Flight of the Lady Beetles

By Lynn Kimsey

One of the more unusual seasonal occurrences in California is the biannual migration of the convergent lady beetle, *Hippodamia convergens*. These beetles are known to overwinter in large aggregations in different parts of the coastal range and Sierra Nevada foothills and the Internet has many photographs posted of these beetle masses. What aren’t commonly observed are the migrations of other insects that co-occur with the lady beetle migrations.

The unusual topography and climate of central California directly influences movement of these insects. In the case of lady beetles, their larvae feed on aphids for the most part. As a consequence, the adult beetles time their activities with the seasonal presence of aphids. Aphids are most abundant in the spring in our region when everything is green and lush. All of a sudden they appear on our roses, in alfalfa fields, and bright orange ones on milkweeds. Shortly thereafter the lady beetles appear. In February and March lady beetles born the previous year migrate into the Central Valley. By May most of the original adults have died and the new crop of adults are emerging. But when these new adults emerge the Central Valley is usually hot and dry, except in irrigated areas, such as gardens and alfalfa, as a consequence aphid populations have declined. This is when the next migration takes place.

During May and June in the mornings when winds are calm, the beetles begin flying as soon as the temperatures rise above 63°F. By mid-morning winds blowing from the west carry them east towards the Sierra. They cannot fly at temperatures near freezing, so when they reach altitudes with these temperatures they fall until the temperatures are warm enough for them to begin flying again. This migration takes them into the high Sierra, where they form small, widespread aggregations. As the summer proceeds they feed on nectar and pollen to store nutrients for overwintering. By fall they begin migrating downhill, gathering in large aggregations at mid to low elevations (2,000-5,000 ft) where they remain through the winter until temperatures begin to warm in the spring.

In February and March, when temperatures begin to warm in the Sierra the beetles begin flying back into the valley. They are carried to the west...
We survived yet another Picnic Day! Finally, the weather was awesome; for the most part warm and sunny. The number of visitors to the Bohart was somewhat lower than last year probably because of the great outdoor weather. Even so more than 2,000 visitors came to the Bohart between 10 am and 3 pm. It was all-hands on deck - Emma Cluff, Noah Crockette, Brennen Dyer, Jessica Gillung, Charlotte Herbert, Steve, James and Anita Heydon, Crystal Homicz, Minsu Kang, Fran Keller, Ziad Khouri, Lynn Kimsey, Karissa Merritt, Jeff Smith, Wade Spencer and Robbin Thorp all helped out.

We had lots of displays of big insects and the petting zoo was heavily petted. Emma, Charlotte and Noah spent hours holding walking sticks and offering them to visitors to hold. Robbin Thorp brought live male carpenter bees for visitors to touch and ask questions about. Brennen and Fran staffed the gift shop and counted visitors as they arrived in the museum. The rest of us answered questions and pointed out insects of interest in displays. We had many families visit and spend a significant amount of time looking and asking questions.

In keeping with our lady beetle theme, the Bohart has new lady beetle t-shirts. Charlotte Herbert and Fran Keller did the design.

The Bohart crew below is modeling our newest t-shirt. In the top row, from left to right are Emma Cluff, Tabatha Yang, Lynn Kimsey, Steve Heydon. On the bottom row, left to right are Charlotte Herbert, Jessica Gillung and Wade Spencer.

To get one stop by the Bohart. We have toddler sizes in gray, youth in gold and teal, adult sized in gray and teal.

Emeritus Professor Robbin Thorp showing Adne Burruss the teddy bear carpenter bee shown above. Photos courtesy of Kathy Keatley Garvey.

Crystal Homicz showing how one of our scorpions glows under ultraviolet light (above). Photo courtesy of Kathy Keatley Garvey.

Entomology Club black widow float and bee (above)! Photo courtesy of Melissa Cruz.
MORE MUSEUM NEWS

LepNet Project

This past summer we joined a group of museums in a National Science Foundation funded grant to database our collections of butterflies and moths.

The object of this four-year project is to database and image as many butterfly and moth specimens as possible. We are collaborating with thirty collections in 27 states.

We estimate that the Bohart collection of butterflies and moths contains 322,000 specimens. The quality of our holdings can be traced to both our collectors and to Jeff Smith who has single handedly spread the wings on tens of thousands of them as well as spending hours/days/years identifying and organizing the collection.

We have two students, Wade Spencer and Brennen Dyer working on databasing specimens and doing the imaging of a selection of each species. While the students are doing butterflies, Jeff Smith is databasing noctuids (sorry Jeff). The image above is typical of the images they’re taking.

Locality information from every collection is being uploaded into a publically accessible Internet website/data server called Symbiota. You can access images and specimen data at the LepNet Portal: http://symbiota4.acis.ufl.edu/scan/lepidoptera/

We won’t get every specimen databased but we’ll do as many as possible. It should be a great resource!

