Bohart Museum Society

Summer 2024 **Newsletter** No. 99

In This Issue

Summer is always a fun time in the museum. Students and staff do field collecting, and summer gives us time to catch up on specimen backlogs from previous work.

We've cut back on the number of days that we're open to the public to give us time to catch up on a variety of projects!

The museum staff and Jason Bond have a number of new open house topics planned for the coming year. We'll be sending out the information later this summer.

Temperatures are hot, so be careful when you're out bug hunting!

-Lynn Kimsey

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SPOTLIGHT ON A SPECIES

Should We Worry?

by Lynn Kimsey

Spotted lanternfly displaying hindwings. Photo by WanderingMogwai, Wikipedia.

The media is full of news about the invasive lantern fly moving across the East Coast of North America. There is some concern about whether it can make it to the West Coast, so it seems like it's time for a reality check.

The spotted lantern fly, *Lycorma delicatula*, is a planthopper in the family Fulgoridae. Fulgorids are large-bodied insects that hold their wings tent-like over the back. They have tubular mouthparts used to feed on plant phloem and often have the front of the head modified into a large swelling or horn-like structure. The family is particularly abundant in the tropics with over 125 genera worldwide. One of the best known fulgorid species is the iconic neotropical peanut bug, *Fulgora laternaria* (Linnaeus), which can reach over 3 inches in length.

There are only three native species of Fulgoridae in California, *Amycle pinyonae, A. saxatilis* and *Cyrpoptus metcalfi*. All three are boringly colored in shades of brown, very much unlike the spotted lanternfly. The two species of *Amycle* are endemic to the state and found nowhere else. *Cyrpoptus metcalfi* occurs from California to Arizona and south into northern Mexico and feeds on species of *Pluchea* (arrowweed). These fulgorids are somewhat host plant specific. *Amycle pinyonae f*eeds on pines, thus the name. Oddly, *Amycle saxatilis* feeds primarily on exotic grasses, including *Andropogon ternarius* (split bluestem), *A. viriginicus* (broomsedge bluestem), *Danthonia sericea* (downey danthonia), *Deschampsia flexuosa* (crinkled hairgrass) and *Eragrostis curvula* (weeping lovegrass), which seems peculiar for a native species. These host grasses are either native to the eastern half of North America or are introduced from Africa.

Ailanthus altissima (Tree-of-heaven). Photo by Joseph DeTomaso.

The spotted lantern fly is native to southeastern Asia in southern China, Vietnam and Taiwan. In the early 2000's it was found to have spread to South Korea and Japan. It first appeared in North America in 2014 and is now found in 17 states in the eastern U.S.

This is a distinctive brightly colored

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Museum News

Picnic Day 2024

Picnic Day, April 20, was a great success with many 1000's of visitors coming to the Entomology exhibit.

Unlike previous years, the Bohart Museum teamed up with the Entomology & Nematology Department and held its Picnic Day displays and activities in front of Briggs Hall, next to the entomology displays.

Picnic Day , Denise Romero and Ramses with the Bohart banner (above). Photo by KE Garvey. Sam McCullough (weevil), Jasmine Chow and Allen Chew (horsefly) at Picnic Day in costumes designed by Allen Chew (left). Photos by Jason Bond.

New Discoveries

By Glen Forister

I caused quite a stir with the BugGuide.net buprestid people because I posted a beetle I collected in my V-FIT (vertical flight intercept trap) Loomis trap that I have been running for four years. This was embarrassing because at the time I thought I was dealing with a lot of throscid beetles and thought it was one of those: https://bugguide.net/node/view/2267472. Instead, the beetle turned out to be a newly introduced species, *Aphanisticus congener*, that has never been reported in the U.S. before! In fact, it was only known from China, Japan and Korea.

