



Redwood Barn Nursery

1607 Fifth Street Davis, California

Pest Notes to close out 2017

I don't often get excited about pheromones. Well, not insect pheromones, anyway. But I do like the citrus I pick this time of year.

Pheromones are the sex lures insects and animals use to attract their mates. There is a long history of their use in plant pest management for trapping and monitoring, and even to spray in order to confuse and disrupt insect mating.

So a recent article by Kathy Keatley Garvey, published Dec 5 in her blog Bug Squad¹ and reprinted in The Davis Enterprise, sparked a lot of excitement among citrus growers, entomologists, and gardeners in California.

“In a ground-breaking discovery encompassing six years of research, an international team of scientists led by UC Davis chemical ecologist Walter Leal announced they've identified the sex pheromone of the pest [Asian citrus psyllid], which feeds on citrus and transmits the bacteria that causes the deadly citrus greening disease known as Huanglongbing (HLB).”

What does this mean? This is a very promising development for our ability to manage the pest that spreads the disease, and help to protect our citrus trees in orchards and in our home gardens.

What is HLB? Where has it been found?

Huanglongbing is a bacterial disease that goes by the common name “citrus greening.” The fruit is partly green when it's ripe; yield, fruit size, juice, and sugar content decline. There are leaf yellowing symptoms, but they are likely the result of root decline and look much like common nutrient deficiencies in our area. Infected trees decline and die in a few years. This disease has been devastating to the Florida orange juice industry, with a large percentage of trees now infected and groves being destroyed every year.

The disease has been found on trees in two counties in Southern California, so there are now strict quarantines in place for those (Los Angeles and Riverside) and their adjoining counties (Orange and San Bernardino). The trees have been destroyed.

What is the Asian citrus psyllid?

Psyllids are true bugs in the same family, Hemiptera, that includes aphids, leafhoppers, mealybugs, scale, whiteflies, and other well-known pests. All members of the family have sucking mouthparts which they poke into plants to suck their juices. Many coevolved with specific hosts; that is, they only feed on certain plants. In the process of feeding they inject a small amount of saliva which can contain diseases such as bacteria and viruses, just as mosquitoes do when they feed on us.

As with many human diseases, HLB is transmitted from one citrus tree to another by the insect, which is called a vector. It feeds on a diseased tree, then flies to the next tree and infects it as it pokes its proboscis in to suck the juices.

The psyllid can fly readily from tree to tree. Researchers in Florida trapped and marked insects with benign proteins (great summer job, kids!) and then released them. Within 3 days they had

¹ <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=25808>



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moved 100 yards. In four days they could move 400 yards. Then further research found that they could travel “at least 1.25 miles within a period of approximately 12 days. Also, we have found that psyllid movement was not inhibited by potential geographic barriers such as roads and fallow fields.”² Then they put tethers on them (seriously) and allowed them to fly unrestrained around a pivot point, demonstrating that “psyllids are capable of approximately 50 minutes of continuous flight and up to nearly one mile of continuous flight.”

Why does it matter if the insect is here if the disease is only in two places in So Cal?

Once a population infests an area, it spreads out quickly. The psyllid (sill-id, the p is silent) has now spread to 26 counties, including Yolo (one found in West Sac) and Solano (one found in Fairfield and in Dixon).

Each find leads to a monitoring and quarantine procedure for the county or locale. Traps are hung on trees through the area and monitored by ag department officials. Presence of the psyllid will lead to treatment of the trees. Abandoned and residential citrus trees are an especial concern.

The most common way the pest and/or the disease will enter a new area is by humans carrying them there: on young tree, foliage, or fruit of citrus from infested/infected parts of the state. I really wish we could just issue a simple edict statewide: *don't carry any part of a citrus tree anywhere!*

Ok, one exception: you can juice the fruit and take it that way. Juice only. NO leaves, branches, young trees, fruit, flowers. If you go and visit grandma in LA and she's got the best oranges, RESIST the temptation to bring home a bag of them. Juice them there if you must and carry the juice with you. All other parts of the tree remain behind!

But I'm not emperor, and state agencies are much more cautious. They enact local quarantines when a county is infested, and count on you all to become informed enough to behave properly. So when a family moved to Lincoln, in Placer County, and brought some little trees with them – little trees that happened to have some Asian citrus psyllids on them – here is what happened to them and to their neighbors, as stated on page 2 of the 15 page order that resulted:

“To treat ACP in this area, I am ordering ground applications [of pesticides] of all ACP hosts within a 100- to 400- meter radius around the detection sites.”³ – CA Secretary of Agriculture. Oops.

Not to mention placing 5 to 16 traps per square mile in the area, to be monitored every 2 to 4 weeks, replaced every 4 to 8 weeks, and so on. The materials used to treat trees are synthetic pyrethroids, and systemics. There is no organic alternative acceptable to the ag department.

Dr. Leal's achievement will make it much easier to trap and monitor the presence of the psyllids. Presently ag officials use yellow sticky traps. It's an oddity of the insect world that many will veer toward and fly into things that are painted bright yellow ('clown yellow' is the official color

² http://www.crec.ifas.ufl.edu/extension/trade_journals/2012/2012_July_Psyllids_move.pdf

³

<https://www.cdfa.ca.gov/plant/pdep/treatment/notices/2016/ACPNOTLincolnPlacerCounty092016.pdf>



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name), so you just put a resin on the yellow card and they meet their demise. But they have to be pretty near the trap for that to work. Lure it with pheromones and they'll come from all over. Pheromones volatilize and drift and lure insects toward the source where they meet a sticky death.

