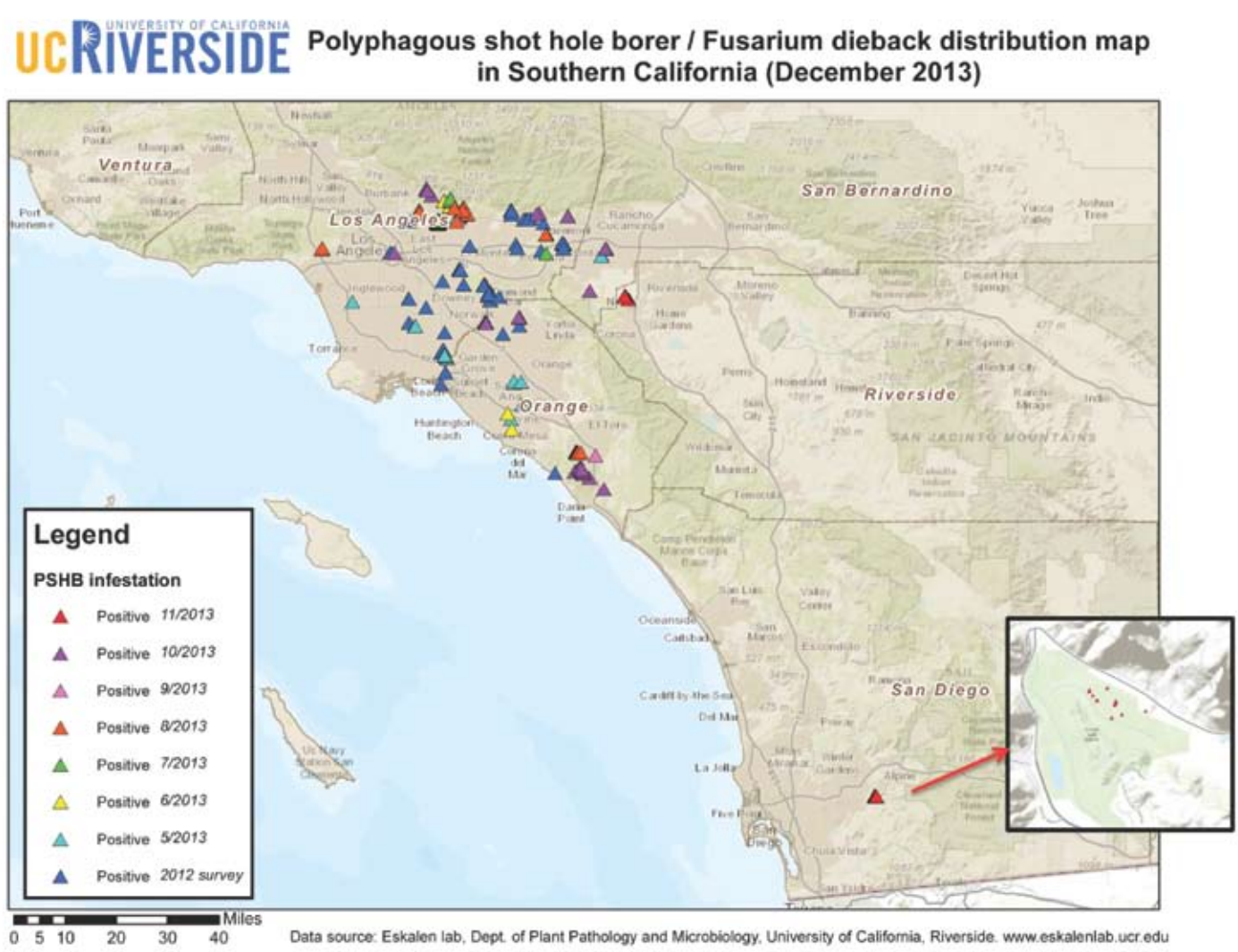

Beetle Found in Commercial Avocado Grove

By Tim Spann
Research Project Manager

On February 11, 2014, a dead 'Hass' tree on Mexican seedling rootstock was found in a commercial avocado grove in south Orange County. Initially, it was thought that the tree had succumbed to salinity and/or drought stress; however, on closer inspection a significant amount of sugar exudate was found on the trunk of the tree. Once this sugar exudate was scraped away, the telltale holes of the polyphagous shot hole borer (PSHB) beetle were found. As of this writing, samples taken from the tree are being analyzed by Dr. Akif Eskalen's lab at UCR to confirm the presence of the *Fusarium* pathogen. No signs of attack were found on any other surrounding avocado trees; however, the area had just received some rain that may have washed away the sugar exudate making detection difficult.

