University of California
Agriculture and Natural Resources

Cooperative Extension

Making a Difference for California

What to do for the 2012 Bloom?

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Almond Bloom Diseases

- Disease control is dependent upon:
  - Fungicide Used
  - Timing
  - Coverage
- Fungicides serve as Protectants!
- Growers need to assess which diseases are present and select the fungicide
- Rotation of fungicides is advised to reduce resistance

Almond Bloom/Foliar Diseases

Bloom/Spring Time Diseases:

1. Brown Rot Blossom Blight
2. Shothole
3. Jacket Rot
4. Anthracnose

Summer Diseases:

1. Scab
2. Rust
3. Alternaria

Brown Rot Blossom Blight

Pathogen: *Monilinia laxa;* rarely *Monilinia fructicola*

Brown Rot Blossom Blight
Pathogen: *Monilinia laxa;* rarely *Monilinia fructicola*

Leaf Wetness, temperatures from 45-80 F

Attacks anthers and pistils of opened flowers

Moves into and kills the spur, can move into shoot

Brown Rot Blossom Blight

Pathogen: *Monilinia laxa;* rarely *Monilinia fructicola*

A conventional Butte orchard that missed a full bloom brown rot spray had over 50% blossom blight despite no rain.

Brown Rot Blossom Blight

Pathogen: *Monilinia laxa;* rarely *Monilinia fructicola*

Varietal Differences:

Most susceptible:

Butte, Wood Colony, Mission, and Livingston

Moderately Susceptible:

Sonora, Fritz, Monterey, and Carmel

Least Susceptible:

Nonpareil, Peerless, and Aldrich

Fungicides: Rovral+Oil, Scala/Vanguard, Many more, but save for later…

Almond Shot Hole
Pathogen: *Wilsonomyces carpophilus*

Almond Shot Hole

Pathogen: *Wilsonomyces carpophilus*

Overwinters on infected twigs and as spores in healthy buds , increases with leaf wetness, temperatures from 45-80 F

Usually controlled by most fungicides, so not much of an issue unless severe rains.

Almond Anthracnose
Pathogen: *Colletotrichum acutatum*

Severe in wet springs, warmer temperatures pre-bloom, treatment starts during bloom.

Kills fruiting wood and nuts. Spray every 7-10 days if rainy – FRAC 3, 7/11, 11, M3

Almond Anthracnose
Pathogen: *Colletotrichum acutatum*

Varietal Differences:

Most susceptible:

Butte, Thompson, Merced, Price, Peerless, Winters, Monterey, and Fritz

Moderately Susceptible:

Harvey, Carmel, Ne Plus Ultra, Padre, and Mission

Least Susceptible:

Nonpareil

Fungicides: Strobilurins (Gem, Abound, Pristine), DMIs (Bumper, Tilt, Quash) – Every 10-14 days with rain

Almond Scab

Pathogen: *Cladosporium carpophilum*

The fungus survives in twig lesions, and spores are spread by wind or rain.

Scab is favored by prolonged wet spring weather

Young lesions are indistinct small yellow specks, best seen by holding a leaf up to the light.