Museum Open Houses This Summer

Special Weekend Hours

CSI Science:
Forensic Entomology
Sunday, July 9
1:00 - 5:00 pm
In collaboration with the North American Forensic Entomology Association.

Celebrating Moths!
Saturday, July 22
8:00 - 11:00 pm
In conjunction with National Moth Week-exploring nighttime nature.

Bark Beetles & Trees:
Forest Health in California
Sunday, August 27
1:00 - 4:00 pm
In collaboration with Dr. Steve Seybold, USDA Forest Service scientist, and his students and staff.

Free parking & admission

Summer 2017

Bohart Museum of Entomology
University of California – Davis
1124 Academic Surge Building
Crocker Lane, Davis, CA 95616
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by northeasterly spring winds. They continue flying until cold nighttime temperatures force them to land. Eventually they reach the Central Valley. The adults that land in the Central valley generally arrive when aphids are most abundant, and conditions are best for them to reproduce.

Convergent lady beetles are also found along the coast of California. These individuals overwinter in aggregations in the Coastal Range, and the beetles that aggregate follow a similar pattern to those in the Sierra. Individuals that overwinter in the coastal range disperse westward to the coast in the spring carried by the same prevailing winds as the Sierran beetles.

A number of aphid species, including the pea (**Acyrthosiphon pisum**), rose (**Macrosiphum rosae**) and milkweed aphids (**Aphis nerii**), follow a similar pattern of dispersal but for different reasons. Pea aphids typically produce wingless daughters until the fall. As days get shorter, and several generations of females have been produced, females begin producing winged migratory male and female offspring. These are carried by eastward blowing fall winds into the Sierra, where they produce eggs that overwinter, often on alternative plant hosts. The following spring these eggs hatch into wingless parthenogenetic females. When these populations become overcrowded they begin producing winged females. These females are carried westward by prevailing winds into the Central Valley arriving a bit before the lady beetles.

Ironically, examination of bug splats on the wings of small private planes at the university airport showed that not only are aphids flying in huge numbers in the spring but they are accompanied by considerable numbers of parasitic braconid wasps that specialize on aphids. It’s not clear where the wasps originate but they are clearly up in the air column with the aphids.

The biology of convergent lady beetles is interesting and more complex than we generally understand. All of the convergent lady beetles sold in garden centers and nurseries are wild harvested. Ordinarily this wouldn’t be a problem but there are some interesting consequences of harvesting them before they begin their migrations. Most of the commercially available lady beetles are harvested from overwintering aggregations in the Sierra, and are kept refrigerated until sold. When they are purchased, for example in Davis, and released into someone’s backyard many of them will stay in place a few days and then continue their migration westward. As a result releasing lady beetles in Davis is really great for folks living further west. If these lady beetles were released in the San Francisco Bay Area many of them will eventually fly out into the Pacific Ocean and die, although who knows, a few might make it to Hawaii... (The species is now known from Hawaii). As a consequence when you go to the beach in the spring you will often see many dead lady beetles in the beach wrack. So even with the best intentions sometimes biology gets in the way.

Regardless, lady bugs are beloved by children and gardeners alike.

*Ladybug! Ladybug! Fly away home. Your house is on fire. And your children all gone. All except one, And that’s little Ann, For she crept under The frying pan.*

Diagram of the seasonal migrations of lady beetles and aphids in central California.
It is surprising how often insects and their relatives become iconic public art. Here are a few flights of arthropod fancy in unexpected places. Some of these are serious public art projects funded by communities or companies, others are iconic folk art projects. All have resulted in some pretty surprising public art as you can see below.

Strange giant spiders discovered in Wolf Creek, Oregon. Photo and discovery courtesy of Eddie Baumann.


Astonishing roof painting of harvestmen on the Seattle Center Armory by artist and illustrator Marlin Peterson, viewed from the top of the Seattle Space Needle. Photo by LS Kimsey.

UC Davis Häagen Dazs honey bee garden. Honey bee sculpture “Miss Bee Haven” by Donna Billick. Photo by Kathy Keatley Garvey.

Flies on the Wall, by artist Sam Poe in downtown Bisbee, Arizona. Photo by LS Kimsey.
OK this is not directly about insects, but one of the unforeseen consequences of collecting insects is that sometimes you get more than you bargained for. Large bodied insects, such as Jerusalem crickets and katydids are sometimes parasitized by what are commonly known as horsehair or Gordian worms. Gordian because of the adult worms tendency to coil themselves into dense “Gordian” knots during mating.

Horsehair worms belong to a phylum of parasitic worms, the Nematomorpha, which resemble enormous nematodes. They parasitize a wide range of invertebrates, including beetles, cockroaches, various orthopteroids, mantids and even crustaceans. They are generally 2-4 inches long but they have been recorded to be as long as 2 meters. Even the longest individuals are only a few millimeters wide.

