SPOTLIGHT ON A SPECIES

Kissing Bugs

By Lynn S. Kimsey

The bug family Reduviidae consists of a diverse group of mostly predatory insects. One of the more notorious members in the family are the so-called kissing bugs. Kissing bugs all belong to the subfamily Triatominae, which includes about 140 species. Most species occur in the Americas, with the exception of one group found in India and one species, Triatoma rubrofasciata, which is found across the globe. Twelve species are found in the United States according to the UC Riverside website: http://www.heteroptera.ucr.edu/index.php/research/reduviidae/triatominae.

Unlike other assassin bugs, all larval and adult kissing bugs feed exclusively on the blood of birds and mammals. They typically live in their host’s nests and feed on them when the hosts are sleeping. In California, kissing bugs are generally found in the nests of wood rats or pack rats (Neotoma).

We tend to think of insect parasites as being pretty small, like bedbugs and lice. However, kissing bugs are large, with adults averaging about 1 inch in length. They have a long narrow head and the mouthparts are modified into a long, apically pointed tube. At rest this tube is folded up under the body. When they feed they stick it out in front to insert it into the skin. The mandibles are long slender rods held inside the tubular sheath. They are used to pierce the skin.

Adult kissing bugs have wings and can fly if they have to. Juveniles never have wings, only progressively larger and larger wing buds. The abdomen is large and ovoid, with an elastic, rubbery sidewall. When they feed this elastic sidewall expands allowing them to take in a large amount of blood at one feeding. The kissing bug’s pharynx can generate suction pressures of 3-6 atmospheres. This makes the blood rush in to the pharynx at rate of 4 m/sec. You have to wonder what keeps the bug from exploding. However, they don’t explode because a series of valves in their digestive tract regulates the flow of blood. Some species excrete excess blood and digested materials during feeding.

The species most commonly found in California is Triatoma protracta. This is a large black or dark brown insect, with slightly paler wings and a long narrow head. Immature forms closely resemble adults except that they lack wings. In California these bugs primarily occur in the hill country in summer.

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Rykman Collection Donation

Professor Raymond E. Ryckman, from Loma Linda University, donated his impressive collection of triatomine kissing bugs, and many other insects, to the Bohart Museum this year. His collection is the result of his research spanning more than half a century. Dr. Ryckman is one of the foremost scientists studying the blood-feeding kissing bugs and the pathogens like Chagas’ Disease they transmit to millions in the Americas. The collection contains more than 25,000 specimens and includes 18 species of kissing bugs as well as 11 species of Tsetse fly and others parasitic insects and insects reared from rotting cacti in Arizona and Mexico that were part of his thesis research.

His research spanned a diversity of medically important insect groups. In graduate school he studied the insects that bred in rotting cacti. A seemingly unlikely place for insects, yet he found an entire guild of insects, including biting flies that spend their lives associated with cacti.

At Loma Linda University he began what would be a lifelong study of kissing bugs. He published more than 100 papers and books on the group, including an enormous database on Chagas’ Disease and its kissing bug vectors that assembled more than 23,000 references on the subject. He also undertook crossing experiments to look at species and population characteristics and studied the pathogenicity of the protozoa that cause Chagas’ Disease from different parts of the Americas.

Dr. Ryckman in the lab in the 1950’s.

Dr. Ryckman also studied plague as part of Operation Whitecoat, funded by the U.S. Army at Fort Detrick, Maryland. He developed protocols for protecting troops and civilians from the disease.

His collection is a tremendous addition to the Bohart Museum and we are honored that he thought of us to take care of it.

Moving On

Toheed Iqbal has finished his 6 month fellowship to work in the museum and has returned to Pakistan. His thesis is to describe the chalcidid wasps of Pakistan. During his stay in Davis he identified and described 11 genera and 26 species of chalcidids in the Khyber Pakhtunkhwa Region of Pakistan where he attends the University of Agriculture Peshawar.

We wish him luck and hope he’ll be back to visit, or maybe return to work as a postdoc in the museum.

