Spring 2018

Dispatches from the Orchard

University of California Agriculture and Natural Resources
Cooperative Extension
UC CE

Stink Bugs and Lygus Bugs – Bane to Fruits (and nuts, too!)

Stink bugs and plant bugs are a diverse group of insects that can damage fresh fruit and nut crops. They're mobile, making them hard to find and require quick action once found. They cause damage in fruit crops, which is the focus of this article, harvested in May and beyond, as well as almonds and pistachios. The damage they cause to fruit crops will downgrade the quality, and if enough damage is present, rejected loads. Orchards that have not received broad spectrum insecticide applications for several years are particularly at risk.

Redshouldered (top right), green (left), and consperse (bottom) stink bugs. Below: Rough stink bug. Photos: Jack Kelly Clark.

There are multiple types of stink bugs that attack *Prunus* species. You will also be able to find the rough stink bug in orchards, which is a predatory species, so it is important to identify them before deciding whether to treat. See pictures to the left. All feed by inserting piercing-sucking mouthparts into the fruit and sucking out the juices. If the damage done is early in the season in fruit crops, the area will stop growing, resulting in dimples. If the feeding happens later in the season, the area will become white and corky. Later season damage may not show up immediately. In almonds, damage is primarily staining or gumming, and in pistachios it can cause nut drop and kernel necrosis.

Most species overwinter as adults on weeds or nearby vegetation; the green stink bug will overwinter in orchards. The first generation moves into the trees in late spring to early summer, usually as their other feed sources dry up. They lay eggs, and the second generation will continue feeding on the crop. Thus, you need to be looking for insects in the cover crops/resident winter vegetation early in the season, and the fruit themselves later in the season. Once the weather permanently heats up, start monitoring nearby weeds and any orchard vegetation using sweep nets. In May, start monitoring fruit. Since the bugs will often hide behind branches and leaves, it's best to start out looking for damage: gummosis, sunken areas, blue-green spots, or white corky areas under the skin in fruit crops, gummosis in almonds, and damaged nuts in pistachios. Once you find damage, look for the pests or eggs. Stink bugs or their eggs can often be found near damaged fruit, so you won't have to look far.

Lygus bugs are another true bug that cause similar damage to stink bugs, however they primarily damage peaches and nectarines. They prefer weeds and flowering row crops such as legumes and may stay in those crops provided they do not dry out or are not mowed down. The can also move into your orchard from surrounding weedy fields or host crop such as alfalfa. *Calocoris*, a plant bug similar to

Lygus bugs in appearance and life cycle, can also damage shoot tips earlier in the season. Unlike Lygus bugs, it only has one generation per year.

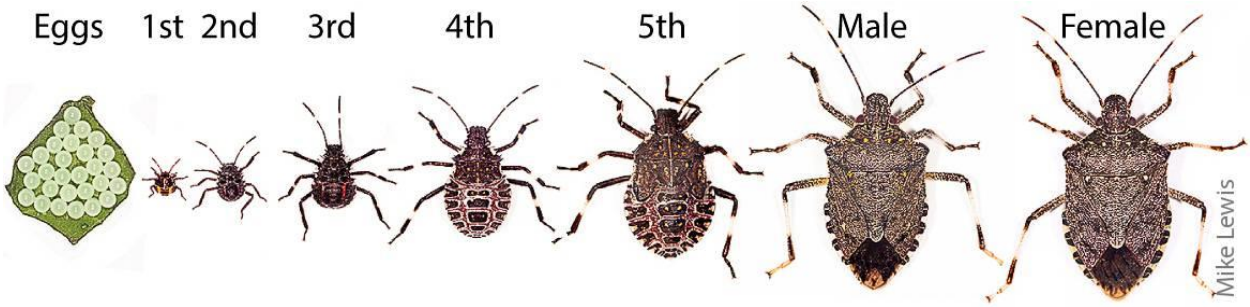
We have no treatment thresholds for stink bugs and plant bugs, so the decision to treat is up to you and your tolerance to damage. Individual insects can cause multiple feeding wounds, so it doesn't take many stink bugs per tree to cause issues. Just keep in mind that the bugs may have moved on by the time you're able to treat. Lygus bugs may be kept in cover crops, however water is needed to maintain them until the fruit is removed from the orchard, which I wouldn't necessarily recommend in dry years like this.

Control of stink bugs and plant bugs can be achieved with broad spectrum insecticides. There are many products available and registration differs by stone crop, so I won't discuss them here. You can find out appropriate materials by visiting www.ipm.ucanr.edu or by talking to your PCA. I would strongly encourage you to confirm that the pests are still present in the orchard before spraying, as broad spectrum insecticide use is strongly correlated to mite outbreaks later in the season. These insecticides kill off natural predators that normally keep mite populations low.