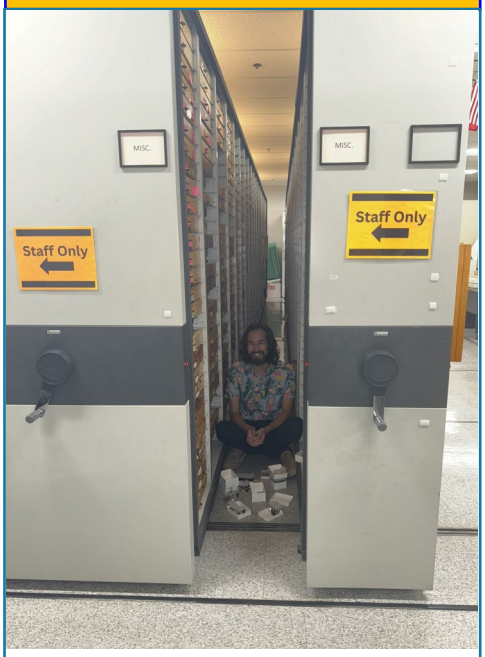
After much research led by Jason Hanson (USDA-APHIS-PPQ) this species is now also known to be in California, Oklahoma and Texas. More looking will probably increase that range since it was found in collections mixed with *A. cochinchinae*. Luckily it appears for the time being to be a relatively minor pest of turfgrass. My BugGuide posting provides ways to identify this species from the others. Also, there is a new publication about this discovery, which is a good resource:

Title: The Palearctic *Aphanisticus congener* Saunders, 1875 (Coleoptera: Buprestidae) recorded for the first time in the Western Hemisphere.

[This is a tiny, dark colored jewel beetle that is less than 3 mm (0.1 inch) long].

Vertical flight intercept trap (above). Specimen of *Aphanisticus congener* (right). Photos by Glen Forister.

Museum Stuff



Rex Nepstad working on the Delta specimens in the museum compactor range.

Sometimes working in the museum requires some unusual skill sets, such as working in confined spaces. Rex Nepstad took this to a whole new level sorting the Delta specimen that need further preparation.

MUSEUM EVENTS

Biodiversity Museum Day

Biodiversity Museum Day this year was great fun. We had more than 4,000 visitors on campus for the event touring the major collections, including the Anthropology Museum, Arboretum, Bohart Museum of Entomology, Botanical Conservatory, California Raptor Center, Center for Plan Diversity, Museum of Wildlife and Fish Biology collection, Nematode Collection, Paleontology Collection and the Phaff Yeast Collection.

The Bohart Museum was open to visitors for most of the day.

Donations to support future Biodiversity Museum Days can be made to https://give.ucdavis.edu/CAES/BIOFUND.

Brennen Dyer, Lynn Kimsey and Jason Bond in the compactor range modeling the Biodiversity Day t-shirts. Photo by Kathy Keatley Garvey.

Margo Rubin using a microscope at the Bohart museum during Biodiversity Museum Day. Photo by Kathy Keatley Garvey.

Outreach Programs

Due to staffing shortages, we've had to reduce our public museum hours this summer. This happened last summer as well. However, thanks to the generous support of society members it looks like we will be able to expand our future summer educational programs. This summer we offered two Bio Boot Camps for junior high and high school students at Sagehen Creek and Bodega Bay Marine Lab.

C.C Edwards and Ethan Matsuyama, instructors at Bodega. C.C. is a graduate student in Medical Entomology. Ethan is an undergraduate in the Wildlife, Fish & Conservation Biology program.

In Memorium

James Mori 1935-2024

Jeff Smith, Lynn Kimsey and Jim Mori in the Museum with the donation of his collection.

James Mori passed away at his home in Sonora, California, this past May

He was an ardent butterfly collector and traveled all over the U.S. and the rest of the world, including Malaysia, Mexico, Ecuador, Israel and Costa Rica, with his wife Glenna.

He got a B.S. from Oregon State University and served in the U.S. Army for several years before working for the State of California for the rest of his career.

In 2015 James Mori donated his butterfly collection of more than 1,300 specimens to the Bohart Museum.

James Mori and Ray Coyle Sr. hosted the Sonora Pass Butterfly Count for many years. He was an active participant in the Yosemite Butterfly Count hosted by Sarah Stock. He also attended the midwinter lepidopterists get togethers held every other year at the Bohart Museum in January.