Adult horsehair worms are free-living in aquatic (freshwater or marine) situations. They are commonly observed in ponds, livestock watering troughs and similar situations. They get there by making their hosts drown themselves in water.

Larval stages are parasitic. Eggs are laid in gelatinous ropes. When the larvae hatch they apparently form a protective covering and wait to be eaten by an aquatic insect that is then eaten by the appropriate host. This works because even crickets will scavenge sick or dead insects. Once ingested the worm larvae penetrate the host’s gut wall moving into the body cavity where they absorb nutrients from the insect’s blood. It takes weeks to months for them to become adults.

Infection by horsehair worms changes the behavior of the host. During the development the worm prevents the insect from doing normal activities such as chirping and once the adult is ready to emerge, the worm causes the insect to search for water and dive in. Thus the adult worm emerges into water where it can complete its reproductive cycle.

These worms are harmless to vertebrates, for the most part, though there are unconfirmed reports of humans and dogs being infected. But really there is no need for concern.

There are some great myths about these worms. They were originally called horsehair worms because it was thought that they were real horse mane or tail hairs that fell into water and came to life, but then we used to think that geese came from barnacles...

This peculiar aculeate wasp was discovered by Lucas Perillo, graduate student at the Universidad Federal, Minas Gerais, Brazil. Its pretty small, less than half an inch long. According to Celso Azevedo it is not a bethylid. I’m pretty sure its not a tiphiid. Also, its not a male ant according to Brendon Boudinot. We do not know what family it belongs to so if any of you have any ideas please let us know.

Mystery wasp (left), Lucas Perillo (above right), and collecting site for the wasp in Serra do Cipó in Minas Gerais, Brazil (right). Photos by Lucas Perillo.
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.

Endangered Bumblebees

Several bumble bee species appear to be going extinct. Robbin Thorp at UC Davis has been searching for Franklin’s bumble bee (*Bombus franklini*) populations for several years and has been unable to find individuals throughout its historical range.

The eastern North America rusty patched bumble bee, *Bombus affinis*, is another disappearing bee. The name derives from an orange patch on the top of the second abdominal segment in workers and males.

Once common throughout the eastern U.S. and upper Midwest the distribution of this bumble bee has shrunk by nearly 90% in recent years. It was once an important pollinator of native wildflowers and some crops.

Concern about the future survival of the rusty patched bumble bee led the Xerces Society to file a petition with the U.S. Fish and Wildlife Service (USFWS) to list the bee as endangered. In 2016 the USFWS finalized their decision and in January 2017 the rusty patched bumble bee was given endangered status under the Endangered Species Act.

Ticks Galore

Aside from flooding, another unfortunate consequence of our long, cool, wet spring is that ticks have never been so abundant for so long.

Two species are most commonly encountered by hikers and dogs, the Pacific Coast tick, *Dermacentor occidentalis*, and the western black-legged tick, *Ixodes pacificus*. The black-legged tick is most abundant in the winter/early spring until the rains stop and temperatures rise (you see where I’m going with this…). The Pacific Coast tick is more common as temperatures rise and the rains stop.

The black legged tick is a potential vector of the Lyme disease pathogen. It also has a nasty bite; you might think of this tick as being venomous. The bite can cause intense inflammation and even a bulls-eye ring around the bite site. Although this is often interpreted to be a sign of Lyme disease it is primarily caused by the salivary products that the tick injects when it feeds.

This tick has been active in coastal areas for months longer this year than it normally occurs.

We haven’t seen many Pacific Coast ticks, yet but as conditions dry they will undoubtedly become more abundant.

For more information on California ticks go to: http://entomology.ucdavis.edu/Faculty/Robert_B_Kimsey/Kimsey_Research/California_Ticks/

Crane Flies by Any Other Name

Spring is also the time when large numbers of flies with long, spindly legs emerge and bumble around lights, and pretty much everywhere out-of-doors.

These often large flies have all kinds of common names, including crane flies, daddy-long-legs, mosquito eaters, mosquito hawks, and in the case of their larvae leather backs.

Adult crane flies do not eat mosquitoes, or for that matter much of anything else. They are harmless and their principle role is to mate and lay eggs.

The larvae of crane flies live in the soil and sometimes in rotting wood. They feed on decaying plant material and sometimes roots, particularly grass roots.

Errata (Oh no not again…)

This seems to be the article that I just can’t get right. The genus name of the bumble bee-imitating robberfly in the fall 2016 newsletter was first listed as *Laphria*, which was incorrect. In the process of giving the correct genus name, which as pointed out by several members, I misspelled the genus name. So here is the correct spelling—*Mallophora*, as pointed out by Henry Hespenheide.