



# In-A-Nutshell



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Steve Sutter, University of California Area Personnel Management Farm Advisor, has recently created a UC Davis e-mail list he will manage from Fresno called *ag-busnet*. The electronic network will extend and supplement his printed APMP *Newsletter*, providing more California growers, packers, farm labor contractors, pest control operators and advisers, officials, and others with brief articles, news, and time-sensitive notices in the broad area of agricultural and personnel management.

*Ag-busnet* topics will include agricultural labor, payroll tax, and safety compliance, services for employers and farm workers, proposed and enacted legislation, and more. Subscription is free. You'll get an electronic confirmation and instructions. The e-mail addresses on this list are confidential. To join *ag-busnet* just e-mail a request that includes your name, firm or organization, city, and state to Steve Sutter at [srsutter@ucdavis.edu](mailto:srsutter@ucdavis.edu). For further details, call Steve Sutter at (559) 456-7560.

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## Ag. Commissioner Reports Nut Crop Production and Revenue

Lenord Craft, Tulare Co. Agricultural Commissioner, has just released his report of acreage, production, and gross value for nut crops in Tulare County for 1999. Here are his data.

	Year	Harvested Acreage	Production			Value	
			Per Acre	Total	Unit	Per Unit	Total
Almonds - Meats	1999	16,009	0.97	15,500	Ton	1,590.00	24,645,000
	1998	13,395	0.82	11,000	Ton	3,400.00	37,400,000
Pecans	1999	934	0.75	700	Ton	2,200.00	1,540,000
	1998	889	0.75	667	Ton	3,510.00	2,341,000
Pistachio Nuts	1999	9,674	0.87	8,420	Ton	2,980.00	25,092,000
	1998	7,266	1.07	7,770	Ton	2,220.00	17,249,000
Walnuts	1999	30,086	1.51	45,400	Ton	900.00	40,860,000
	1998	27,346	1.44	39,400	Ton	990.00	39,006,000

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# Codling Moth in Walnuts

## 1<sup>st</sup> Flight Update

Codling moth biofix in the Visalia area from 3/17 - 4/1 depending on the orchard. Generally, flights were modest. Flight peak 1a treatments were applied around 10 April - 20 April and 1b treatments around 10 May (about 600 degree days). Nuts, infested from 1<sup>st</sup> generation larvae, are dropping from the tree now. This first flight is expected to end when 950 - 1050 degree-days have been accumulated from the biofix. This season, it appears this will occur about 23 May - 3 June depending on the original biofix..

Now is the time to service your traps (replace lures and trap bottoms) to detect emergence of the 2<sup>nd</sup> flight of codling moth. Watch degree-day accumulation and trap catches to establish when this flight starts. Controls for the 2<sup>nd</sup> generation will likely be applied, barring abnormal temperatures, about 3 - 13 June so plan irrigation schedules accordingly.

## 2<sup>nd</sup> Flight Strategies

### Determining Need to Treat

Monitor 2<sup>nd</sup> flight codling moth adult activity in all orchards, especially those with a worm history; moth activity indicates imminent egg laying and potential for larval damage.

Also, monitor the orchard floor for infested dropped nuts through May (your “Integrated Pest Management Manual for Walnuts” has a good picture of a nut infested by 1<sup>st</sup> generation worms) and into June. Presence of infested dropped nuts indicates presence of codling moth. Such monitoring will be especially important where 1<sup>st</sup> generation was not treated.

**Treatment is not recommended** if no infested dropped nuts are found and few codling moth adults are caught in traps.

**Treatment is recommended** if dropped nuts infested with codling moth are present and either sustained, moderate numbers of adult moths are caught in traps or an abrupt high number is caught in any one night.

### Material Decisions

If the first generation was thoroughly treated (i.e., both 1a and 1b peaks), few dropped nuts were found, and relatively low number of moths caught, use one of the insect growth regulators (Confirm or Dimilin) or “softer” organophosphates for 2<sup>nd</sup> generation control. If 1<sup>st</sup> generation wasn’t controlled **and/or** dropped nuts are common, **and/or** relatively high number of moths are being caught in pheromone traps, use a long residual, organophosphate insecticide.

