HEALTHY FOOD SYSTEMS • HEALTHY ENVIRONMENTS • HEALTHY COMMUNITIES • HEALTHY CALIFORNIANS

University of California
Agriculture and Natural Resources
Making a Difference for California

UCCE

Tree & Vine

JUNE 2011

Central San Joaquin Valley Summer Nut Grower's Meeting

Thursday, June 16th, 2011
Merced UCCE Classroom
2145 Wardrobe Avenue, Merced, CA 95341; 209-385-7403
8:00 AM-12:00 PM

8:00 a.m. **Introduction, PCA and continuing education credits sign-up**
David Doll, Farm Advisor, UCCE Merced County

8:30 a.m. **Coping with and Managing Pesticide Regulations**
Sean Runyon, Deputy Ag Commissioner, Merced County

9:00 a.m. **Fumigant and Possible Fumigant Alternatives for Replanting Almonds**
David Doll, Farm Advisor, UCCE Merced County

9:30 a.m. **Managing Summer Disease of Almond and Pistachio**
Themis Michailides, UC Plant Pathology Specialist, Kearney Ag Center

10:00 a.m. **Break**

10:30 a.m. **Navel Orange Worm Management for Almonds and Pistachios**
Joel Siegel, USDA-ARS, Parlier, CA

11:00 a.m. **Control Strategies for Leaf-Footed Plant bug and Other True Bugs within Almonds and Pistachios**
Walt Bentley, UC IPM Specialist, Kearney Ag Center

11:30 a.m. **Selection, Drift Management, and Increasing Efficiency of Herbicides**
Brad Hanson, UC Specialist, UC Davis

12:00 p.m. **Conclusion**

3.0 hours of PCA, and Private Applicators Credit have been approved - Including 0.5 hours of Laws and Regulations

NEW PEST THREAT IN ORCHARDS – BROWN MARMORATED STINK BUG

Lucia G. Varela and Rachel B. Elkins
University of California Cooperative Extension

The brown marmorated stink bug (BMSB), *Halyomorpha halys*, is native to East Asia, where it is considered a pest damaging many crops. It was first officially identified in North America from specimens collected in Allentown, Pennsylvania in 2001, but is suspected to have been present since 1996, perhaps entering in ship containers. Large populations are now established in the mid-Atlantic region from Virginia to Pennsylvania and lower New York State where severe losses to many crops occurred in 2010. It is known to be established in 15 states and specimens have been detected in another 14 states.

BMSB is a very serious pest because it feeds on a very wide range of host plants and can attain very high population levels on some. It is difficult to control for several reasons: 1) most of the damage occurs between 26-60 days before harvest; 2) it is highly mobile, being more active in the evenings and at night and moving continuously between the crop, weeds and adjacent vegetation; and, 3) high population levels require repeated application of highly toxic insecticides, thereby dismantling current integrated pest management programs for many crops.

BMSB aggregates in very large numbers seeking winter shelter in buildings and houses, and hence has become a serious nuisance in urban areas. It is an excellent "hitchhiker" and so has spread rapidly from the eastern US to the West Coast where it is found in large numbers in the Portland, Oregon metropolitan area (though it has yet to invade the major commercial agricultural areas in that state). According to the Western Plant Diagnostic Network First Detector Newsletter (Vol. 3 (4), Winter 2011), it has been detected in nine counties in California since 2002 and has been intercepted numerous times at border stations. These detections have been associated with vehicles or belongings arriving from the eastern U.S. It is considered to be established, however, only in some highly urbanized cities in Los Angeles County, since 2006.

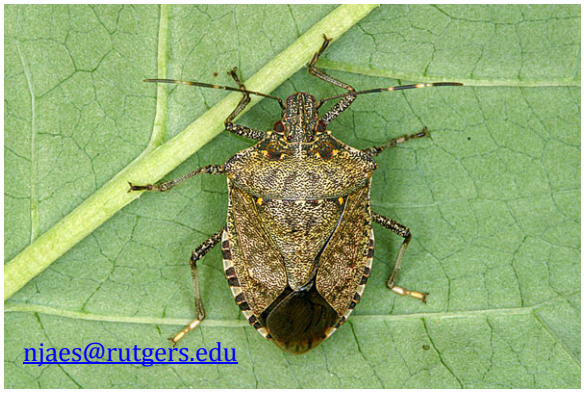
Host Range and Damage

In Asia, BMSB is reported to feed on over 300 host plants including tree fruit, vegetables, shade trees and leguminous crops. It is a most serious pest in apple, cherry, peach, pear, plum, citrus, lima beans and fig. In 2010 in the mid-Atlantic, the crops most affected were apple, pear, apricot, cherry, peach, nectarine, lima bean, snap pea, pepper, sweet corn, tomato, field corn and soybean. Other identified hosts include raspberry, blueberry, grape, hazelnut, pecan, cucumber, and pole and bush bean. The damage in fruits is primarily due to the corky internal damage caused by feeding with piercing and sucking mouthparts.