Open House Schedule 2014-2015

Saturday, Sept. 27—How to be an Entomologist
Sunday, Nov. 1—Bugs and Beer at the Mondavi Food & Wine Institute
Saturday, Nov. 22—Insect Myths
Saturday, Dec. 20—Insects and Art
Sunday, January 11—Parasitoid-Palooza
Sunday, February 8—Biodiversity Museum Day!
Saturday, March 14—Pollination Nation
Saturday, April 18—Picnic Day
Saturday, May 16—Name that bug! How about Bob?
Saturday, July 18—Moth Night (This would be an evening event from 7-10 pm with blacklights)

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At the invitation of Michael Powers from the Fresno office of the U.S. Bureau of Land Management, Bohart Museum staff and the UC Davis Entomology Club went on a collecting trip to the Monvero Dunes.

These dunes are part of the Monocline Ridge located in western Fresno County. They are a bizarre set of ridge top sand dunes. The dunes are perched 900 feet above the floor of the Central Valley and you can actually look down on Interstate 5 from the top of the dunes.

It seems bizarre that there would be sand dunes on the top of a ridge. However, they may be quite ancient. In addition to desert plants, we found fossil seashells in stones on the dunes. The Monocline Ridge is evidently a series of fossilized sand dunes that are up to 110 million years old. They consist of sandstone and kaoline clay shale. According to Mike Powers a Plesiosaur skeleton was excavated at the base of the ridge not too far from where the group photo below was taken.

The top of these dunes also seemed to have been an ancient native American camp site. We found pieces of flints and other objects that indicated their presence, as well as a patch of dock (Rumex) that appeared to have been “planted” by native peoples.

The dunes are topped by large, ancient Mormon tea (Ephedra) shrubs and a number of other plant species known primarily from the Mojave Desert, including sand verbena. In addition, we observed buckwheat (Eriogonum), Phacelia and many other species that would be great insect attractors in the spring.

By the time we visited the dunes in May things were pretty dry, but you could see the remains of a fairly impressive spring bloom even in a drought year. We collected roughly 39 species of insects in six orders. Not bad for a really hot, dry day in May.
the state’s mountain ranges, and in desert washes, where they live in rodent nests.

*Triatoma protracta* has a relatively simple biology. During the warm months it takes about 4 months to go from an egg to an adult. They consume quite a few blood meals as they grow. Kissing bugs need 3-4 to fully develop, and five more meals before they can molt to the adult stage. Furthermore, adult females take a blood meal for each batch of eggs they produce. Feeding generally takes 10-15 minutes and these bugs can take in their body weight in blood at each feeding.

These bugs have a well-earned bad reputation. They are called “kissing bugs” because they often bite the thin skin around the lips and eyes of sleeping persons. These bugs are nocturnal and hide in cracks and crevices by day. During the night they leave their hiding places searching for sleeping hosts to feed on. Aside from the ick factor, kissing bugs can cause disease. Because they are blood feeders they are well-suited to transmit pathogens to their hosts. Kissing bugs are vectors of the Protozoa that cause Chagas’ Disease. In addition, the saliva they inject when they feed contains proteins and other compounds that can trigger allergic reactions. About 7% of people bitten develop severe allergic reactions to the bite itself.

Fortunately, the California species apparently do not transmit human pathogens, although they do carry the Protozoa that cause Chagas’ Disease. It may very well be that their behavior makes them poor vectors.

Chagas’ disease protozoa are not transmitted by bite. They remain in the kissing bug’s gut and are excreted in its droppings. To become infected you have to either scratch the droppings into your skin and/or inhale them. Gross as this sounds people who live in parts of the Americas that have no air conditioning or window screens can be exposed to large numbers of these bugs and high levels of their droppings.

Adult kissing bugs are attracted to lights at night and may enter homes this way. It is important to kill kissing bugs when they are found in or around the home, as they can become established indoors, feeding on you, your family members and your pets.

