

Polyphagous Shot Hole Borer/ Fusarium Dieback Update

By Tim Spann

CAC Research Project Manager

Significant progress has been made on several fronts in the past few months with respect to the Polyphagous Shot Hole Borer (PSHB) and Fusarium dieback disease complex. The California Avocado Commission was successful in applying for United States Department of Agriculture (USDA) funding under Section 10201 of the Farm Bill to help broaden our current PSHB outreach efforts. CAC requested three years of funding (maximum allowed) totaling almost \$300,000 to help with survey and outreach efforts related to PSHB/Fusarium Dieback, in cooperation with the California Master Gardener program, County Agriculture Commissioners, County and State Parks personnel, nursery and landscape industries, and the California Association of Pest Control Advisors. We believe this will be a big help in getting other industries involved in the CAC-led efforts on this pest and disease. And it will allow for an expansion of our current outreach efforts into those industries who are currently affected by this pest, but who have not been active in the survey and outreach efforts to date.

Dr. Richard Stouthamer, professor of entomology at University of California, Riverside, has been making great strides in figuring out where the PSHB's native range is. In the last issue of *From the Grove* we reported that Dr. Stouthamer had received two beetle samples from Thailand that were genetically very similar to the beetle here in California. Recently, he received two additional beetle samples from the same region of northern Thailand and they too were similar to the California PSHB. In addition, he received eight beetles from Japan for testing, and determined that those too are similar to the Thai and California beetles. These data strongly indicate that the beetle originates from the region of Southeast Asia from Thailand to Japan. Unfortunately, the beetle is difficult to find there, which is slowing the collection and analysis of additional samples. However, this does indicate that natural enemies – predators, parasites or pathogens – are at work keeping population levels low, and these natural enemies may eventually be able to be introduced to California.

Dr. Tim Paine, professor of entomology at UC Riverside, has been actively working on understanding the biology of PSHB and developing control strategies. His lab has suc-



Sugar volcanos surrounding PSHB entry holes on an avocado trunk. Photo from: Dr. Akif Eskalen, UC Riverside.

cessfully established a colony of PSHB in the quarantine facility at UC Riverside. This will allow them to conduct life history studies (temperature requirements, generation time, etc.) of the beetle, as well as have a ready supply of beetles to continue their work on host preferences. With respect to controlling the beetle, Dr. Paine and his team have recently completed an initial study to test whether solarization could effectively reduce beetle survival in intact logs. They used infested logs of castor bean and box elder, and placed them under black or clear plastic. Logs were



PSHB entry hole on an avocado tree trunk. Photo from: Dr. Akif Eskalen, UC Riverside.

removed from beneath the plastic sheeting at two and four weeks and placed into buckets for two weeks to monitor for beetle activity. Clear plastic was much more effective than black plastic, reducing the level of infestation by about 90 percent compared to the black plastic after just two weeks. However, there were still live, active beetles present in the logs covered with clear plastic after four weeks. This study will be repeated and extended for a longer duration. Dr. Paine's group is also working on determining the beetle's host preferences, and they are seeking your help in obtaining samples of as many different varieties of avocado wood as possible. If you have freshly pruned avocado wood that they could use, please contact Michele Jones in Dr. Paine's lab at michele.eatough@ucr.edu or (951) 827-4488.

Dr. Akif Eskalen, extension plant pathologist at UC Riverside, has recently found that, in addition to the *Fusarium* and *Graphium* species of fungi the PSHB carries, a third fungus, *Acremonium* sp., is also present. Initial assays indicate that all three fungi are plant pathogenic. The *Graphium* sp. appears to be the primary food source for the larvae, whereas the adults feed mostly on the *Fusarium* sp. The *Acremonium* sp. has only recently been identified and it is uncertain what role it plays in the beetle's diet. Dr. Eskalen emphasizes that these are very preliminary data, and they are doing more work to verify these results. Also, prelimi-

nary work in which they have infected young (nursery size) avocado trees with the *Fusarium* and *Graphium* species has indicated that the *Graphium* may be more aggressive within the tree than the *Fusarium*.

It was hoped that the winter would slow the spread of the PSHB, unfortunately the recently compiled data from spring scouting is showing that there has been significant movement since December. We encourage all growers to be vigilant and to familiarize themselves with the symptoms of PSHB attack on avocado. The beetle entry holes are quite small (about the size of the tip of a ballpoint pen), but at this time of year the tree responds by exuding copious amounts of sugar, forming very visible "sugar volcanos" around the entry holes. If you see anything in your grove resembling these symptoms you are encouraged to report it immediately either to the CAC office at 949-341-1955 or to Dr. Eskalen either by phone 951-827-3499, or email at akif.eskalen@ucr.edu for confirmation of the pathogen.

DO NOT transport suspect material from your grove, but wait for someone to visit the grove and collect samples for confirmation. More information about this pest/disease complex and pictures of the beetle and symptoms on a variety of species can be found on Dr. Eskalen's website (<http://eskalenlab.ucr.edu/avocado.html>). 🥑