



RCD

RESOURCE CONSERVATION DISTRICT
OF THE SANTA MONICA MOUNTAINS

Ventura and LA County Bad Beetle Watch

Polyphagous Shot hole borer (*Euwallacea* sp.)



Goldspotted Oak Borer
Photos courtesy of UCANR



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WELCOME!

Thank you for joining our volunteer community science team to learn more about the Polyphagous and Kuroshio Shot Hole Borer beetles (collectively known as Invasive Shot Hole Borers, ISHB, or BAD BEETLES) and other emerging tree pests!

ISHB are invasive wood boring beetles that attack numerous native and non-native trees in Southern California, including commercial avocado groves. While these beetles mechanically damage trees by boring galleries (caves) into trunks and branches, both beetles also carry a fungal disease called Fusarium Dieback. This fungus is “farmed” by the beetles as food and supports their reproduction. Trees that become infected with this fungal disease are prone to branch dieback, canopy loss, and mortality. Mortality can occur quickly within 1-5 years. A conservative estimated rate of spread is 1.5 to 2 miles a year. This is, however, drastically increased by humans as we transport infected wood. In Southern California, the drought has already weakened many trees and now they must fight infestations as well! To learn more about the pests threatening native oak trees, visit

https://ucanr.edu/sites/socaloakpests/Resources_on_oak_pests/.

Your participation will detect early infestations and allow us to get a clearer picture of the spread of ISHB in Ventura and Los Angeles County. This knowledge will assist us, and many other conservation agencies, plan for management. While this beetle/disease complex can affect hundreds of tree species, this survey will focus on eight species: a native box elder, two native willows, two sycamores (one native and one non-native), two oak species, and castor bean (a non-native, invasive species). These species are a few of many known reproductive hosts (these are trees where all life stages of the beetle have been found. For a complete list, visit www.ishb.org). Box elder trees (*Acer negundo*) are few in the Santa Monica Mountains and are found in the sensitive riparian zone. The arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*) are early detection systems, and often the first species to show infestation. They are also found in the sensitive riparian zone. The non-native London plane sycamore (*Platanus x hispanica*) is commonly found planted in wildland-urban and urban areas. The native California or western sycamore (*Platanus racemosa*) is commonly found in wildlands (usually near a creek, or riparian, environment) and planted in urban areas. The valley oak (*Quercus lobata*) and coast live oak (*Quercus agrifolia*) trees are also found in both wildland and urban environments. All are highly susceptible to pests, and both the trees and the pest damage are easy to see.

The Goldspotted Oak Borer (GSOB) is another beetle threatening to spread into the Santa Monica Mountains. This borer attacks only oak species and is usually found in the bark. While it is not found in our mountains yet, we must keep an eye out! Evidence of GSOB attack includes staining, oozing, chipping on bark from a woodpecker eating the larvae, and small D-shaped exit holes on only oak trees. In 2017, one GSOB was found in Idyllwild by a volunteer who had attended a GSOB education and outreach event. The volunteer then used the online reporting system at www.gsob.org to report the find. Early detection systems work!

FREQUENTLY ASKED QUESTIONS

Where can I learn to identify invasive shot hole borers?

Go to www.ishb.org for an amazing online class that takes less than half hour to complete. Visit www.gsob.org to learn what a GSOB looks like!

Can I set up my survey along my daily/weekly hike route?

YES PLEASE!

What if I don't find anything?

Please let us know where you looked. It is super important as well! Knowing where the trees are impacted as well as where there is no infestation is important to help us follow changes and rate of spread over time.

Do I have to do this regularly or is a random hike through the Santa Monica Mountains helpful as well? Repeat visits to one location are preferred, as that will more clearly show changes over time. If, however, you are hiking somewhere else and see some trees that look infested, it is also helpful for you to take an observation in iNaturalist.

WHERE TO LOOK

Anywhere you regularly walk or hike! The more eyes looking the better.

Identifying the extent of infestations requires an iterative process of detection and monitoring.

California's statewide monitoring system has a list of high-risk areas. Most of these areas are in places where wood is being transported, processed, and/or used, such as:

- trailheads and campgrounds
- parks and recreation areas with grills
- botanical gardens
- universities and school campuses with susceptible host tree species
- green waste and landfill facilities, and routes to them
- landscape management areas (Homeowners Association green spaces, etc.)
- tree nurseries, box stores selling trees and firewood
- firewood sellers, Craig's list review for firewood sellers
- firewood processing facilities
- wildfire boundaries

Other areas that are at high risk of infestation are:

- located along the leading edge of a known infestation
- contain a host species of concern (such as a box elder or California sycamore)
- a sensitive location, such as riparian areas and drainages, or where endangered species are found

A map of where ISHB have been found is available at <https://ucanr.edu/sites/pshb/Map/>.

HOW TO START

IMPORTANT: Do this FIRST where you have service or connection to the internet!!



iNaturalist is a commonly used tool to help quickly identify various types of species.

You will be using this app to help detect and report instances of bad beetles.

Thank you!