Fire protection is certainly one of the reasons why it is so important to remove all brush and piles of debris away from homes in California. However, equally important is the relationship between kissing bugs and wood rats. Wood rats build nests in piles of branches, twigs and other debris and will build their nests under or beside structures, which allows ready access to the home by kissing bugs living in the wood rat’s nest.

Pack rat nests are home to a diversity of insects and spiders other than kissing bugs. In a single nest in a wash on the east side of the Algodones Dunes in Imperial County we found *Triatoma* kissing bugs, black widow spiders, fleas, desert recluse spiders and a diversity of beetles. I would not want to be a pack rat!

Kissing bug bites can be recognized by the swelling, and often bruising around the bite wound, usually in areas of thin skin. During feeding the bite is painless. However, these insects are capable of giving a painful defensive bite.

Symptoms caused by their bites can generally be treated with antihistamines and ice packs. However, extensive swelling and any difficulty with breathing are symptoms of an acute allergic reaction and it is essential to get medical assistance as soon as possible. Extreme allergic reactions occur more frequently from kissing bug bites than from the bites of any other North American insects.
MUSEUM NEWS

The Other “Creatures” in the Museum

Visitors always think of the museum’s collections as only housing insects. Yet we actually have collections of most kinds of non-marine invertebrates. The museum collections house seven different phyla of invertebrates, including arthropods, annelid worms (leeches), mollusks, flat worms, water bears, horsehair worms, and velvet worms (onychophorans).

Our arthropod holdings include insects, mites, spiders, harvestmen, scorpions, pseudoscorpions, sun scorpions, whip scorpions, vinegaroons, lung worms, millipedes, centipedes, fairy shrimp, springtails, diplurans and proturans.

Here is a sampling of the different non-insect creatures in our collection.
**The Latest in Sports Nutrition**

A biochemist in Japan published in the Japanese Journal of Physical Fitness that swimming mice fed baby wasp saliva, could swim longer and stronger. As a result of this research he developed a sports drink sold as VAAM in Japan. The saliva comes from the Japanese giant hornet, *Vespa*¹, also known as oosuzumebachi or the giant sparrow bee. Yummy!

*NEW POISONOUS SPIDER IN THE UNITED STATES*

Supposed two striped *Telamonia*.

Three women in North Florida, turned up at hospitals over a 5-day period, all with the same symptoms. Fever, chills, and vomiting, followed by muscular collapse, paralysis, and finally, death. There were no outward signs of trauma.

Autopsy results showed toxicity in the blood. These women did not know each other, and seemed to have nothing in common. It was discovered, however, that they had all visited the same Restaurant (Olive Garden) within days of their deaths. The health department descended on the restaurant, shutting it down. The food, water, and air conditioning were all inspected and tested, to no avail.

The big break came when a waitress at the restaurant was rushed to the hospital with similar symptoms. She told doctors that she had been on vacation, and had only gone to the restaurant to pick up her check. She did not eat or drink while she was there, but had used the restroom.

That is when one toxicologist, remembering an article he had read, drove out to the restaurant, went into the restroom, and lifted the toilet seat. Under the seat, out of normal view, was a small spider.

The spider was captured and brought back to the lab, where it was determined to be the Two-Striped *Telamonia* (*Telamonia dimidiata*), so named because of its reddened flesh color. This spider’s venom is extremely toxic, but can take several days to take effect. They live in cold, dark, damp climates, and toilet rims provide just the right atmosphere.

Several days later a lawyer from Jacksonville showed up at a hospital emergency room. Before his death, he told the doctor, that he had been away on business, had taken a flight from Indonesia, changing planes in Singapore, before returning home. He did not visit (Olive Garden), while there. He did, as did all of the other victims, have what was determined to be a puncture wound, on his right buttock.

Investigators discovered that the flight he was on had originated in India. The Civilian Aeronautics Board (CAB) ordered an immediate inspection of the toilets of all flights from India, and discovered the Two-Striped *Telamonia* (*Telamonia dimidiata*) spider’s nests on 4 different planes!

