Erratic Leaf-Out and Bloom for Walnuts (& Others)

As we proceed through walnut leaf-out and bloom, it’s quite apparent how erratic growth development is this year, typical of a year where we receive inadequate winter chilling. This year was, for all practical purposes, a normal year for number of hours under 45°F, the commonly used temperature threshold for calculating winter chilling hours. However, we didn’t get the fog that normally keeps temperatures between 35° and 45°F. Instead, although low temperatures occurred, relatively high daytime temperatures (i.e., 50° - 70°) were the norm. Such high daytime temperatures effectively negate low temperatures received that day. The result, poor quality chilling and erratic leaf-out and bloom. Almost all tree fruit and nut crops are experiencing similar conditions.

Codling Moth Biofix Status

First codling moths of the season were trapped in walnuts 17-18 March in several Tulare County orchards. In these cases, 1-2 moths were trapped. Since then, continued catches were reported (i.e., 1-2 caught per count date) in these orchards, but many orchards had not begun to catch. Around 23 - 25th March, catches were reported in more orchards, some catches as high as 5 per trap, again in selected locations. Some orchards still reported no catches. So, biofix, that point where a consistent catch occurs and evening temperatures are 62°F, must be determined for each location/orchard. (Note, evening temperatures have been conducive to codling moth flight and egg laying.) Once biofix is established, begin accumulating degree days.

Here are the developmental stages of codling moth and degree day requirements.1/

<table>
<thead>
<tr>
<th>Development Stage</th>
<th>Day Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg laying begins</td>
<td>50</td>
</tr>
<tr>
<td>Eggs begin to hatch</td>
<td>125-175</td>
</tr>
<tr>
<td>Optimum spray timing</td>
<td>300</td>
</tr>
</tbody>
</table>

1/ Degree day accumulations, to determine various stages of codling moth development and generation conclusion, should be initiated from the “biofix” date. Use a lower threshold of 50°F and upper threshold of 88°F. Degree day table attached.

2/ Requires 62°F sunset temperatures.

3/ 300 D° for conventional insecticides only. Apply IGR’s earlier; Dimilin® must be applied before egg laying and Confirm®, before egg hatch.

Making 1st Generation Spray Decisions for Walnuts

First, you have to monitor

Spray decisions require monitoring this pest. Codling moth population size and activity are measured with pheronome traps that monitor male
moth flight. An appropriate number of properly placed traps (including high traps) monitored/maintained in the orchard according to the manufacturer’s specification are critical to management of this insect, especially making sensible spray decisions.

To “Control” or “Not Control” 1st Generation Codling Moth Larvae (“Worms”)?

Control is not recommended when:

1) Last year’s harvest grade showed less than 3% worms, and very few codling moths of the overwintered generation are being caught. But, keep monitoring moth flight and look for infested nuts that fall to the ground in May (infested during peak 1a) or in the tree (infested by peak 1b) to determine need for 2nd generation treatment. Note, if high trap catches are low, too, that verifies low number of codling moths.

2) You have a less susceptible walnut variety (e.g., Chandler, Hartley, Tehama) with no codling moth damage history and minimal trap catch.

Control is recommended when:

1) You have a susceptible variety (e.g., Ashley, Payne, Vina, Serr, Chino, Sunland) and:

- More than 3% worm damage occurred in last harvest’s grade and adult codling moths, developing from overwintering pupae, are being caught in pheromone traps.
- More than 5% worm damage occurred in last season’s harvest grade, regardless of trap catch.

Timing 1st Generation Sprays

Spray timing decisions are, in part, made based on degree day (D°) accumulations. D° are accumulated from the codling moth “biofix” (see definition under “Biofix Status”).

Organophosphate (OP) and carbamate insecticides: Often, there are two peaks of moth activity referred to as peak 1a and peak 1b. Both may need treatment.

Peak 1a: Apply insecticides to “early leafing” varieties (e.g., Ashley, Serr) when 250-300 D° have been accumulated from biofix or when nuts reach ½” diameter - whichever occurs later. For later developing varieties (e.g., Hartley, Vina, etc.) wait for ½” nut size, which may be considerably later than 300 D°.

Peak 1b: Apply insecticides when moth activity again increases in pheromone traps following peak 1a treatment. Usually this occurs about 600 - 650 D° from the flight’s start (300 - 350 D° after peak 1a). Treatment is suggested if activity (moth catch) is ½ or greater that of peak 1a (monitor a high trap with your low traps to gain good resolution of this 2nd peak’s activity), and if residual effect from your first chemical treatment has ended.

Timing Insect Growth Regulator (IGR) Insecticides: Timing IGR applications (Dimilin or Confirm) is critical to their success. IGR’s are applied to coincide with egg laying or egg hatch; Dimilin® must be applied before egg laying (50-100 D° from biofix) and Confirm®, before egg hatch (200 D° from biofix).

What Materials Should I Use?

Of the OP’s, such as Guthion, Imidan, Lorsban, Supracide, Pencap-M, Guthion has longest residual but is the most disruptive to other pests (e.g., walnut aphids and spider mites). If high “worm” populations existed in last year’s harvest and substantial number of moths are being caught, Guthion is suggested for peak 1a. However, additional insecticide treatment (Imidan, Lorsban, Supracide, Pencap-M) will be needed for peak 1b if this occurs.
Note: When controlling 1st generation worms with OP’s, always monitor walnut aphids - biological control of this pest can be disrupted with use of OP insecticides.