It was very surprising that this tree was completely dead upon discovery. From what has been observed on avocado trees at the Huntington Gardens and elsewhere, avocado appeared to tolerate this pest for quite some time (at least two years), showing only branch dieback symptoms, before succumbing. This was a relatively small tree (about eight feet), was suffering from salinity stress, and, no doubt, was under some drought stress given our current dry conditions. All of these factors may have combined and led to the quick death of this tree.

Growers are advised to be extra vigilant, particularly those

who have groves near known areas of infestation. The tree that was found was just a few rows into the grove, which is adjacent to a park with a riparian forest that includes very good PSHB hosts, including willows and sycamore, which likely served as the source of the infestation. If you see any suspect symptoms you are encouraged to contact your county farm advisor or Dr. Akif Eskalen's lab at 951-827-3499, akif.eskalen@ucr.edu.

PSHB in San Diego County

As the last issue of *From the Grove* went to press, we learned that PSHB had been found in El Cajon in San Diego County. The find was on sycamore trees at the Sycuan Golf and Tennis Resort. Surveying efforts to fully delimit the extent of this infestation are still ongoing, but it does not appear to have reached nearby commercial avocado groves.

Initially, it was thought that the San Diego infestation was the result of infested plant material being moved from L.A. and Orange Counties. However, genetic analysis of the beetles in San Diego County shows this is not the case. Much the same way that DNA analysis can be used to determine where a person's ancestors were from, the same can be done with PSHB. Dr. Richard Stouthamer, an entomology professor at UCR, believes that PSHB likely originated in Vietnam and spread throughout Asia, with distinct populations found in Thailand, Taiwan, Japan and elsewhere. His work shows that the beetles in L.A. and Orange Counties match those in Vietnam and the beetles in San Diego County match those in Taiwan. This means that there have been at least two introductions of this beetle into California, one from Vietnam and one from Taiwan.

The trunk of the infested avocado tree in a south Orange County grove showing sugar exudate and several PSHB bore holes with dark staining caused by the fungal infection.

A close-up of a PSHB bore hole (center) surrounded by dark staining caused by fungal infection on the trunk of the infested avocado tree in a south Orange County grove.

PSHB in Santa Cruz County

On November 4, 2013 inspectors with the California Department of Food and Agriculture's Plant Health and Pest Prevention Services department found a small beetle while checking a funnel trap in the city of San Lorenzo Valley in Santa Cruz County. The beetle was submitted for identification and was confirmed as a polyphagous shot hole borer specimen on February 24, 2014. The trap, part of a network of traps distributed throughout the state to monitor for pests, was in a bay laurel tree. However, since the beetle was collected from the trap it is not clear whether the bay laurel tree was the host. Survey crews will be visiting the area to inspect known PSHB host species near the capture site to determine if there is an established population in the area and, if so, how it got to northern California.

Searching for Predators in Vietnam

As of this writing, Drs. Stouthamer and Eskalen are in Vietnam working with colleagues there to try to find natural predators of the PSHB. They have been visiting acacia and cinnamon plantations, both known PSHB hosts. Acacia, a non-native timber species is hit very hard in some locations, and the farmers report that the infestation seems to have gotten worse over the past couple of years. In cinnamon, a native species, PSHB is a minor pest. They have also found a beetle attacking tea plants in a tea plantation; however, until genetic tests are complete they are unsure if this beetle is PSHB or the physically identical tea shot hole borer. With regard to natural enemies, their cooperator in Vietnam finds a lot of flies and fly larvae associated with the beetle. However, they need to determine what fly species they are and whether they are feeding on the PSHB, the fungi, or are simply found together but do not interact.

For the latest updates about PSHB and to see the current distribution map, please visit the Eskalen Lab's website, http://eskalenlab.ucr.edu/avocado.html.