I wanted to give special mention to a new stink bug on the agricultural block: the brown marmorated stink bug. Hopefully at this point you've heard about it already, but if not, it's an invasive stink bug from Asia. It was first found in Pennsylvania and has spread through the Midwest and East Coast states. It has been found in California primarily in urban areas, Fresno city included. Jhalendra Rijal and Roger Duncan, IPM and pomology advisors for Stannislaus county, have found a stable, reproducing population in a peach orchard near Modesto, so they have moved into agricultural areas.

At Risk Crops	**Potential or Unknown Risks**
Apricot	Almond
Cherry	Pistachio
Peach	Plum
Nectarine	Olive

The damage it causes is not unique, however it can build up to large populations and can mass-feed on fruit. We do not fully understand its behavior in California compared to other stink bug populations, but from what we do know, they overwinter in sheltered areas like buildings, as opposed to other stink bug species, which overwinter in plant trash or plants. If you find any brown marmorated stink bugs in agricultural areas, please notify me, other farm advisors, or the agricultural commissioner. We want to monitor its spread through the state, as well as the crops it is found in. Control guidelines have not yet been developed. I monitored for the insects last year in three orchards in Madera County and did not find any.



Brown marmorated stink bug life stages. Photo: Mike Lewis.

Herbicide Application Checklist for Orchard and Vineyard Spraying

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Spring and summer foliar weed sprays will be going out soon in orchards and vineyards to control emerged weeds as winter soil-residual weed sprays begin to lose their punch. When spraying emerged weeds, the goal should be to deliver the spray mix to the weed target as accurately and uniformly as possible to achieve the best possible control for the money. Hopefully, your spray operation is up to par and you achieve effective control of the weed population. If you've had issues in the past with foliar herbicide performance, this would be a good time to check that your spray operation is really where it needs to be. The herbicide products we are able to use in orchards and vineyards provide effective burn-down control of weeds if they are applied accurately, uniformly, and timely. By being prepared ahead of time, especially when it comes to sprayer calibration and spray application, you can avoid many of the problems that can lead to poor herbicide performance and/or crop injury. Like performing routine maintenance on your pickup, good sprayer maintenance, calibration, and application are essential to achieve effective herbicide performance. Although it may take a little longer and costs a few extra bucks to make sure the spray job is done correctly, the added expense will pay off in improved herbicide performance and less re-sprays.

Consider creating a herbicide application checklist, like the one below, to use as a guide for improving your weed spray operation. Also, remember to submit appropriate paperwork ahead of time to your local agricultural commissioner's office, as required.

Weed spray checklist:

- ❑ Products selected according to weeds targeted
- ❑ Rates selected according to local needs
- ❑ Equipment and labor availability
- ❑ Functioning, calibrated sprayer
- ❑ Spray nozzles selected to manage coverage and drift
- ❑ Favorable environmental conditions for spraying
- ❑ Experienced, attentive applicator
- ❑ Follow-up evaluation

☑ <u>Products selected according to weeds targeted</u>

It's important to correctly identify the weeds in your field, so you can choose product(s) that are labeled to control those weeds. If you can't identify the weeds yourself, have someone (farm advisor, crop consultant, chemical rep, etc.) do so for you. Since weed species can vary from field to field, it

may be necessary to use different herbicides for each field. Also, it is usually best to tank-mix at least two herbicides with different herbicide chemistries, or modes-of-action (MOA). Tank-mixing herbicide MOAs usually increases the weed spectrum controlled and helps to manage weed resistance.

☑ Rates selected according to local needs

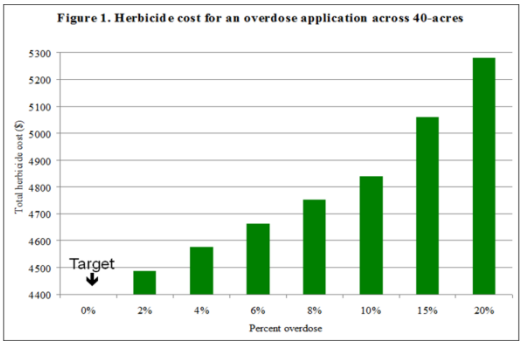
Several factors can influence how herbicide rates are chosen. Probably the most important are stage of weed growth at time of treatment and cost. As weeds become large and mature, herbicide rates usually need to be adjusted upwards, increasing costs. So, spray when weeds are young and tender so you can use lower label rates at a lower cost. However, you should always use label rates designed to control the largest and most difficult weeds to control within the field. Herbicide cost alone should not be used to dictate rate selection.