An infestation will be spotted much sooner and treatment can be preventative. Ultimately, if past efforts are any indication, it may be possible to spray pheromones in an area to disrupt mating. This new pheromone is not a panacea, it's just a much more effective and efficient monitoring tool with potential as a safe treatment alternative as well.

But keep in mind that this is for the insect (the vector), not the disease. It's up to you and me to keep the insect and the disease from moving around the state if we want to keep growing and enjoying citrus.

Speaking of hemipterous pests....

A Davis resident recently found a relatively new pest to our area in the vicinity of 10th and F: a brown marmorated stink bug.

Stink bugs are annoying pests in the garden because they cause blemishes and bad spots on soft fruits such as tomatoes and peaches. We've always had some types of stink bugs here, and you may already see damaged areas on your summer fruit from them. Population levels are generally not severe, as various other insects as well as large birds such as jays and mockingbirds prey on them. In a diverse and healthy garden, a few stink bugs cause little damage.

The brown marmorated stink bug was first reported in the mid-Atlantic states about 2000, and has spread or been introduced into all but 10 states since then. Large populations were found in downtown Sacramento in 2013, and it is spreading east into the urban parts of Sacramento very steadily. Individual bugs were confirmed in Davis in 2011-12 and 2014.

It has become a major agricultural pest in those first states, and is causing minor problems (so far) in the rest. One of its notable characteristics is aggregation in large numbers on warm surfaces in late fall: the south-facing side of a tree trunk or wall, or around your windows and doors. They are definitely a nuisance and "emit a pungent cilantro-like odor."⁴

Unlike the Asian citrus psyllid, the brown marmorated stink bug feeds on hundreds of species of plants, damaging a wide range of fruit and vegetable crops, and they feed on the fruit, seeds, leaves, and stems of many garden ornamentals as well. Damage to the fruit consists of pits on the surface and areas that are pithy in the flesh. Those can be cut out. But if there are large numbers of the pest, the crop can be seriously damaged.

Sprays aren't very effective. Large aggregations can be vacuumed up, though you may wish to dedicate a vacuum just to that purpose. Research on management of this pest has focused on introduction of natural predators, and the results look promising.

The Cooperative Extension personnel in local counties are monitoring the pest. Chuck Ingels of Sacramento County has lots of information on his site:

http://ccag-eh.ucanr.edu/Brown_Marmorated_Stink_Bug/

⁴ <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=20352>



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Locally, Karey Windbiel-Rojas, author of the Urban Pest News blog⁵ asks that sightings be reported to her at <http://ucanr.edu/survey/survey.cfm?surveynumber=21733>

How about something more upbeat?

Gardeners love to bring butterflies into their yards. The most effective approach is to plant a diverse set of plants to provide flowers over the longest possible season, increasing the likelihood that adult butterflies will wander in. But sometimes we can plant larval (caterpillar) food sources and establish our own local populations of specific butterflies.

Certain species and varieties of passion flower (*Passiflora*) will host the caterpillars of Gulf fritillary. California pipevine (*Aristolochia californica*) can host caterpillars of the pipevine swallowtail. Milkweed species (*Asclepias*) can sometimes host monarch butterfly larvae, and the flowers attract all kinds of butterflies as well.

And now comes word that another, low-water garden plant called firecracker plant (*Russellia equisetiformis*), acts as a host to the caterpillars of yet another butterfly, the common buckeye. Garvey writes in her blog that Davis resident Ria de Grassi found them feeding on her firecracker plant this summer, and local butterfly expert Art Shapiro identified them and subsequently found some of the caterpillars on a *Russellia* plant on campus. This is the first known record of this feeding behavior.

The plant has a loose, mounding habit with bright red tubular flowers over a long season. It mixes well with California native plants, and Mediterranean species in drought-tolerant landscapes. We already plant it to attract hummingbirds, and now we have the added benefit of establishing more butterflies in our gardens. Bear in mind that when we say “larval food source” we mean that caterpillars will be eating your plants! The tradeoff is lovely butterflies.

References:

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http://www.crec.ifas.ufl.edu/extension/trade_journals/2012/2012_July_Psyllids_move.pdf

<https://www.cdfa.ca.gov/plant/pdep/treatment/notices/2016/ACPNOTLincolnPlacerCounty092016.pdf>

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<http://ucanr.edu/blogs/ccurbanpests/index.cfm>

⁵ <http://ucanr.edu/blogs/ccurbanpests/index.cfm>



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Brown marmorated stink bug was introduced on the east coast nearly two decades ago and has now spread or hitchhiked across the country. It feeds on a wide array of garden plants, including many vegetables and fruits. It may not become a major pest in our area, but homeowners often find them crawling in large numbers on the wall and around windows and doors in cold weather. Cooperative Extension personnel want to know if you find any.

Photo by Amy Hiss, used with permission.



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An interesting, long-blooming plant for low-water landscapes, firecracker plant is already used to draw hummingbirds to the garden. Turns out it also provides a food source for caterpillars of the Common buckeye butterfly. The plants are usually available spring through fall, and sometimes at the UC Davis Arboretum plant sales. Photo by [Eurico Zimbres](#), Wikimedia Commons



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Common buckeye

photo by Kathy Keatley Garvey, used with permission

Common buckeye, *Junonia coenia*, is a pretty butterfly with a 2 to 3" wingspan. The adults will visit a variety of flowers in your garden. The caterpillar is spiny, black-and-white, with a bright orange head. Now they have been found feeding on firecracker plant, a great garden ornamental for low-water landscapes.