His passing is a great loss to the Lepidoptera community.

Your Legacy is our Future

Consider a gift to the Bohart Museum of Entomology through your trust or will, as a beneficiary of a retirement account, or through a donor advised fund. Contact Cari DuBois-Wright (caduboiswright@ucdavis.edu or 510.388.3605) for more information.

Hegemona beetle. Photo by Alex Wild.

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Lycorma delicatula life stages with size comparison. Oxford University Press on behalf of the Entomological Society of America 2021.

insect. Adult lantern flies are large bodied insects, reaching about 1 inch long and ½ inch wide. The brightly colored wings are the adult's most distinctive feature. The forewing is basally grey, often with a pinkish tint and black spots. The wing tip is mottled grey. The hindwing is brightly colored with the anal area red with black spots, the wing tip is black, and the remainder of the wing light grey with black markings. In addition, the antennae are unusually short and orange colored.

Adults can fly, but often just use their hindlegs to jump and then glide from surface to surface. The brightly colored wings are only exposed during flight or when they are startled.

Juvenile spotted lantern flies are also distinctively colored. Early-stage nymphs are black with bright white spots. Later stage nymphs retain the black and white coloration on the underside but have bright red markings on the dorsum with white spots.

Spotted lantern flies have one generation a year. Females can lay two egg masses in the fall. Each egg mass contains 30 to 50 eggs. The egg masses are deposited on smooth surfaces, such as tree bark, stones, vehicles and even patio furniture. Each egg mass is about 1 inch long with a waxy covering. When the eggs hatch the nymphs go through four instars, the end of each is marked by a molt.

The last instar occurs in the summer before the winged adult emerges. The adult stage is reached in the summer or fall.

Unlike the native fulgorids the spotted lanternfly preferentially feeds on the tree of heaven (*Ailanthus altissima*) but will also feed on more than 173 other plant species, including grapes, stone fruits, maples, walnuts and willows. So, it is easy to see why growers and the California and U.S. Departments of Agriculture are concerned about this insect getting established in California. The tree of heaven originates in Asia and was introduced into the U.S. as an ornamental. It is now widespread in California, both as a garden plant and as a "weed". This tree is commonly found along highways and county roads. Fortunately, there is no evidence that feeding by this lanternfly can vector plant pathogens.

This being said it seems unlikely that the spotted lanternfly will get established in California. If you look at the native range and where it is now established all have wet summers. This is clearly not typical of California summers.

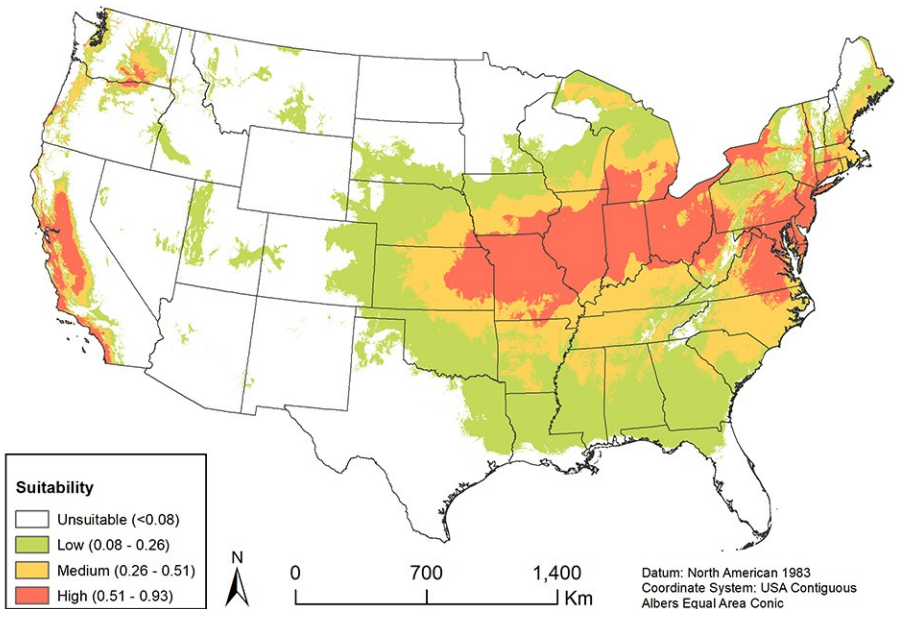
Native Fulgorid Species

Cyrpoptus metcalfi. Photo by CNC/CBG Photography Group, Centre for Biodiversity Genomics.