IGR’s can be used for both 1st or 2nd generation codling moth. However, if you intend to use them, they should only be considered for low populations of codling moth (see timing for IGR’s above) and may have to be applied twice. Moth activity should then be carefully monitored relative to the IGR’s residual for further treatment need. See timing above.

The pyrethroid Asana is cheap and effective against codling moth. There is substantial concern for spider mite build-up following a pyrethroid spray.

What Kind of Coverage do I Need?

Thorough spray coverage is required for codling moth control (this can't be overemphasized in cases where IGR’s are to be used). Large equipment, with horsepower and fan capability to reach tree tops, driven slowly (1.5-2.0 mph) is required. PTO equipment is usually not capable of reaching tops of our larger walnut trees without a volute. Remember, the larger the tree, the slower one must drive the spray rig to get coverage. Trees higher than 40 feet should be sprayed at 1.5 mph.

What About “Top and Bottom” Applications?

It is extremely difficult to adequately cover trees greater than 45' tall even with the best equipment driven at the slowest speeds. Aerial applications combined with ground sprays can improve total tree coverage. Be sure to work closely with your PCA and Agricultural Commissioner and check product labeling if such a practice is to be used.

What About Biological Control and Mating Disruption?

Use of parasites and mating disruption techniques for codling moth control is being researched. Parasites (Trichogramma Spp.) are available now, but should only be considered for 2nd generation and where low populations of codling moth exist. Mating disruption is often suggested in combination with insecticides within a season-long control program. Be sure to work closely with your supplier to ensure proper use of these technologies. Note: When using parasites, monitoring nuts in the tree for damage is the only way to determine their effectiveness or lack of control.

Should I Keep Monitoring After Treatment?

Do not take down your pheromone traps. Continue to service the traps and monitor codling moth on the normal schedule following treatment. Note, most OP’s and IGR’s do not kill adult moths (the pyrethroid, Asana and Pencap-M are the exceptions). Consequently, your traps will still “catch” if you have used those OP’s or IGR’s, so, moth catch before your insecticides’ residual has “run out” does not signify poor control or need for additional treatment.

What About the Next (2nd) Generation?

Look for codling moth infested nut drops (nuts infested with codling moth larvae from peak 1a adults) in May. Infested nuts indicate need for 2nd flight treatment to control 2nd generation worms. Note, nuts infested by peak 1b adults may not drop from trees. A visual “on tree” inspection is needed to assess presence of codling moth infested by worms emanating from flight 1b.

FINAL NOTE: Work closely with your local PCA when making codling moth treatment decisions. He/she will be knowledgeable about your local flight conditions and can assist in your management efforts.
Peach Twig Borer (PTB) - Almonds

Expect PTB emergence in early to mid April. Once emergence takes place, accumulate degree days from that biofix. “May sprays” are applied when 400-500 degree days (same thresholds as codling moth) accumulate.

**Botryospheraia (‘Bot’)**
Watch for Pistachios

Bloom time Benlate sprays are recommended in the fungicide protection program against Bot. Although just modestly effective, Benlate treatment enhances (or adds to) a subsequent fungicide treatment program.

**Fruit Tree Leaf Rollers (FTLR) in Walnuts**

We are seeing increased FTLR damage to emerging walnut shoots, usually in those orchards intensely treated for codling moth. When present, FTLR feeds on shoots and developing cuts. BT is an effective material for FTLR but needs to be applied before damage becomes extensive.

April Checklist

- **Walnut Blight**: Walnut blight is active during April. Continue treating sensitive cultivars, especially if rain threatens.
- **N Fertilization**: Make your first N application before an irrigation. The 2nd application (if a “split” application is the strategy) should be made in late June through July.

**Newly Planted Trees**

Several new shoots emerge from the trunk of a newly planted tree. Select one of these to ultimately become the trunk and suppress growth on the others by pinching the growing tip or removing the shoot entirely. If you are using a stake, loosely tie the shoot to “train it up” to be the trunk. Continue to train the shoot up during summer.

Bill Stuke Passes

Bill Stuke, owner of Stuke Nurseries passed away quietly on 8 March 2000. He was 89.

Bill was truly a pioneer in and for the California walnut industry. He started in the walnut nursery business in the ‘30s, about the time “Hartley” was beginning to be planted. He worked in close association with walnut researchers Dr. Gene Serr and Mr. Harold Forde of the University of California’s Pomology Department to help evaluate and increase most of the walnut varieties currently in use today. His close cooperation with the University continued following Serr’s death and retirement of Forde; he provided nursery stock, grafting services, invaluable technical assistance, and experiential advice to the University’s breeding and production research program and to the state’s farm advisors working on various walnut test projects. Several years ago, he funded a fellowship in the University’s Department of Pomology for graduate work in walnuts. The walnut cultivar evaluation block at Davis is named in his honor. The university’s walnut industry will sadly miss Bill Stuke working in their behalf.

* * * * * * *

G. Steven Sibbett
Farm Advisor
(559) 733-6486
### For each day, locate the low and high temperatures on the table and follow the column and row to where they intersect to find the total degree-days. For odd-numbered temperatures, between numbers.