Task #1 – Install iNaturalist on your smartphone:

-For Apple iPhones-

1. Tap the app store on your phone.
2. Go to search and type in iNaturalist.
3. Download the free iNaturalist app (just the plain iNaturalist, not Seek by iNaturalist).
Seek is also a fun app and totally recommended!

-For Android smartphones-

1. Tap the apps icon from your phone's home screen (it looks like several dots or small circles in a square).
2. Go to the Play Store.
3. Find the search bar at the top and type in iNaturalist.
4. Download the free iNaturalist app (just the plain iNaturalist, not Seek by iNaturalist).
Seek is also a fun app and totally recommended!

VERY IMPORTANT FOR ALL SMARTPHONES!!!!

Task #2 – Check that location services are turned on in your phone:

Be sure to turn on the GPS locator on your phone. This is **ESSENTIAL** for determining your location. Even if you do not have cell phone service at the time when you take photos with iNaturalist or your phone's camera, your GPS location will be saved to that photo.

How to turn on location services on your phone:

-For Apple iPhones (may vary depending on iPhone version) -

1. Go to Settings.
2. Look for the Privacy menu. Look for Location Services and make sure this is turned ON.
3. Scroll down until you find iNaturalist. **ALLOW LOCATION ACCESS** while using the app.
4. Or, in case you need to use your phone's built-in camera, be sure to find Camera in the same menu as iNaturalist. **ALLOW LOCATION ACCESS** while using the app.

-For Android smartphones (may vary depending on phone version) -

1. From your home screen, enter Settings menu.
2. Tap on Location Services or Location Access.
3. If your phone shows "High Accuracy" anywhere, turn that on as well.

Alternatively, if you choose to use a digital camera with GPS capability, please turn on that capability. We should be able to collect GPS information from the photo files you submit. You will need to collect data then email photos and data sheet to Rachel Burnap at rburnap@rcdsmm.org.

Task #3 – Join iNaturalist:

1. Sign up for an account through the app on your phone or on your computer at iNaturalist.org.
2. Join the Ventura and LA County Bad Beetle Watch project.
3. To do this on your phone's iNaturalist app, click on the three "dots" in the lower right corner.
4. Bring up a search bar by clicking on the small magnifying glass in the top right corner. Type in "Ventura and LA County Bad Beetle Watch". Once it goes to that page, find and click the "Join" button. That's it! You are ready to make your first observation!

If you want to know more about using iNaturalist, please visit these online tutorials:

-Getting Started - (<https://www.inaturalist.org/pages/getting+started>)

-Video Tutorials - (<https://www.inaturalist.org/pages/video+tutorials>)

Learn more about the ISHB and GSOB directly from the iNaturalist app. From the iNaturalist phone app, click on ACTIVITY (to the left of the Observe button), then NEWS (at the upper right corner). This will show clickable links to an online plant ID pdf, ISHB and GSOB guides online.

COLLECTING DATA

If all else fails, take the pictures with your phone camera, and write down your data on paper to enter in later.

Task #1 – Pick a tree you want to monitor:

- 1) It can be the same tree over time or different ones. Look for red or arroyo willows, California sycamores, coast live and valley oaks, or London plane trees. Pick trees that have a diameter at breast height over 4" (trees under 4" are rarely infected). If it is winter and the deciduous trees (all trees but the coast live oak) have lost their leaves, look at the ground for a leaf to examine. The ideal stand for monitoring is 3-6 trees but could be an individual tree in your back yard, or a stand of 10 trees in a park or along a trail.
- **Keep in mind that it must be SAFE location and one where you have permission to enter. Be aware of traffic – cars, bikes, etc. and uneven surfaces. When examining trees that may be off trail, be sure to look where you are walking! Keep an eye out for large amounts of ants, rocks, gopher holes, and rattlesnakes. When working in long grasses, check your surrounding (and yourselves!) for any other animals, such as ticks. We always recommend working in pairs!**
- 2) If you choose to monitor the same trees over time, choose a photo point that you can **easily locate again**. Ideally, you want to return to the same point to take a picture each time you visit. Good candidates for photo point "markers" are a street corner, a unique rock or plant, features found along a sidewalk, etc.
- 3) **Remember, trees that are infected and are NOT infected are both important!**

Task #2 – Observe the tree:

- 1) Walk around the tree and look for signs of infestation: staining, gumming, frass, exuding sugar, and any visible bore holes. Look up and look down. Sometimes staining is most evident at the intersection between the trunk and first branches. Oak infestation is usually seen first high up on the branches.

Task #3 – Take three photos of each tree with iNaturalist:

- 1) **You will take three photos for EACH TREE INFESTED TREE, two photos for non-infested trees.**
- 2) From the iNaturalist app, click the OBSERVE button on the screen bottom to bring up the camera. Following the photo guidelines found below, take the first photo. If you are satisfied with it, click on the green NEXT button. To take photo 2 of the same tree, click on the BOX WITH THE PLUS sign in the upper left corner. Take the next photo in the same manner for a total of three photos for infected trees.
- 3) **Alternatively**, you can take each picture with the normal camera app and then click OBSERVE and select the images from your photo timeline. Again, make sure that location services are turned on.
- 4) **iNaturalist will save your photos in the app and in the app where your phone's pictures are stored.**

Some photo guidelines to keep in mind:

- **The image must be very clear** (we can't tell anything from an image that is out of focus).
- Please wipe off your camera lens.
- Having the sun at your back will reduce glare in your photo.