Note: It will be important to include a miticide with any organophosphate application, even if you don’t see mites. The insect growth regulators do not require addition of a miticide. Also, watch for walnut aphid “flare-ups” following any organophosphate treatment; aphid levels build quickly in summer and when above 15 per leaflet result in damage requiring control.

### Timing Your Application

After the 1<sup>st</sup> generation ends and trap catches begin again, the 2<sup>nd</sup> flight has started. Treat with conventional insecticides, 225-250 D° from the flight start; if an abrupt, high catch occurs, treat within 7 days. **Note: The insect growth regulators (Confirm or Dimilin) require different timing. Use these as the manufacturer directs and make sure you get 100% coverage.**

## Watch for the 3<sup>rd</sup> Generation of Codling Moth

Third generation codling moth infestation and resulting damage can be significant. Again, don’t “let your guard down” just because you’ve done a



good job on the first two generations. It will be important to maintain and monitor your traps through July into mid-August to detect a 3<sup>rd</sup> flight of moth activity and any need to treat.

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## Botryosphaeria

### What to Do in June/July/August

*The following are month-by-month (June-August) guidelines for managing Botryosphaeria in pistachios.*

#### “Bot” in June

##### Shoot Blight

Shoot blight is the most easily found symptom this month. Remember that Botrytis infections also cause shoot blight and it is important to distinguish between the two diseases. They are similar in that the leaves on infected shoots first become light green then turn beige to brown. Blighted shoots are distinct against the dark green healthy foliage. The two diseases differ as follows:

- **Botryosphaeria** blighted shoots remain straight, not curved at the tips. Infected stems are black then become brown as they dry and there is no visible fungal sporulation at the canker margin. If temperatures are warm (mid 70's° F or more) extension of the infection from the current season shoot into last year's wood may cause blighting of young fruit clusters. Female and male trees are equally infected.
- **Botrytis** infections occur earlier in the season than do Botryosphaeria infections causing the soft supple shoot to wilt into a curved shepherd's hook at the tip as it dries. Botrytis infections do not extend into older wood, and the canker margin usually is located just above the base of the young shoot. Buff to gray fungal sporulation typically develops at the basal portion of the blighted shoot. Most (but not all) Botrytis infections are found in the male trees and the male inflorescences also may be infected. Botrytis ceases to cause infection by mid to late spring.

##### Fruit

Botryosphaeria infections, rain stains, and epicarp lesion may occur this month. Of these, Botryosphaeria is the least likely and usually is not found in June.

- **Botryosphaeria** (rare in June) infections are tiny, black, shallow lesions associated with lenticels and scattered over the fruit surface. The lesions do NOT have a red margin; red margins are found on Alternaria infections.
- **Rain stains** are superficial black areas, of no particular size or shape, on the green fruit surface.
- **Epicarp lesion** causes darkened spots on the fruit. Split the fruit open and with a hand lens look for hemipteran insect feeding sites in the inner hull (pericarp). Insect feeding dissolves tissue leaving indentations or cavities surrounded by blackened tissue. Stylet sheaths may be present internally in these.

##### Recommendations

- Survey orchards carefully for Botryosphaeria shoot blight.
- Apply Abound® in orchards where Botryosphaeria has been confirmed at 4-5 week intervals beginning the first part of June.
- Prune aggressively. Cut 1 to 2 inches below canker margins of any blighted shoots and fruit clusters to reduce inoculum and prevent movement of the pathogen into second year's wood.

#### “Bot” in July

##### “Bot” Shoot, Leaf, and Rachis Infections

- Shoots (current season growth) may continue to collapse and die. Be sure to distinguish between these and old Botrytis infections (see June description for a complete description of shoot blight). New lesions, which are the secondary

spread of Botryosphaeria, on shoots are small, round black spots.

- Leaf lesions are small black angular areas defined by leaflet veins. Black infected areas may occur near the base of a leaflet stem, leading to blight of an individual leaflet or at the base of the leaf stem causing the entire leaf to die.
- Rachis infections also are black, frequently are located at branching points, and are most common in sprinkler irrigated orchards.