Infections occur 45-70 days before symptoms appear

Almond Scab

Pathogen: *Cladosporium carpophilum*

Almond Scab

Pathogen: *Cladosporium carpophilum*

Aggressive Spray Program for Scab

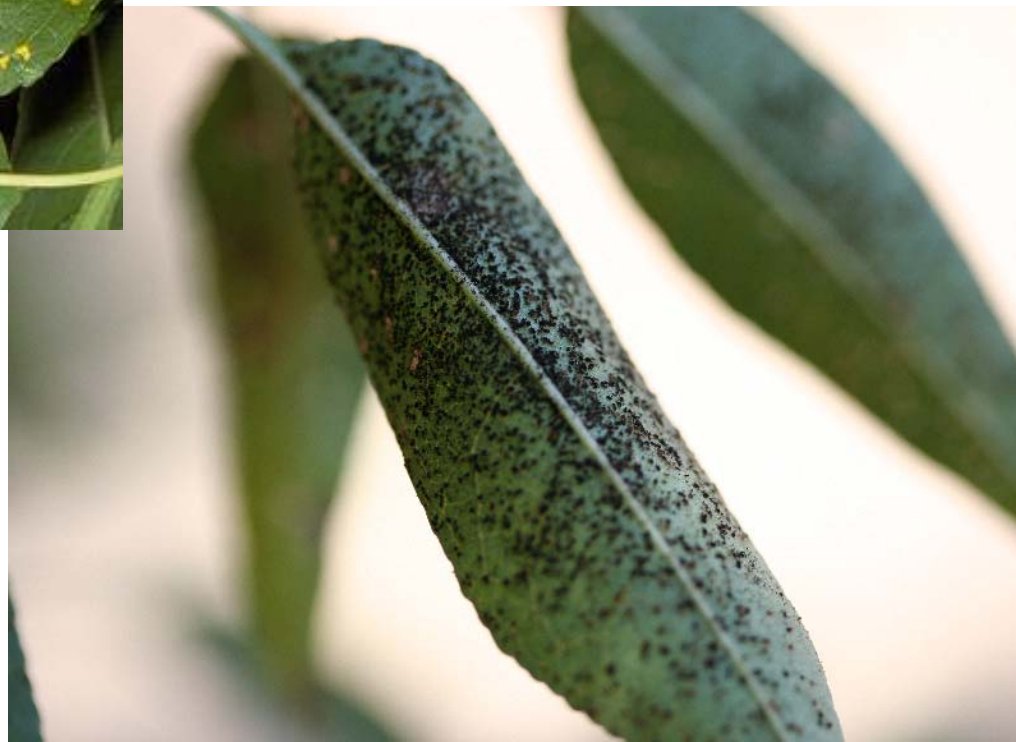
- Dormant: Copper/Oil (5lb, 4 gallon oil)
- Petal Fall: Chlorothalinil (can damage if contacts oil)
- 2-5 weeks Post Petal Fall – Strobilurins, DMIs

Almond Rust

Pathogen: *Tranzchelia discolor*

Rust appears as small, yellow spots on the upper surface of leaves.

On the lower leaf surface, spots take on a rusty red appearance then turn black in the late season



Almond Rust
Pathogen: *Tranzchelia discolor*

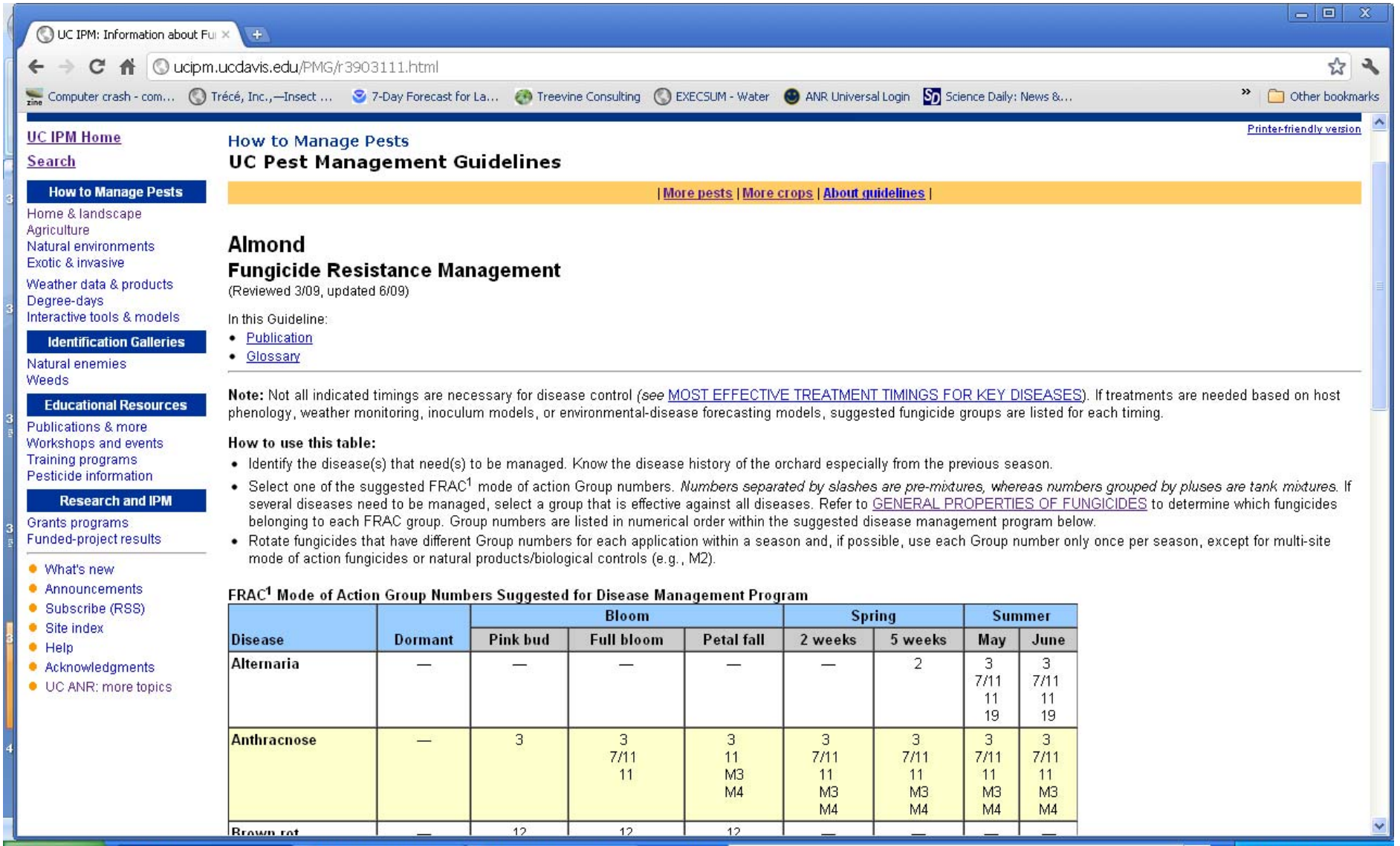
- History of rust: Fungicides 5 weeks post petal fall on. 2-3 applications may be needed in orchards that have had severe rust problems.
- Fungicide must be applied before symptoms appearance
- To prevent the rust inoculum from increasing in late fall, apply zinc sulfate (20-40 lb/acre) in late October to early November to hasten leaf fall.