BMSB damage on Golden Delicious apple in a Pennsylvania orchard.

Be on the alert ● Know how to identify it

The adult BMSB is 0.55 to 0.67 inch (14-17 mm) long, speckled brown. It has copper, bluish-metallic tinted depressions on the head and shield. It can be distinguished from other stink bugs of comparable size and color by the following characteristics: the antennae have two distinct white bands; the margin of the shoulder (thorax) is smooth; the membranous parts of the forewings have dark bands at the tip; and there is a black and white pattern at the edge of the abdomen to the side of the wings.



Eggs are barrel-shaped, laid in clusters of approximately 28 on the underside of leaves. The newly hatched nymph has an orange abdomen with dark brown plates and brown head and thorax. Nymphs first aggregate around the egg mass, then later stages disperse.

It goes through five stages, has dark red eyes and develops wing pads with each successive molt, becoming darker with various shades of brown. It has distinct pale bands on the antennae and legs.

Life Cycle

BMSB overwinters as an adult in a state of facultative diapause (resting stage). It becomes active in the spring and, after feeding for about two weeks, mates, and the female begins to lay eggs, with a range of 212 to 486 per lifetime. In the mid-Atlantic it has one generation per year in Pennsylvania, and two in Maryland. The number of generations may be greater in southern areas. Up to six generations have been reported in southern China.

There are no official California Depart-ment of Food and Agriculture surveys currently being conducted. **If you spot it please report it!**

As BMSB expands its range on the West Coast it will likely continue to be first found in urban areas. Anyone who finds specimens that appear to be brown marmorated stink bug should report them to their local Agricultural Commissioners Office or UC Cooperative Extension Office.

Early Season Fruit Drop in Figs

Maxwell Norton, UC Cooperative Extension

Reports of some of the first crop in Mission figs drying up and dropping can cause some concern. After consulting with three different experts, I cannot offer a solution. All fruit trees and almonds can experience some early season fruit drop for various reasons. Some stone fruit growers may wait till after the spring drop before making final decisions about thinning if that variety has a history of shedding fruit.

It is likely that spring temperatures play a role in the amount of drop. Cold, wet soils may also be a factor. The positive side of any kind of early fruit drop is the remaining fruit may become a little larger in size as the result of less competition.

Using Urea Efficiently

Franz Niederholzer, UC Farm Advisor, Sutter/Yuba/Colusa Counties*

Summary: Soil applied fertilizer is intended for root absorption by plants. Manage fertilizer nitrogen (N) to keep as much of it as possible in the root zone to maximize crop N uptake, crop yield, and protect the environment. To keep urea fertilizer N in the root zone 1) incorporate urea into the soil with water or cultivation within a day or two of application and 2) don't over irrigate when incorporating urea using water. Inject liquid fertilizers containing urea (for example, UAN32) into irrigation systems in the middle third of the irrigation set. This delivers urea N evenly through the root zone, avoiding leaching that can occur when urea is injected too early in the set and limited root zone distribution when injected too late in the set.

Background. Urea is the most commonly used dry nitrogen (N) fertilizer in the U.S. It provides half of the nitrogen in UAN (**U**rea **A**mmonium **N**itrate) 28 or 32 liquid fertilizers. Dry and liquid fertilizers that contain urea have several advantages -- relatively high N content (28-46% N), ease of handling and reasonable price relative to other N sources. However, nitrogen from applied urea can be lost from the root zone when used improperly, wasting money, reducing plant available N, and risking reduced crop growth and yield. The lost N can also be an environmental contaminant. Growers and PCAs should be aware of how to avoid N losses and get the most from urea fertilizer dollars.

Within days of application, urea N can be lost from the crop root zone in two ways – through ammonia volatilization or urea leaching. This article will briefly describe how these losses can occur and how to manage urea to avoid them.

The uncharged urea molecule (H_2N-CO-NH_2) breaks down in or on the soil into two ammonium molecules (NH_4^+) and a bicarbonate molecule (HCO_3^-) within days of application. Urease, a naturally occurring enzyme in soil and on plant surfaces, drives this reaction. Ammonium produced by urea breakdown (urea hydrolysis) has many potential fates. It can shift form to ammonia (NH_3; a gas), a process accelerated by high temperatures (over 70^{o}F) and high pH. It can be held by the cation exchange capacity of clay or organic matter, absorbed by soil microorganisms or plants or changed into nitrate (NO_3^-) by certain soil bacteria (nitrification). Where urea transformation occurs has a major impact on whether the N applied actually enters and stays in the root zone.

Ammonia volatilization. Urea fertilizer – dry or liquid – applied to the soil surface and left there for days to weeks can lose >50% of N content into the air through ammonia volatilization. High soil pH, high soil temps (>70^{o}F), sandy soils with low cation exchange capacity (CEC), weeds or turf, and moist soils/heavy dew are all factors that increase the ammonia losses from unincorporated urea. Incorporate urea into the soil within a day or two of application to avoid significant N loss.