### Fruit Infections

- “Bot” fruit infections are small, round black dots without red margins (red margins indicate Alternaria infections). Some may be associated with suspected hemipteran punctures. Do not confuse with epicarp lesion.
- Epicarp lesion causes darkened spots on the fruit. Split the fruit open and with a hand lens look for hemipteran insect feeding sites in the inner hull (pericarp). Insect feeding dissolves tissue leaving indentations or cavities surrounded by blackened tissue. Stylet sheaths may be present internally in these. White netting in the inner surface of shell indicates feeding activity by larger hemiptera which arrive in mid-summer.
- Nuts with epicarp lesion may have black infections moving down via their stem into the main or secondary branches of the rachis.

### Recommendations

- Monitor orchards for new and increasing Botryosphaeria infections and for hemipteran insects.
- In orchards where Botryosphaeria has been confirmed, apply Abound®. Prune aggressively, 1 to 2 inches below canker margins, any blighted shoots and fruit clusters to reduce inoculum and prevent movement of the pathogen into second year’s wood.

Note: No more than 3 Abound® treatments can be applied in succession. Following three applications use copper. Abound® can then be re-applied provided you don’t exceed the Abound® limit stated on the label.

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## July Is Time for Leaf Tissue Analyses

Leaf analyses provide excellent information to guide an orchard’s fertilization program. July (August for pistachios) is the month to take leaf samples for analyses of the orchard’s nutrient status.

The elements of most common concern that require annual monitoring are:

Almonds and Walnuts	Pistachios	Pecans
Nitrogen (N)	Nitrogen (N)	Nitrogen (N)
Potassium (K)	Potassium (K)	Potassium (K)
Zinc (Zn)	Zinc (Zn)	Zinc (Zn)
Boron (B)	Boron (B)	Copper (Cu)
	Copper (Cu)	Sulfur (S)

In special situations, sodium (Na), chloride (Cl), magnesium (Mg), manganese (Mn), and calcium (Ca) can be problems as well. Table 1 (page 7) provides critical levels for these nutrients in nut crops.

NOTE: Always observe your trees carefully to detect visual symptoms of nutrient deficiency or excess. Visual observations provide an excellent complement to any lab analyses and indicate when special analyses are needed.



## Pecan Orchard Management Short Course Announced

New Mexico State University announces their annual "Pecan Orchard Management Short Course" to be held 5-9 June 2000 at the Hilton Inn in Las Cruces New Mexico. The short course covers all aspect of pecan culture including: pecan biology, variety selection, pruning, harvest management, nutrition, propagation, pest control, water and soil management, and marketing. Registration materials can be obtained by calling 505-646-2921.

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## Water Management for Nut Crops

Remember, June, July, and August are the highest water use months of the season. Coincident with crop development, vegetative growth is taking place that will support the crop for next year. Here are water use estimates for fully canopied orchards during these months.

### Water use in acre inches per acre

Period	Walnut/Pecan	Pistachio	Almond
June 1-15	3.45	4.05	3.15
June 16-30	3.90	4.50	3.30
July 1-15	4.65	4.80	3.75
July 16-31	4.80	4.96	3.84
August 1-15	4.05	4.35	3.45
August 16-31	4.00	4.00	3.36
Total	24.85	26.66	20.85

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## Leaffooted Bugs

An unusually high incidence of crop damaging leaffooted bug populations has occurred in some local pistachio and almond groves this spring. In some pistachio cases significant epicarp lesion has occurred and has required treatment. In parts of some almond trees a high percentage of nuts show the typical sap exudates where bug "stings" occur. These nuts may shrivel and/or have aborted kernels.

In those groves, these are adult bugs and are usually noticed flying within the orchard between trees or around buildings next to orchards where populations occur - detecting leaffooted bugs with beating trays has been difficult; they readily hide from those trying to sample trees. One is better off looking for the adults if damage is observed.

This population of adults will give rise to a nymphal population that may further damage pistachios this summer; damage to almonds later in the season is usually minor. Nymphal populations are easier to detect with beating trays than the adults. Growers and PCA's should be watchful for these pests and treat if high populations occur.

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## Summer Pruning - Walnuts

As crops develop in productive trees, limbs begin to bend and breakage occurs; late June is when most breakage occurs, as nuts are full size and full of water. A lot of grief can be avoided simply walking through the orchard with a pair of pruning shears, or a pruning pole, to cut parts of loaded limbs to "lighten them up."

