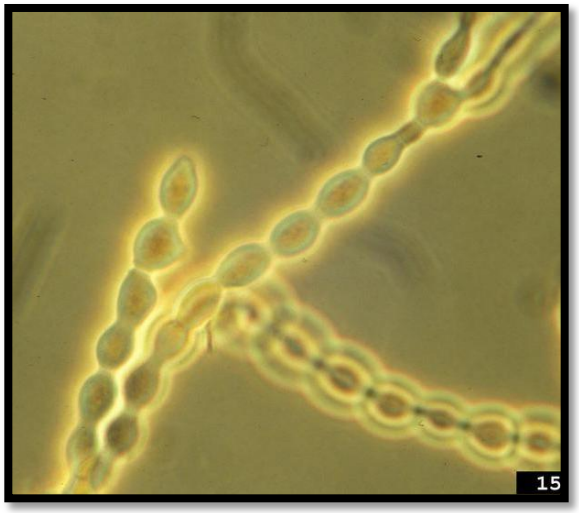
Different pathogens yield similar effect on almond

Hull Rot Pathogens



Rhizopus spores



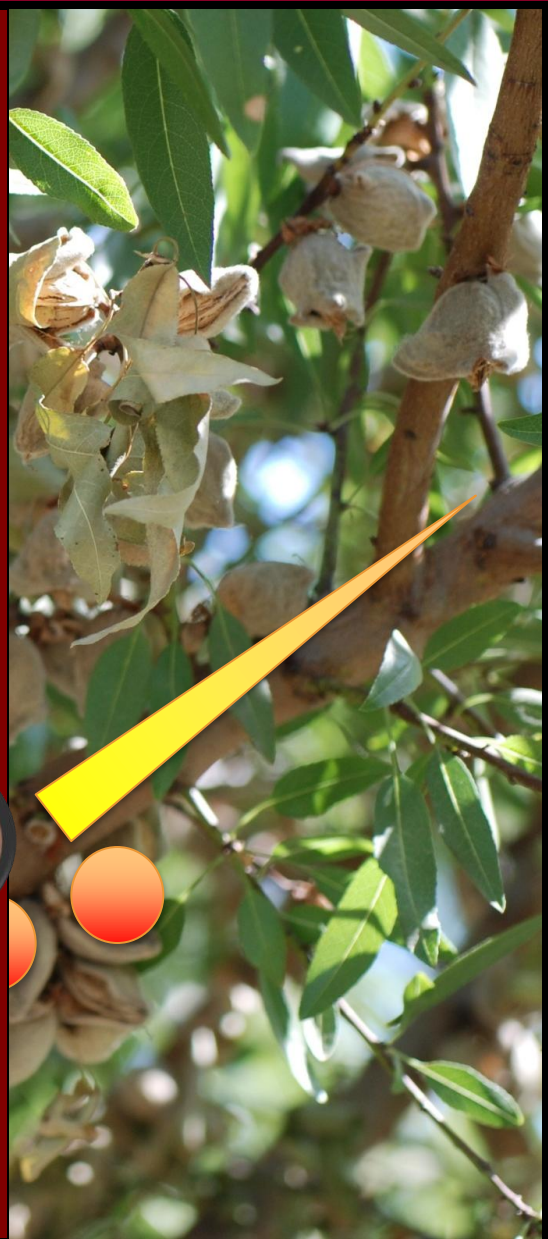


Monilinia spores

Infection and Symptoms

Tree Damage

- Death of fruiting wood
  - Reduced return bloom/yield
- Infected fruit remain on tree
  - NOW overwintering site



Hull Rot Management

Fungicides not recommended

- Regulated deficit irrigation, or reducing irrigation at onset of hull split (-14 - -18 bars).
  - Use pressure bomb because soils vary.
  - Arrange irrigation system to water varieties separately.
  - Avoid over-application of nitrogen

- Visit www.ipm.ucdavis.edu
  (B. Holz. 2007 The Pomology Post)

Almond Scab

(*Cladosporium carpophilum*)

Scab: Symptom Development

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Scab: Symptom Development

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Scab: Severe in 2010?

Primary Inoculum

- Twig infections

Disease Development

- Presence of inoculum
- Prolonged wet springs
- Sprinkler-irrigation

2010 Tulare County: low, cool, moist areas of orchards

Scab Management

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Shot hole sprays

- **May control scab**

Cladosporium carpophilum

- *Resistance to strobilurin fungicides in northern SJV and Sacramento Valley*

Severe Outbreaks

- Dormant / delayed dormant: Cu/oil or liquid lime sulfur
- Reduces risk of resistance to strobilurins

Scab Management

Dormant sprays

- Delay/reduce sporulation

Spring-time sprays (2-5 weeks after petal fall)

- Protect leaves, fruit, young twigs
- If rains persist, applications may extend into May

Prevent Fungicide Resistance:
use single-site fungicides preventatively, not after disease development.

For More Information

Almond Pest Management Guidelines--UC IPM - Windows Internet Explorer

http://www.ipm.ucdavis.edu/PMG/selectnewpest.almonds.html

University of California • Agriculture and Natural Resources

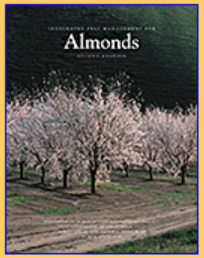
UC IPM Online

STATEWIDE INTEGRATED PEST MANAGEMENT PROGRAM

UC IPM Home

Search

For more information, see this UC IPM book:



Integrated Pest Management for Almonds

How to Manage Pests

Home & garden
Agriculture
Natural environments
Exotic & invasive

Weather data & products

How to Manage Pests

Almonds

More crops

Year-Round IPM Program—tells you what you should be doing throughout the year in an overall IPM program. Includes Year-Round IPM Program Annual Checklist.

Year-Round IPM Program for Almonds (3/09)

- Dormant/Delayed Dormant
- Bloom to Postbloom
- Fruit Development
- Harvest
- Postharvest

UC IPM Pest Management Guidelines—University of California's official guidelines for pest monitoring techniques, pesticides, and nonpesticide alternatives for managing pests in agriculture, floriculture, and commercial turf. More

| Authors/credits | Index to crops | PDFs to print | Recent updates |

General Information

- Dormant Spur Sampling and Treatment Guidelines (3/09)
- Approximate Impact Ratings of Various Pest Management Tools Against Natural Enemies (3/09)
- General Properties of Fungicides Used in Almonds (3/09)
- Fungicide Treatment Timing in Almonds (3/09)
- Most Effective Treatment Timings for Key Disease (3/09)
- Fungicide Resistance Management (6/09)

Insects and Mites

- Ants (3/09)
- Brown Mite (3/09)
- European Fruit Lecanium (3/09)
- European Red Mite (3/09)
- Forest Tent Caterpillar (3/09)
- Leaffooted Bug (3/09)
- Leafrollers (3/09)
- Navel Orangeworm (3/09)

Acknowledgements

Dr. Brent Holtz, UCCE, San Joaquin County

Dr. Jim Adaskaveg, UC Riverside

Dr. Roger Baldwin, UCCE, Kearney Ag Center

Tulare County growers, PCAs, Ranch Managers

Wrap-Up, Discussion and Q&A

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