Amycle pinyonae. Photo from inaturalist.org.

Amycle saxatilis. Lectotype photo from Planthoppers of North America, https://sites.udel.edu/planthoppers/.

Potential distribution of spotted lanternfly in the United States



Wakie et al 2019. *Journal of Economic Entomology.*

New Displays

Proposed Cicada Sculpture

Cicada shed sculpture posted by puinkump7 on Reddit

Cicada skins sent to us by Daniel Young, University of Wisconsin (center).

The emergence of two cicada broods in the eastern U.S. has led to some incredible creativity. The sculpture on the left was created by an unknown artist completely out of cicada skins.

We were so taken with these sculptures that we put out a call to the Entomology Collections Network for skins to have one or more of our students create their own sculptures. We got two shipments of skins, one from Alfred Daniel Johnson a postdoctoral associate at Tennessee State University and the other from Prof. Daniel Young at the University of Wisconsin, Madison. Thanks to them for sharing some East Coast insect treasures with us in California.

New Display Drawers

The Bohart Museum display drawers travel to all parts of northern California, to schools, libraries, county fairs and other events. They are available to teachers, students and other folks to borrow for educational outreach programs or events. Periodically we try to come up with new themes based on student interest or changing needs. This year we had three creations from Ann Holmes, Emma Joachim, Samantha Strom and Jason Hu.

Ann Holmes designed a drawer on insects that bats feed on in the local area. She just completed her Ph.D. in Ecology at UCD studying the diet of bats found beneath the I-80 causeway over the Yolo Bypass.

Emma Joachim is a graduate student in Jason Bond's lab. Her drawer displays the largest and smallest bodied arachnids.

Samantha Strom and Jason Hu designed two drawers, one last year focused on scarab beetle diversity, and this year the second is a detailed display of structural modification arthropods have to defend themselves from predators (and each other).

Samantha Strom and Jason Hu were both members of the UCD Entomology Club even though neither majored in Entomology. Jason got his B.S. in Biochemistry and Molecular Biology and Samantha got her degree in Neurobiology, Physiology and Behavior.

Ann Holmes with her display drawer on bats.

Emma Joachim with her display on BIG arachnids.

Samantha Strom and Jason Hu and their new display on how arthropods defend themselves.

Insects in the News

Long Distance Fliers

Painted lady butterfly on lantana. Photo by Kathy Keatley Garvey.

We tend to focus on monarch migrations, but painted lady butterfly migrations are even more impressive. The painted lady butterfly, Vanessa cardui, is one of the commoner butterflies in the Western Hemisphere. In North America, painted lady butterflies spend winters near the US-Mexico border, where they breed in the desert regions on annual plants. The resulting generation then migrates northward in the spring. In good desert rain years, the painted lady butterfly populations may be enormous. One of the biggest populations was recorded in 2005 by Art Shapiro[1], "at the height of that spring migration the butterflies were passing in one's field of view at the rate of about 3 per second!".

A recent study found that painted lady butterflies can migrate across oceans. Scientists from the Botanical Institute of Barcelona discovered these butterflies on the beaches in French Guiana. Painted lady butterflies are not usually found in South America. When they analyzed the pollen on the butterflies they found that it came from flowers in tropical Africa. The butterflies evidently crossed 2,600 miles of ocean using winds blowing eastward form the Sahara. If they only used their own energy stores, they would only have enough energy to fly a maximum of 484 miles!

[1] https://butterfly.ucdavis.edu/butterfly/vanessa/cardui

Mosquito Control?

Hawaiian honey creeper, *Drepanis coccinea*. Photo by Phil Chaon.