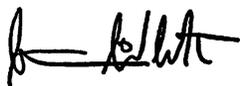
Vigorous shoots on young trees often require summer pruning ("tipping" is best) as well to avoid their "willowing" over, distorting the tree's shape. Plan a regular "walk through" to prune back tips of shoots that look like they may lie over. Without summer pruning, distorted shoots have to be severely pruned or removed the following winter. Usually, excessive pruning then encourages even more vigor the following season.



## N Fertilization

Nitrogen (N) is critical for optimal productivity and high quality. There are very subjective recommendations out there; for mature trees, the very general recommendation is 150 to 300 lbs of actual N per acre per year depending on the crop. (For walnuts and pecans, one also hears that 100 lbs of N per ton of nuts removed the previous season must be replaced annually.) To “tailor” a recommendation for a specific orchard, factors that must be considered if excessive applications are to be avoided are: previous yield, tree vigor, leaf N concentration (July leaf tissue levels of more than 2.3% are considered sufficient), soil texture (heavy soils are more retentive of N than shallow soils), nitrates contained in the irrigation water (these supply N with irrigation), and rainfall. Our suggestion is to determine a reasonable rate based on the above, apply 2/3 of that amount with (or just prior to) the first irrigation, take a leaf tissue sample in early July, and, if needed (adjust for pistachios) apply the last 1/3 in mid-July (note, if leaf tissue levels are excessive, consider not applying N until next year’s tissue levels are determined).

Young trees also require N to maintain tree vigor. Light, frequent applications encourage continued vigor throughout the season. However, with normally vigorous varieties or where tree vigor is excellent, withhold N after July 1. “Pushing” new or young trees into the fall results in vulnerability to early fall freeze damage.



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**Table 1**  
**Critical Nutrient Levels for Nut Crops<sup>1,5</sup>**

*July Leaf Samples - Almonds, Walnuts, Pecans*  
*August Leaf Samples - Pistachios*

	Almond	Walnut	Pistachio	Pecan <sup>6</sup>
<b>% Nitrogen (N)<sup>2</sup></b>				
Optimal	2.1-2.6	2.2-3.2	2.5-2.9	2.7-2.9
Def. Below	2.0	2.1	2.3	2.3
<b>% Potassium (K)<sup>3</sup></b>				
Optimal	1.4	1.2	1.0-2.0	1.3-1.5
Def. Below	1.0	0.9	1.0	0.7
<b>% Magnesium (Mg)</b>				
Optimal	0.25	0.3	1.2	0.35
<b>ppm Manganese (Mn)</b>				
Optimal	20	20	30-80	---
<b>% Calcium (Ca)</b>				
Optimal	2.0	1.0	1.3	1.3-1.5
<b>% Chloride (Cl)</b>				
Optimal <sup>4</sup>	0.3	0.3	.1-3	---
<b>% Sodium (Na)</b>				
Optimal <sup>4</sup>	0.25	0.1	?	---
<b>ppm Boron (B)</b>				
Optimal	See	36-200	120-250	35-50
Def. Below	footnote	20	90	13
Excess	#7	300	---	---
<b>ppm Zinc (Zn)</b>				
Optimal	---	---	10-15	50-100
Def. Below	15	18	7	40
<b>ppm Copper (Cu)</b>				
Optimal	4	4	6-10	10-15
<b>% Sulfur (S)</b>				
Optimal	---	---	---	.25
Def. Below	---	---	---	.15

<sup>1</sup> Leaves are from spurs (fruiting & nonfruiting) on spur-bearing trees (almond) and terminal leaflet on walnut and pistachio.

<sup>2</sup> Percent nitrogen in August and September samples can be 0.2-0.3 lower than July samples and still be equivalent.

<sup>3</sup> K levels between deficient and adequate are considered "low."

<sup>4</sup> Excess Na or Cl causes reduced growth at levels shown. Leaf burn may or may not occur when levels are higher. Confirm salinity problems with soil or root samples.

<sup>5</sup> Phosphorus levels should not be allowed to go below .1% for almond, walnut, pistachio and 1.8% for pecans.

<sup>6</sup> Pecan leaf levels supplied by Darrell Sparks, Horticulturist, University of Georgia, Athens, GA.

<sup>7</sup> For boron status, sample hulls at harvest (30-80 ppm in hulls is deficient; 80-200 ppm is sufficient; >200 ppm is excessive).