☑ Equipment and labor availability

Emerged weeds can have high growth rates, some (like Palmer amaranth) doubling in size every couple of days. Therefore, ample spray equipment and personnel should be available to be able to treat the weeds in a timely manner. If it takes several days to treat an entire field, degree of control from start to finish of the application may be different, simply due to differences in weed size prior to actually being treated. Keep in mind, anything that impedes weed spraying (rainfall, sprayer breakdown, high winds, etc.) may impact overall control. In some cases, borrowing or purchasing additional spray equipment may be needed to meet the needs of your spraying operation.

☑ Functioning, calibrated sprayer

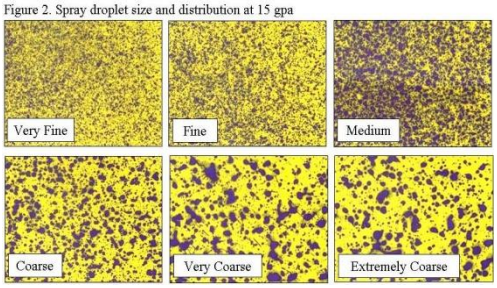
Herbicides need to be applied through spray equipment that is fully functional and calibrated. This helps ensure the proper dose of spray mix is applied to the target site for maximum control. Underdosing a treatment can lead to poor or erratic weed control. Overdosing can damage the crop, increase costs, and in some cases, deem the application illegal (figure 1). Weed sprayers should be in good operating condition. Repair and/or replace parts that are damaged, warn, leaky, and otherwise hinder uniform spray delivery, including hoses, fittings, gaskets, pressure gauges, pumps, and other components. Calibrating the sprayer is important, because it shows how much water and herbicide will need to be added in each spray tank load. There is nothing written in stone as to how often a sprayer needs to be calibrated. But, it would be desirable to perform this task at least once a year; in fall before winter dormant soil-residual treatments go out is a good time. Sprayers should also be calibrated following any repairs to the equipment. Examples of procedures and formulas for calibrating spray equipment can be found in spray nozzle/equipment booklets and the UC IPM website (*http://ipm.ucanr.edu/training/incorporating-calibration.html*).



☑ Spray nozzles selected to manage coverage and drift

Spray nozzle choice directly affect nozzle flow rate, spray droplet size, spray coverage, and drift potential; which directly impacts weed control, economics, and environmental quality. While knowing the total spray volume (gpa) you want to achieve is important for determining how much water you will need, it is more important to understand that spray droplet size and spray coverage have a direct impact on herbicide performance. For herbicides, use spray nozzles at an operating pressure (usually 30-40 psi) that produces spray droplets of "medium" size and larger. Spray nozzles that produce "medium" to "coarse" droplets are ideal for contact and soil-residual herbicides, because they provide near complete coverage of the target area. "Very coarse" and larger droplets are good for systemic herbicides, because complete coverage is generally not needed. "Fine" and smaller sized droplets tend to drift, so should not be used with herbicides. Examples of various spray droplet size and distribution patterns are shown in figure 2. Spray nozzles with a chamber design (like Turbo TeeJet) work well for most contact and systemic herbicides, and nozzles with a venture design (like Air Induction) are suited for systemic herbicides. Replace spray nozzles if their flow rate varies by more than 5% of new nozzles, or if they are warn or damaged. Refer to your local spray equipment and spray nozzle dealer for booklets showing specific spray nozzle recommendations.

Figure 2. Spray droplet size and distribution at 15 gpa



☑ Favorable environmental conditions for spraying

Table 1. Environmental conditions affecting spray drift potential

Environmental condition	More spray drift	Less spray drift
Wind speed	0 to <3 mph; >7 mph	3 to 7 mph
Air temperature	>85°F	<85°F
Relative Humidity	Lower	Higher
Air stability	Inversion layer	No inversion layer
Herbicide volatility	Volatile	Non-volatile

Local weather conditions influence application and spray drift. Wind speed and direction, temperature, and relative humidity should be favorable before treating to minimize drift (table 1). This holds true even if drift-mitigating measures (low-drift nozzles, spray shields, drift retardants, etc.) are being used. Monitor wind speed and wind direction while the field is being treated, so the application can be halted temporarily if spray conditions become unfavorable. Applicators should have an anemometer on hand to periodically measure weather conditions during application.

☑ Experienced, attentive applicator

An experienced, attentive applicator is necessary to make sure an application goes out as accurately and uniformly as possible, with minimal drift. The best calibrated spray rig and herbicides in a spray tank won't give effective weed control unless the applicator makes it happen. Applicators must constantly be aware of issues while spraying that may arise and affect the application, so problems can be rectified immediately. Recognizing when spray nozzles are plugged, spray pressure fluctuates, wind speeds are too high, and spray booms are bouncing too much are just some of the problems that need to be corrected before continuing to spray. The time to smoke, take a lunch break, or use a cell phone, should be done outside the field, so the spray mix can be agitated sufficiently before reentering the

field to continue spraying. This helps alleviate overdosing areas within the field, which can lead to crop injury, as the sprayer restarts following a stoppage.