The Hawaiian honey creeper population is endangered by avian malaria transmitted by exotic species of Culex mosquitoes. These birds have a 90% chance of dying after being bitten by an infected mosquito. To counter this the National Park Service, State of Hawaii and the Maui Forest Bird Recovery Project are using helicopters to drop 250,000 male mosquitoes a week. The males are infected with Wolbachia bacteria that stop the female mosquitoes from reproducing.

Asian Hornet News

Vespa velutina alert on their nest. Photo by Francis Ithurburu, Wikipedia.

The Asian hornet, *Vespa velutina*, first reached Europe in Bordeaux, France. Since then it has spread across northwestern Europe. More recently, it was found in parts of the United Kingdom. In 2023 record number of Asian hornets were reported in the UK and the numbers are even higher this year. Although not considered to be as potentially dangerous as the giant Asian hornet, the Asian hornet is also a serious predator of honeybees. Recent studies in France of prey meatballs made by foraging Asian hornets found that 38% of their diet consisted of honey bees, 30% flies and 20% social wasps. What they preyed on depended on where the colony was located. Urban colonies preyed more on honeybees, whereas forest colonies preyed more heavily on social wasps. They found that a single Asian hornet nest consumed an average of 25 lbs of insects in one season!

Surgical Ants

Ants evidently have a number of ways of dealing with injuries of nestmates. *Megaponera analis* ants have a special gland that secretes antimicrobial compounds used to treat injuries. Carpenter ants, *Camponotus floridanus*, found in Florida, lack this gland but instead do either wound cleaning with their mouthparts or surgical amputation, with their jaws depending on the injury.

Camponotus floridanus worker. Photo by Alex Wild.

ASK THE BUG DOCTOR

If you have an insect question, need advice, want an identification of something you've found, or would like to see an article in the newsletter on a particular topic let us know. Email us at bmuseum@ucdavis.edu.

World's Biggest Earwig

The Saint Helena Island earwig, *Labidura herculeana*, is the largest known earwig. Adults are more than 3 inches long. The species was originally described by Fabricius in 1798. Sadly, this earwig has not been seen since 1967, despite several searches conducted decades later on this remote island in the south Atlantic.

Predator Versus Predator

Large tarantula eating a toe-biter in Belize. Photo by Emma Joachim.

During the latest collecting trip to Belize this summer. The team from UC Davis ran blacklights and sheets to collect night-flying insects. Emma Joachim photographed this large tarantula catching an equally large belostomatid toe biter on the blacklight sheet.

Incredible Mimicry

Twig caterpillar, probably a species of *Ennomos* (Geometridae). Photo by Donna Hauser.

Ennomos caterpillars are incredible mimics of inedible things like twigs. The larvae feed on the leaves of a variety of common trees, such as elms, oaks and maples. The adult moths are unremarkable greys, browns and white.

Static Electricity

Pipevine swallowtail butterfly. Photo by Kathy Keatley Garvey.

A study by a team from the University of Bristol discovered that butterflies and moths collect static electricity when they fly. This in turn causes them to collect pollen grains on their bodies when they visit flowers. So, unlike bees, butterflies and moths don't need to expend any energy to collect pollen and yet provide pollination services for some of the plants they visit.

Mantis Eyes

Mantis head. Photo by museum staff.

Praying mantises are unusual among insects because the position and orientation of their eyes gives them binocular vision with depth perception. This gives them vision in three dimensional space. Engineers at the University of Virginia School of Engineering and Applied Science are using this design to create artificial "eyes" for machines.

State Insects

In the U.S., the majority of states have an official state insect. Most of these insects are colorful or cute, butterflies, bees and ladybugs. Fifteen states have the exotic European honeybee as their state insect. The exceptions are new Mexico, with the tarantula hawk wasp and South Carolina and Connecticut's state insect, the mantis. In Connecticut, several school groups are petitioning their legislature to replace the exotic Carolina mantis with the spring azure butterfly, *Celastrina ladon* tiny blue lycaenid butterfly.

Spring azure butterfly. Photo by Walter Siegmund, courtesy of Wikipedia.

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Don't Miss the
Museum Halloween Party
Oct. 26!