Photo 1 – Close-up of the entry hole

Lightly scrape off the bark. **Be sure to DISINFECT BEFORE the tool before you do this!** The first image should be of the beetle hole and include the point of a medium ball point pen for scale and to point out the hole. Make sure not to cover the hole itself but be within ¼ inch of the hole. In some cases, you may be able to see a black roundish thing poking out of the hole; this is a beetle abdomen.

If no holes are found and the tree is absent of beetles, skip this photo. Beetle-free trees will only contain 2 photos.



Photo 2 – IMPORTANT: Photo of leaves, flowers, and/or fruit to identify tree species.



Photo 3 – Photo of entire tree canopy.

This will be the hardest photo to take. Step back far enough from the tree to see the entire tree canopy. For the best photo, aim to have the sun behind you. Watch your step.

Task #4 – Provide data for THIS individual tree.

- 1) Under the photographs, look for “What did you see?” Type in *Euwallacea* and Complex *Euwallacea*... will pop up in list. Choose this. If you cannot find it in the field, it is easy to later. Leave blank if noninfected tree.
- 2) You can write notes...
- 3) Under location, take a quick look at the map to see if the location is correct. Adjust if needed. Note that the accuracy is improved.
- 4) Under “geoprivacy,” leave as open or obscured. One note about geoprivacy: if you keep your geoprivacy open, everyone on iNaturalist can see the location at which you took the photo. This may or may not matter to you. If you choose to keep the geoprivacy obscured, a location will be shown but it will not be the true location. It will still be visible to project curators. Private observations show nothing on the map and make it hard for curators to see.
- 5) Enter yes in Captive/Cultivated if planted.
- 6) Click on “Projects” and turn on Ventura and LA County Bad Beetle Watch. This will reveal these data prompts:
 - a. **Name of Host Plant.** Required. Common names and abbreviations are fine.
 - CA sycamore (*Platanus racemosa*)
 - London plane (*Platanus x hispanica*)
 - Valley oak (*Quercus lobata*)
 - Coast live oak (*Quercus agrifolia*)
 - Red willow (*Salix laevigata*)
 - Arroyo willow (*Salix lasiolepis*)
 - Box elder (*Acer negundo*)
 - Castor bean (*Ricinus communis*)
 - a. **Tree Circumference at Breast Height** – In inches. 10” or less, 10” to 20”, greater than 20.” Required.
 - b. **Tree Height-Rough Estimate** – In inches. Get a mental image of how tall you are and imagine how many of “you” equal the tree.
 - c. **Infestation Level** – 0, 1-50, 50-150 (Moderate), greater than 150 (Heavy), over 150 plus dieback (Severe). Required.
 - d. **Crown Dieback (%)** – 1-10%, 11-20%, 21-30%, over 30%, or Dead. Required.
 - e. **Evidence of Staining, Frass, Both, or None.** Not a required.
 - f. **Live Beetles** – None, live beetles found in hole, or climbing on trunks. Not a required field.
 - g. **Sample Taken?** Yes or No.
- 7) Click the back arrow.
- 8) IMPORTANT:
- 9) Click the SHARE button and you’ve made an observation! You may edit your entries through the app or online.

What will we do with the data you just collected?

We will check it first then share it with local county and state agencies.

To edit your data:

-From the app on your phone-

- 1) Click on ME, found at the bottom of the screen, to the right of the observe button. A list of all observations made will be shown.
- 2) Click on the appropriate one to edit. Click EDIT at the top right corner. From here, anything can be edited.
- 3) To edit observations, click on PROJECT, then turn OFF ISHB of the Santa Monica Mountains. Then turn it back on. All previous answers will still be saved. Make any needed changes.
- 4) Click on back arrow.
- 5) Click DONE at the upper right corner. It is edited and saved!

-Online at iNaturalist-

- 1) Log into your account.
- 2) Under the account name, click on OBSERVATIONS.
- 3) Find the entry to be edited. To edit, click on EDIT. It consists of a *small font size* and is found to the far right of the observation entry.
- 4) Please check location and edit if necessary.
- 5) To look at or edit observation data, click on the down arrow button located to the right of Start Typing Fields. A menu of data fields will appear. Click on each one to see or edit.
- 6) Click SAVE OBSERVATION.

Other ways to enter data:

-Online at inaturalist.org-

- 1) Log into your account.
- 2) Click on UPLOAD at upper right corner. Find and place all photos for a SINGLE TREE.
- 3) Enter species name if confident on species identification.
- 4) IMPORTANT: Check metadata associated with photo. Check timestamp (date photo taken), and location. Change if needed.
- 5) Under projects, find ISHB of the Santa Monica Mountains.
- 6) Under fields, enter the observation data.
- 7) At the upper right, click on SUBMIT.

-Email photos and data-

-From your phone or computer, please place all pictures from a SINGLE tree and corresponding data into an email and send to rburnap@gmail.com. Data includes the observation fields from Task #4, Step #6 above.