☑ Follow-up evaluation

Check the success of your application. Evaluate the results within a couple weeks after treatment, looking for areas where spray coverage is lacking and weed escapes occur. Look at several representative areas within the field, especially in high and low-lying areas, as well as wet areas. Use this time and information to fine-tune application procedures if needed before the next spray application to improve control.

Meeting Announcement

Spring Almond Nutrient and Water Management Field Day
Tuesday, March 20th, 2018, Chowchilla, CA
8:30 AM to 1:00 PM

Please join us on Tuesday, March 20th from 8:30 am to 1:00 pm to participate in talks and rotating sessions on best water and nutrient management practices. This event is co-sponsored by UC Cooperative Extension, UC Davis, CDFA-FREP and the Almond Board of California.

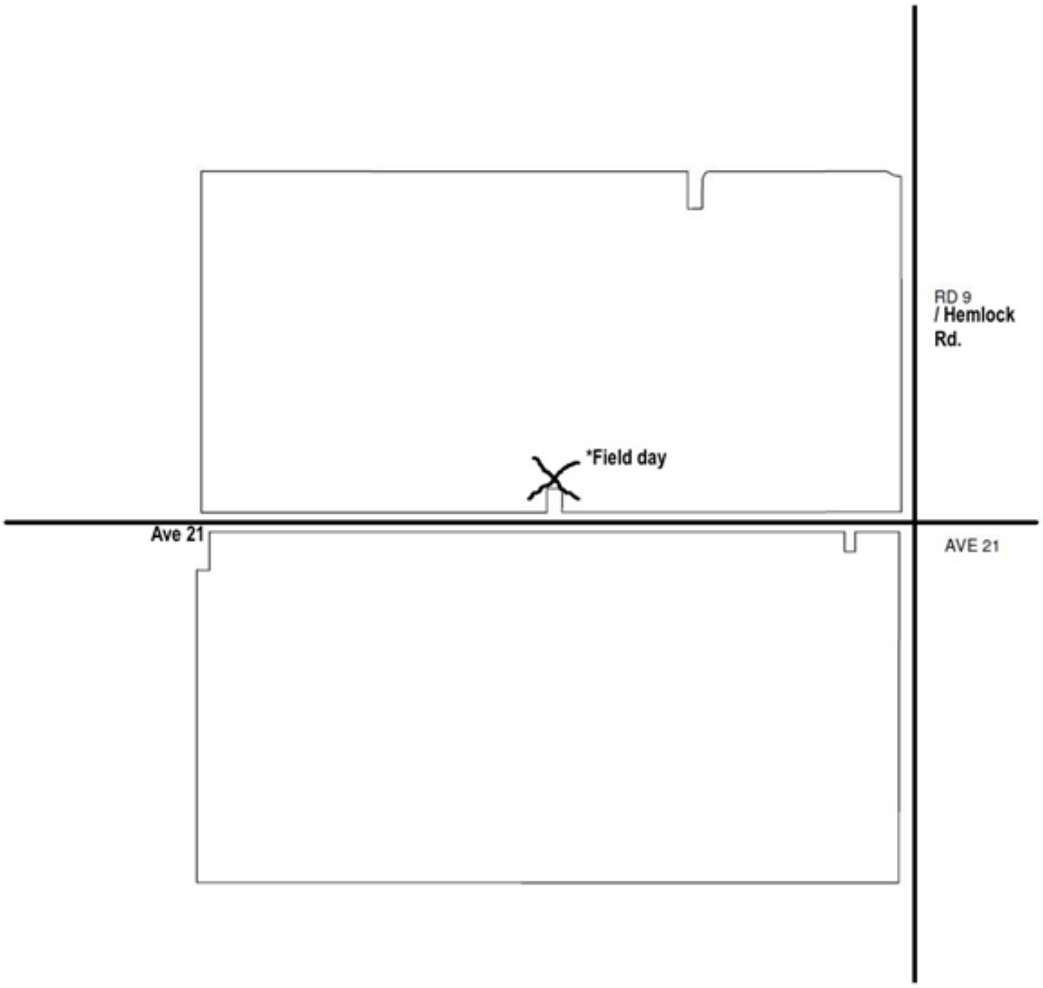
Location: Ash Slough Farms
Ave 21, Chowchilla, CA

Directions: Map on Next Page

Requesting 3.5 Continuing Education Units

Lunch will be provided

RSVP & Register at:
http://cemadera.ucanr.edu
or call 559-675-7879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