

Evaluating overwintering navel orangeworm populations in mummy nuts



Emily J. Symmes, PhD
Sacramento Valley Area IPM Advisor

University of California Cooperative Extension and Statewide IPM Program

Background & Significance:

- Navel orangeworm (NOW) continues to be one of the key arthropod pests in almonds.
- Research has shown the importance of winter sanitation (= removal and destruction of mummy nuts) in reducing NOW abundance and damage the following season (Photo 1).
- Mummy nuts not only harbor overwintering NOW populations, they also provide oviposition and development sites for first generation NOW prior to availability of in-season nuts (Photos 2 and 3).
- Current University of California thresholds for mummy nuts are fewer than an average of 2 mummies/tree in the Sacramento and northern San Joaquin Valleys and 0.2 mummies/tree in the southern San Joaquin Valley.
- While overall numbers of mummy nuts remaining in the orchard are an important indicator of potential NOW pressure and harvest damage, evaluating the level of infest in mummies provides an additional source of information for crop advisors and growers.
- Ultimately, the combined estimates of remaining mummies in the orchard and overwintering NOW population in mummies can be used to improve pest pressure and damage models, providing an additional level of decision-support for managing NOW in almonds.



Photo 1. Hand-poling to remove mummy nuts for NOW management.



Photos 2 and 3. Mummy nuts remaining on almond tree.



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Methods:

- After harvest 2016, prior to any orchard sanitation activities for mummy removal, the average numbers of mummies per tree were evaluated according to University of California guidelines (visual samples of 20 trees per block) in 10 orchard blocks in the Sacramento Valley.
- At this time, a minimum of 30 mummies per cultivar from each orchard block were collected, cracked, and NOW infestation evaluated.
 - Multiple NOW can be present, survive, and emerge from a single almond mummy (Photos 4 and 5). Therefore, in order to achieve population estimates, the total numbers of viable NOW larvae and pupae were recorded rather than the proportion of NOW-infested mummies.
- Mummy infestation and mummy nut estimates will be re-evaluated in the same blocks in early 2017 following the same protocol.
- NOW population estimates will be compared between sample dates using standard statistical methods.
- Trapping and harvest damage data will be obtained for the 2017 season according to standard University of California guidelines and protocols. The relationships among trapping and damage data will be evaluated relative to overwintering NOW population data using standard statistical methods.
- Complete study results will be presented at the 2017 Almond Conference.

Objectives:

1. Compare NOW populations in mummy samples obtained in October-December 2016 to those obtained in January-March 2017.
 - Currently, crop consultants who are evaluating mummy infestation rates are doing so after harvest (October through December), prior to sanitation activities and key periods of natural mortality factors (winter rains and cold temperatures). One question that has arisen is how well data obtained at this time relate to the actual surviving NOW population going into the spring emergence period.
2. Evaluate relationships among overwintering NOW mummy populations and 2017 trap numbers (pheromone, kairomone, egg traps) and harvest damage.



Photo Credit: J.E. Nay



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Photos 4 and 5. Mummy nuts infested with multiple NOW larvae.