

## Late Season Navel Orangeworm Considerations Western Farm Press early July 2008

### Introduction – Navel Orangeworm a Double Quality Threat

Moving toward harvest, it is important to take steps to effectively manage the navel orangeworm (NOW). This pest is a double threat to almond quality - besides causing direct damage to the kernel, NOW has broader quality implications. It opens the door to fungal infections and contaminants. Research shows the mold *Aspergillus* and the aflatoxin contaminant it produces is associated with reject kernels, particularly those damaged by navel orangeworm. Aflatoxin produced by *Aspergillus* mold is a known carcinogen and mutagen.

Aflatoxins are regulated the world over, with the European Union (EU) having particularly low maximum limits. The EU is the largest market for US almonds, even larger than the US and has put pressure on the California almond industry to enhance aflatoxin – and hence NOW--prevention and control measures. Growers must take critical steps to minimize NOW damage – to attain a goal of no more than 2% damage and reduce the risk of aflatoxin contamination.

### Early harvest is one key to NOW control and prevention

There are two keys to NOW control and prevention: The first is winter sanitation to remove and destroy mummy nuts from the trees and orchard. The second is early harvest. Knock as soon as possible after the nuts are mature -- when 95 to 100% of the hulls have split along at least a portion of their suture as best measured at the 6 – 8 foot level of the tree canopy. When nuts are knocked to the ground, they escape late season NOW egg-laying and the resulting damage. Late season orangeworm populations starting 30-40 days after the very first nuts split can be explosive because the NOW has cycled through the new crop, which is a plentiful food source. After nuts have been shaken to the ground, remove them as soon as possible to avoid ant damage.

### Hull split spray: Timing important – more insecticide options

Under higher pressure NOW situations a spray at hull split initiation can be considered if winter sanitation is insufficient (e.g., average of more than one mummy left per tree by June) and/or mated female moths fly in from adjacent uncleaned areas (including pistachios and walnuts), particularly within ½ mile. It is very important hull split sprays to susceptible varieties be applied at hull split initiation in concert with NOW egg laying. Just as hull split begins, egg laying can be confirmed by using egg traps, which are effective at the beginning of hullsplit and lose effectiveness as split progresses; and/or tracking day degrees from the biofix of the spring NOW flight – see UC IPM website for details. Balance egg laying activity with timing the spray typically to about 1-5% hull split – which will be nuts in the upper outer portions of the tree canopy.

A number of new insecticides are being registered and the Almond Board is currently funding research evaluating these. Studies underway by David Haviland (UCCE Entomologist, Kern County), Brent Holtz (UCCE Pomology Farm Advisor, Madera County) and Frank Zalom (Entomologist, UC Davis) are evaluating their performance and best “fit” in-season (e.g., May or hull split spray). In addition, their work is getting an “assist” from past and current research being conducted by Joel Siegel (USDA ARS, Parlier), Brad Higbee (Paramount Farming), and Walt Bentley (UC IPM Advisor, Kearney).

This work is in progress, but there are some general observations. These insecticides fall into two groupings: 1) Reduced risk compounds (e.g., Intrepid, Delegate); and 2) Next generation pyrethroids (e.g., Brigade, Baythroid, Warrior). Traditionally, well timed and applied hull split sprays have offered 50-60% control. Historically pyrethroids have given good insect control because they have contact activity against all stages (egg, larvae, and adult), while reduced risk compounds are not as active against adults; however, pyrethroids adversely affect mite predators and can prompt mite flare-ups. (Note: When Brigade was initially registered in crops like strawberries and cotton, it had a “mite suppressive” effect, but this subsided with use and application resulted in mite flare ups.). Therefore, pyrethroids are probably best considered under high pressure situations and later season application like hull split. In contrast, reduced risk compounds may have appropriate “fits” for both earlier May and later season sprays. The ongoing research will fine tune these observations.