- Fungicide Control: 5 weeks after petal fall on, Strobilurin, Micronized sulfur

What to do with continual rains:

- Fungicides should be made every 7-10 days with persistent rains
  - Rotate through the chemistries
  - Try to mix in one broad spectrum
- If application has been longer than 10 days and a series of storms are predicted, an application is advised (Strobilurin, DMI, etc,)
- If a rain shower is predicted followed by sunny weather, than a spray may not be needed, or a broad spectrum may do the trick

Fungicide Rotation: How?



UC IPM: Information about Fu

ucipm.ucdavis.edu/PMG/r3903111.html

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Almond
Fungicide Resistance Management
(Reviewed 3/09, updated 6/09)

In this Guideline:
- Publication
- Glossary

Note: Not all indicated timings are necessary for disease control *(see* MOST EFFECTIVE TREATMENT TIMINGS FOR KEY DISEASES). If treatments are needed based on host phenology, weather monitoring, inoculum models, or environmental-disease forecasting models, suggested fungicide groups are listed for each timing.

How to use this table:
- Identify the disease(s) that need(s) to be managed. Know the disease history of the orchard especially from the previous season.
- Select one of the suggested FRAC[1] mode of action Group numbers. *Numbers separated by slashes are pre-mixtures, whereas numbers grouped by pluses are tank mixtures.* If several diseases need to be managed, select a group that is effective against all diseases. Refer to GENERAL PROPERTIES OF FUNGICIDES to determine which fungicides belonging to each FRAC group. Group numbers are listed in numerical order within the suggested disease management program below.
- Rotate fungicides that have different Group numbers for each application within a season and, if possible, use each Group number only once per season, except for multi-site mode of action fungicides or natural products/biological controls (e.g., M2).

FRAC[1] Mode of Action Group Numbers Suggested for Disease Management Program

		Bloom			Spring		Summer	
Disease	Dormant	Pink bud	Full bloom	Petal fall	2 weeks	5 weeks	May	June
Alternaria	—	—	—	—	—	2	3 7/11 11 19	3 7/11 11 19
Anthracnose	—	3	3 7/11 11	3 11 M3 M4	3 7/11 11 M3 M4	3 7/11 11 M3 M4	3 7/11 11 M3 M4	3 7/11 11 M3 M4
Brown rot	—	12	12	12	—	—	—	—

Final thoughts:

- Warm temperatures pre-bloom could encourage Anthracnose infection
- Remember the important factor of leaf wetness
- Fungicides serve as protectants
- Some disease is livable, a lot is intolerable – for years to come

Questions?

Further Resources:

- UC IPM Website
- Almond Doctor Blog
- Local Extension Office
- Chemical PCA