Urea Leaching. Dissolved urea moves with water. Why? Urea hydrolysis takes several days to complete. Until hydrolysis occurs, the uncharged urea molecule won't bind to soil particles. This helps with water incorporation, but can result in leaching of urea below the root zone during irrigation if excess water is applied. The most efficient use of urea fertilizer requires good irrigation management. Don't over irrigate when incorporating surface applications or injecting urea-containing fertilizers through irrigation systems. When injecting urea fertilizer in a micro-irrigations system, a good general rule is to add the fertilizer in the middle third of an efficient irrigation set, a set that won't push water down below the bottom of the root zone. For example, in a 12 hour irrigation set, add the urea in hours 4 to 8. This reduces the chances of pushing urea below the root zone or at least deeper in the root zone where there are fewer roots. Urea-containing fertilizer added late in the set is concentrated near the water source and not evenly distributed in the root zone.

Review. Surface-applied dry or liquid urea fertilizer must be incorporated as soon as possible or significant nitrogen losses can occur. Incorporation within 2 days of application is best. When irrigating to incorporate urea, don't over irrigate. When injecting liquid urea fertilizer into an irrigation system, apply fertilizer in the middle third of the irrigation

set for the most even distribution in the root zone. How you use urea can go a long way to helping you get the most out of your fertilizer dollar.

**Helpful reviews and comments on this article were provided by Rob Mikkelsen, International Plant Nutrition Institute, and Sebastian Braum, Yara North America, Inc.*

Almond Potassium Fertilization: Where did My Potassium Go?

David Doll, Farm Advisor, Merced County

A common question received from growers after they see their leaf sampling results is "How come my potassium levels dropped significantly from last year?" The short answer is that it was removed with last year's harvest, but there are many complicating factors that should be taken in consideration.

Potassium Removal from the Orchard System. Studies by UC Davis have shown that 56 pounds of potassium are removed from the orchard for every 1000 pounds of kernels harvested. From nutrient analysis of the fruit parts, 70-80% of the potassium removed by the harvest is within the hull, while the rest is within the shell and kernel.

Potassium loss from the orchard can also occur through leaching. Leaching of potassium is reduced in soils with high exchange capacities, which includes loams, clays, and silts. Sands and loamy sands have a relatively low exchange capacity, lower amounts will bind to the soil particles. Furthermore, this bond is not as strong within acidic soils which can lead to leaching in areas that are over irrigated or received excessive rainfall.

Since potassium and sodium have the same charge strength, strategies used to move sodium out of the rooting zone will also move potassium as well. These include applications of gypsum or other strongly charged cations to "flush" the system. Excessive applications of water applied as a leaching coefficient may also leach potassium.

Proper Leaf Levels of Potassium. Since Potassium plays a large role in tree health, it is important to maintain proper levels of the nutrient within the tree. A critical leaf value of 1.4% has been established by the University of California and current research has suggested that levels excessively above this value do not increase yields. Recent field studies by Roger Duncan (UCCE Stanislaus) have demonstrated that leaf potassium levels in excess of the 1.6-1.8% range did not increase yield. Through the study, leaf levels between 1.5-1.7% gave the best yield results, with yield decreasing when potassium levels were below this level. Leaf potassium levels higher than this range did not increase yield, and may actually reduce yields if applied in excess. Keep almonds within the 1.6-1.8% range.

Sources of potassium. Potassium fertilizer products including potassium sulfate (K_2SO_4), potassium chloride(KCl), potassium nitrate (KNO_3), potassium carbonate (K_2CO_3), potassium thiosulfate (K-T-S), and a few others can be used. Organic applications of potassium can be made through manure composts, green manures, guano, and wood ash. It is important to note that some potassium fertilizers may have unwanted chemicals/traits – chloride, sodium, alkalinity, and food safety concerns – which may have a negative impact on the orchard when applied in excess. The best bargain is KCl, followed by K_2SO_4, the water soluble products which include K-T-S, KNO_3, and K_2CO_3, and then the foliar sprays. Organic sources vary in price and potassium concentration, and thus are hard to compare to mineralized sources.

Strategies of potassium applications. In soils with lower exchange capacities, applications should match current strategies of nitrogen fertilization – multiple smaller applications made throughout the year. Potassium chloride, potassium sulfate, and compost/organic forms should be applied in the dormant period. In season applications of K-T-S, potassium nitrate, and potassium carbonate can be fertigated in-season. Growers on heavier soils can apply large "slugs" of potassium chloride or potassium sulfate in the dormant period and rely on in-season products to fine tune their fertilization program. Keep in mind the added benefits and risks with in-season applications. Potassium nitrate is about 13% nitrogen, and can be applied as a foliar spray or fertigated. Potassium carbonate can be used to help buffer acidic soils. K-T-S acidifies the soil, but commonly causes phyo-toxicity when applied incorrectly.