It is now believed that these spiders can be anywhere in the country. So please, before you use a public toilet, lift the seat to check for spiders. It can save your life!

*Needless-to-say there is no such spider.*

**Spiders Swallowed Annually**

“The average person swallows eight spiders per year.”

According to Snopes.com this urban myth originated in a book on insect folklore published in 1954, which was then repeated in a *PC Professional* article in 1993 to demonstrate how quickly Internet visitors accepted ridiculous “facts” as truths. As a result of this article this “fact” became widely circulated and believed.

There are several reasons why this idea is ridiculous. Spiders found indoors either spend this time in their webs or hunting for insect prey in non-human infested parts of the house. A sleeping human would be threatening to a spider because humans give off several kinds of vibrations, heart beat, snoring or at least deep breathing, that would warn spiders of danger. Spiders cannot hear but they detect vibrations through their legs. Big vibrations usually mean danger, which is something they avoid.

**Winged Killer Spiders**

You just have to love Photoshop.

Thanks to Snopes.com again for finding this one. Earlier this year a website service in the UK, Digital Plumbing, published an article about the “Volat-Araneus” to attract viewers to their site. In the article they explained that the whole thing was a ploy to attract visitors. The spider name volat-araneus was made up as was the country of origin, the Republic of Kamistan. The image originated as a spoof fabricated by adding wings and a fake newspaper clipping, and was borrowed by Digital Plumbing for their fake article.

However, pieces of this article including the image made their way into the larger Internet as the real deal.
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.

Ramen Noodle Insect

Recently we were contacted by Andrea Taddei, of the Lombardia Plant Protection Organization in Italy about this peculiar insect on liquidamber trees in Lombardy. Turns out female scale insects in the species *Takahashia japonica* produce these Ramen noodle-like wax strands. This is a Japanese species that evidently has gotten introduced into Italy.

Burning Down the House

Every year someone sets fire to their house or apartment trying to kill a spider. The most recent, in Seattle involved a cigarette lighter and a can of spray paint. In another case a lighter was used to set fire to towels. Clearly some people should not be allowed to have lighters. Folks, don’t do this even outside.

Flies and the Founding Fathers

We always talk about insects having a profound impact on our lives, but just think how the U.S. Declaration of Independence might have turned out if not for some very annoying insects:


“During the 2d, 3d, and 4th of July, Congress were engaged in reviewing the Declaration. Thursday, the fourth, was a hot day; the session lasted many hours; members were tired and impatient. Mr. Jefferson used to relate, with much merriment, that the final signing of the Declaration of Independence was hastened by an absurdly trivial cause.

Near the hall in which the debates were then held was a livery-stable, from which swarms of flies came into the open windows, and assailed the silk-stocked legs of honorable members. Handkerchief in hand, they lashed the flies with such vigor as they could command on a July afternoon; but the annoyance became at length so extreme as to render them impatient of delay, and they made haste to bring the momentous business to a conclusion.”

Another Oak Killer in California

For a number of years California oaks and tanoaks have been suffering from sudden oak death, caused by the fungus *Phytophthora ramorum*. The disease was first reported in California in 1995 and has spread mostly throughout north coastal areas.

Although the pathogen is known the transmission cycle is still unclear. It is still really unknown if insects are involved in the transmission of this fungus.

But now coastal live oaks in southern California are dying from yet another fungus. This one is insect vectored. The pathogen, *Geosmithia pallida* is related to the fungus infecting walnuts. The oak fungus is carried from tree to tree by the western oak bark beetle, *Pseudopityophthorus pubipennis*. The fungus causes foamy bark canker disease.

Unlike sudden oak death, foamy bark canker causes pale colored, foamy lesions on the tree trunk. In sudden oak death the lesions are black.

So far the disease has only been found in coastal southern California oak forests.

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Horsefly. Photo courtesy of Alex Wild

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A cinnamon colored gum, followed by a creamy, foamy sap, running down the bark. Photo credit: Rebecca Latta.